

FIRST AMENDMENT

TO

PUBLIC-PRIVATE TRANSPORTATION PARTNERSHIP AGREEMENT

TO DESIGN, BUILD, FINANCE AND MAINTAIN

**THE PENNDOT MAJOR BRIDGES PROJECT
"PACKAGE ONE" MAJOR BRIDGES P3 PROJECT**

by and between

**THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION,
an executive agency of the Commonwealth of Pennsylvania,
as the Department**

and

**Bridging Pennsylvania Developer I, LLC,
a Delaware limited liability company,
as the Development Entity**

Dated as of December 22, 2022

This FIRST AMENDMENT TO PUBLIC-PRIVATE TRANSPORTATION PARTNERSHIP AGREEMENT TO DESIGN, BUILD, FINANCE AND MAINTAIN "PACKAGE ONE" OF THE MAJOR BRIDGES P3 PROJECT (this "Amendment") is entered into and effective as of December 22, 2022 (the "Effective Date"), by and between the Pennsylvania Department of Transportation ("Department"), an executive agency of the Commonwealth of Pennsylvania, and Bridging Pennsylvania Developer I, LLC, a Delaware limited liability company ("Development Entity"). The Department and the Development Entity are referred to in this Amendment as the "Parties" or individually, as a "Party."

RECITALS

WHEREAS, the Parties have previously executed and delivered a certain Public-Private Transportation Partnership Agreement to Design, Build, Finance and Maintain "Package One" of the Major Bridges P3 Project (the "Existing Project Agreement"), dated November 29, 2022, with respect to the design, construction, financing, and routine and life cycle maintenance of the following Bridges (as defined in the Existing Project Agreement): I-81 Susquehanna, I-80 Nescopeck Creek Bridge, I-78 Lenhartsville Bridge, I-80 Over Lehigh River Bridge, I-80 Canoe Creek Bridge, and I-80 North Fork Bridge, and all associated assets, work products and activities, in each case, expressly required under the terms and conditions of the Existing Project Agreement (the "Project");

WHEREAS, the Parties acknowledge and agree that the Existing Project Agreement, by its terms, anticipates performance by the Development Entity of those obligations to effect Financial Close for the Project;

WHEREAS, the Parties seek to perform their respective obligations under Section 4.7.11 of the Existing Project Agreement in connection with Financial Close;

WHEREAS, the Parties seek to amend the Existing Project Agreement and enter into this Amendment also to set forth their understandings and agreements with respect to certain matters related to the Project;

NOW, THEREFORE, in consideration of the covenants contained herein and for other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, the Parties hereto agree that the Existing Project Agreement shall be amended as follows:

1. **Definitions.** All capitalized terms not otherwise defined in this Amendment, including in the recitals above, shall have the meanings ascribed to them by the Existing Project Agreement.
2. **Amendment of Exhibit 16 (Forms of P&P Bonds).** Exhibit 16 (Forms of P&P Bonds) of the Existing Project Agreement is hereby amended, restated, and replaced by Exhibit 16A (Forms of P&P Bonds) attached hereto.
3. **Amendment of Exhibit 17 (List of Initial Funding Agreements and Security Documents).** Pursuant to Section 4.7.11 (Amendment to Project Agreement Following Financial Close) of the Existing Project Agreement, Exhibit 17 (List of Initial Funding Agreements and Security Documents) to the Existing Project Agreement is hereby amended, restated, and replaced by Exhibit 17A (List of Initial Funding Agreements and Security Documents) attached hereto.
4. **Amendment of Section 20.2.1 (Restrictions on Equity Transfers and Change of Control).** The first sentence of Section 20.2.1 (Restrictions on Equity Transfers and Change of Control) of the Existing Project Agreement is hereby amended and restated as follows:

The Parties acknowledge and agree that no less than 51% of the equity ownership of the Development Entity shall be held directly or indirectly by the Equity Members as of Financial Close until two years following the Final Acceptance Date.

5. **Amendment of Definition of Base MAP.** The definition of "Base MAP" or "Base Maximum Availability Payment" set forth in Exhibit 1 (Acronyms, Abbreviations and Definitions) to the Existing Project Agreement is hereby amended and restated as follows: "means \$139,382,048.04".

6. **Attachment of Technical Provisions, as amended or amended and restated, as applicable.**

(a) The Existing Project Agreement is hereby amended to add Exhibit 22 (Technical Provisions) to this Amendment as Exhibit 22 (Technical Provisions) to the Existing Project Agreement.

(b) Section 1.2.1.3 (Contract Documents; Order of Precedence) of the Existing Project Agreement is hereby amended and restated as follows: "all exhibits (other than PA Exhibit 1 (*Acronyms, Abbreviations, and Definitions*) and PA Exhibit 22 (*Technical Provisions*))."

(c) The first sentence of the definition of "Technical Provisions" set forth in Exhibit 1 (Acronyms, Abbreviations and Definitions) to the Existing Project Agreement is hereby amended as follows: "means the "PennDOT Pathways Major Bridge P3 Initiative Technical Provisions" attached as PA Exhibit 22 (*Technical Provisions*), as such documents that comprise the Technical Provisions may individually or collectively be changed, added to or replaced pursuant to the Contract Documents."

7. **Amendment of Addressees for Notices and other Formal Communications.**

(a) Section 25.11.2 of the Existing Project Agreement is hereby amended and restated in its entirety as follows:

25.11.2 All Formal Communications to the Development Entity shall be delivered to the following address or as otherwise directed by the Development Entity's Authorized Representative:

Bridging Pennsylvania Developer I, LLC
125 West 55th Street
New York, NY 10019
Email: sarah.schick@macquarie.com
Attention: Project Manager / Director

With copy to:

Email: maccaplegalamericas@macquarie.com

(b) Section 25.11.3 of the Existing Project Agreement is hereby amended and restated in its entirety as follows:

25.11.3 All Formal Communications to the Department shall be marked as regarding the "Package One Major Bridges Project" and shall be delivered to the following address or as otherwise directed by the Department's Authorized Representative:

Pennsylvania Department of Transportation
Public-Private Transportation Partnerships Office, 6th Floor
400 North Street
Harrisburg, Pennsylvania 17120-0041
E-mail: ra-pdp3majorbridges@pa.gov
Attention: Director

with a copies to:

Pennsylvania Department of Transportation
Office of Chief Counsel
P.O. 8212
Harrisburg, Pennsylvania 17105-8212
Attention: Chief Counsel

Pennsylvania Department of Transportation
Highway Administration
400 North Street
Harrisburg, Pennsylvania 17120
Email: MBP3ProjectTeam@pa.gov
Attention: MB P3 Project Manager

For insurance policies, endorsements, only to:

Pennsylvania Department of Transportation
Public-Private Transportation Partnerships Office, 6th Floor
400 North Street
Harrisburg, Pennsylvania 17120-0041
Attention: Director

8. **Correction of Typographical Errors.** The following adjustments to the Existing Project Agreement are hereby effectuated for the purpose of correcting typographical errors contained therein:

(a) The reference to “Submittals Requirements Database” in Section 3.4.2.4 (Conditions to Commencement of Construction Work) of the Existing Project Agreement is hereby amended to “Submittal Packaging Requirements Database”.

(b) The reference to “Project Documents” in Section 15.1.2.2 (Request for Change Proposal) of the Existing Project Agreement is hereby amended to “Contract Documents”.

(c) The reference to “PA Section 14.3.4.3 (Compensation to the Development Entity due to Missed Availability Payment as a Result of Relief Event Delay of Final Completion)” in Section 19.4.4.1b (Department Options upon the Development Entity Notice) of the Existing Project Agreement is hereby amended to “PA Section 14.3.4.3 (Compensation to the Development Entity due to Missed Availability Payment as a Result of Relief Event Delay of Substantial Completion)”.

(d) The reference to “Final Completion Date” in Section 20.2.1 (Restrictions on Equity Transfers and Change of Control) of the Existing Project Agreement is hereby amended to “Final Acceptance Date”.

9. **Cooperation.** The Parties agree, at their sole cost and expense, to cooperate with the other Party in good faith, as needed, in performing the duties and activities set forth in this Amendment.

10. **Confirmation.** Except as may be amended and supplemented by this Amendment, the Existing Project Agreement and this Amendment shall be read, taken and construed as one and the same instrument, and all references to the “Project Agreement” set forth in the Existing Project Agreement shall henceforth be deemed to refer to the Existing Project Agreement as amended by this Amendment.

11. **Governing Law.** This Amendment shall be governed by and construed in accordance with the laws of the Commonwealth without regard to conflict of laws principles and the Development Entity consents to the jurisdiction of the applicable courts of the Commonwealth.


12. **Effective Date.** This Amendment shall become effective as of the date of the last Commonwealth signature.

13. **Counterparts.** This Amendment may be executed in any number of counterparts, each of which when so executed and delivered shall be an original; but such counterparts shall together constitute but one and the same instrument.

[Signatures begin on succeeding page]

IN WITNESS WHEREOF, the Parties, intending to be legally bound and have executed this Amendment as of the Effective Date.

BRIDGING PENNSYLVANIA DEVELOPER I, LLC

By:  12/13/22

Name: Sarah Schick

Title: Authorized Representative

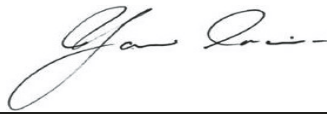
By:  12/13/22

Name: Lucas Lahitou

Title: Authorized Person


[Department signature appears on succeeding page]


COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

By:  12/13/22
Secretary of Transportation

APPROVED AS TO FORM AND LEGALITY

By:  12/13/22
Department Agency Counsel

By:  2022.12.15 15:39:58 -05'00'
Office of General Counsel

By:  Digitally signed by David E. Stover,
Senior Deputy Attorney General
Date: 2022.12.18 13:03:36 -05'00'
Office of Attorney General

Encumbrance No. _____

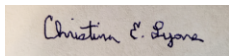
By:  Digitally signed by Christina E. Lyons
Date: 2022.12.19 13:30:38 -05'00'
Comptroller

Exhibit 16A

FORMS OF P&P BONDS

FORM OF PERFORMANCE BOND

(Bond No. _____)

KNOW ALL BY THESE PRESENTS, That we, [_____] *[Lead Construction Contractor]* of [_____] *[NTD: Principal's full address]* as PRINCIPAL, and [_____] *[NTD: surety's full legal name]*, as SURETY *[NTD: if co-sureties, add in additional surety information]*, are held and firmly bound unto [_____] *[Development Entity]*, as OBLIGEE in the full and just sum of \$[_____] *[NTD: value as determined under PA Section Error! Reference source not found. (P&P Bonds)]*, lawful money of the United States of America, to be paid to the OBLIGEE, or its assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents. As used herein, "OBLIGEE" shall include the additional obligee(s) identified in the Dual Obligee Rider(s) to this Bond.

Sealed with our respective seals and dated this [_____] day of [_____] , A.D. 202[_____].

Whereas, the OBLIGEE has undertaken to contract with the Commonwealth of Pennsylvania, acting by and through the Secretary of Transportation, for the Pennsylvania Department of Transportation, an agency of the Commonwealth of Pennsylvania ("PennDOT"), to perform work necessary to design, construct, finance, and maintain the [_____] *[NTD: name of Project]* (the "Project"), part of the PennDOT Major Bridges Project, pursuant to that certain Public-Private Transportation Partnership Agreement to Design, Build, Finance And Maintain the PennDOT Major Bridges Project "Package One" Major Bridges P3 Project (the "Project Agreement"); and

Whereas, the above bounden PRINCIPAL has entered into that certain Design-Build Contract dated November 29, 2022 with the OBLIGEE (as amended, the "Contract"), to perform the DB Work (as defined in the Contract) with respect to the Project in accordance with the requirements specified in the Project Agreement; and

WHEREAS, it was one of the conditions of the Project Agreement and the Contract that these presents should be executed, to become binding upon the date the said Project Agreement is approved for the office of Budget, by the Comptroller.

NOW, THEREFORE, the conditions of this obligation is such that if the above bounden PRINCIPAL, as contractor, shall in all respects comply with and faithfully perform the terms and conditions of said Contract, and its obligations thereunder, including the plans, specifications, requirements, terms, and conditions therein referred to and made a part thereof, and such alterations as may be made as therein provided for, and shall well and truly, and in a manner as set forth in such Contract, complete the DB Work, and shall save harmless the OBLIGEE from any expense incurred through the failure of said contractor to complete the DB Work as required thereunder, or for any damages as specified therein of said PRINCIPAL or its servants, and shall save and keep harmless the OBLIGEE against and from all losses to it from any cause whatsoever, including indemnities, liquidated damages, and termination compensation, in each case, in the manner of performing the DB Work under the Contract (but for the avoidance of doubt, not to exceed the above penal sum); then this obligation to be void or otherwise to be and remain in full force and virtue.

Whenever the PRINCIPAL shall be declared to be in default under the Contract and is in default under the Contract, then the SURETY [or CO-SURETIES], for value received, hereby stipulate[s] and agree[s] that reasonably promptly, in no case to exceed 45 days after having received written notice of default from the OBLIGEE, SURETY [or CO-SURETIES] will notify the OBLIGEE of its intention to:

- (1) remedy the applicable default;

- (2) waive its rights to either (i) perform and complete, or (ii) to arrange for completion, or (iii) obtain a new contract and upon such election, then promptly remit payment to the OBLIGEE of the full penal sum set forth herein in complete discharge and exoneration of this bond and of all the liabilities of the SURETY [or CO-SURETIES] relating to this bond;
- (3) undertake to perform and complete the DB Work (and satisfy any other applicable payment obligations) pursuant to the Contract either through (i) itself and its own forces or if appropriate, the PRINCIPAL (provided, that the SURETY may not select the PRINCIPAL or any affiliate of the PRINCIPAL to complete any portion of the DB Work for and on behalf of the SURETY without all OBLIGEEs' express written consent, each given in its sole discretion), or (ii) otherwise remedy the non-performance of the DB Work under the Contract by obtaining bids or negotiating proposals from qualified contractors approved by the OBLIGEE (and PennDOT where required under the Project Agreement) for a contract (meeting the terms, conditions and requirements of the Contract) for performance and completion of the DB Work in accordance with the terms and subject to the conditions, and covenants thereof; or
- (4) deny liability in whole or in part and notify the OBLIGEE, citing reasons therefor.

If the SURETY [or CO-SURETIES] do[es] not proceed as above with reasonable promptness (not to exceed such 45 day period), then SURETY [or CO-SURETIES] shall be in default on this bond seven days after receipt of an additional written notice from the OBLIGEE to the SURETY demanding that the SURETY [or CO-SURETIES] perform its obligations under this bond, and the OBLIGEE shall be entitled to enforce any remedy available to the OBLIGEE at law or in equity.

It is further provided that any alteration which may be made in the terms of the Contract or in the DB Work to be done under the Contract or the giving by the OBLIGEE of any extension of time for the performance of the Contract or any other forbearance on the part of either of the OBLIGEE or the PRINCIPAL to the other shall not in any way release the PRINCIPAL and the SURETY [or CO-SURETIES] or either or any of them, their heirs, executors, administrators, successors or assigns, from their liability hereunder, notice to the SURETY [or CO-SURETIES] of any such alteration, extension, or forbearance being hereby waived.

The aggregate liability of the SURETY [OR CO-SURETIES] under this Bond, to the OBLIGEE, is limited to the penal sum of the Bond.

[/NTD: Use in case of multiple or co-sureties] The CO-SURETIES agree to empower a single representative with authority to act on behalf of all of the CO-SURETIES with respect to this bond, so that the OBLIGEE, CO-OBLIGEE[S], and claimants will have no obligation to deal with multiple sureties hereunder. All correspondence from the OBLIGEE, or claimants to the CO-SURETIES and all claims under this bond shall be sent to such designated representative. The designated representative may be changed only by delivery of written notice (by personal delivery or by certified mail, return receipt requested) to the OBLIGEE designating a single new representative, signed by all of the CO-SURETIES. The initial representative shall be [____], and correspondence to be directed at the following address(es): [____].]

This bond shall be governed by, and construed under, the laws of the Commonwealth of Pennsylvania. Any dispute brought by the SURETY [(or CO-SURETIES)], the PRINCIPAL, or the OBLIGEE, directly relating to the rights and obligations of any of the foregoing persons or entity under this bond shall be filed, heard, and decided in the Commonwealth courts, which shall have exclusive jurisdiction and venue.

[remainder of page intentionally left blank]

IN WITNESS WHEREOF, the said PRINCIPAL and SURETY have duly executed this Bond under seal the day and year first above written.

Principal: [_____] **/NTD: Principal**

By: _____

Name: _____

Its: _____ (Seal)

Obligee: [_____] **/NTD: the Development Entity**

By: _____

Name: _____

Its: _____ (Seal)]

Surety: [_____] **/NTD: Surety**

By: _____

Name: _____

Its: _____ * (Seal)

[Co-Surety: [_____] **/NTD: Co-Surety/ies**

By: _____

Name: _____

Its: _____ * (Seal)

Attorney-in-Fact Certification: The undersigned attorney-in-fact by executing this Performance Bond certifies that he or she is licensed with the company named as surety for this Performance Bond and that to the best of his or her knowledge the said Surety [and Co-Surety/ies] is[/are each] licensed with the Pennsylvania Insurance Department.

PERFORMANCE BOND DUAL OBLIGEE RIDER (Concurrent Execution)

This Rider is executed concurrently with and shall be attached to and form a part of Performance Bond No. _____.

WHEREAS, on or about the ___ day of 2022, _____ **[Development Entity]** ("Primary Oblige"), entered into a written agreement with _____ the Pennsylvania Department of Transportation, an agency of the Commonwealth of Pennsylvania, for the design, construction, financing, and maintenance of the _____ **[Name of Project]** (the "Project Agreement") and

WHEREAS, on or about the ___ day of 2022, _____ **[Lead Construction Contractor]** ("Principal"), entered into a written agreement with the Primary Oblige for the design and construction of the Project (the "Contract") and

WHEREAS, the Primary Oblige is required by the Project Agreement to provide a performance bond naming the Pennsylvania Department of Transportation, an agency of the Commonwealth of Pennsylvania and _____ as Collateral Agent to the Lenders as additional obligee under the performance bond; and

WHEREAS, Principal is required by the Contract to provide such performance bond; and

WHEREAS, Principal and _____ ("Surety") have agreed to execute and deliver this Dual Oblige Rider in conjunction with Performance Bond No. _____ (the "Performance Bond").

NOW, THEREFORE, the undersigned hereby agree to and stipulate that the Pennsylvania Department of Transportation, an agency of the Commonwealth of Pennsylvania and _____ as Collateral Agent to the Lenders are added to said bond as named obligees (hereinafter referred to as Additional Obligees"), subject to the conditions set forth below:

1. All of the terms, conditions and provisions of the Performance Bond are hereby incorporated herein by this reference as if fully set forth herein. Additional Obligees shall have only such rights under the Performance Bond that Primary Oblige would have.
2. All defined terms set forth in the Performance Bond shall have the same meanings herein.
3. Nothing herein shall alter or affect any of the terms, conditions and other provisions of the Performance Bond, including especially but without limitation, the aggregate liability of Surety as described in the Performance Bond, to any or all of the Obligees (Primary Obligees and Additional Obligees), which is limited to the penal sum of the Performance Bond.
4. Except as expressly set forth in the Project Agreement, no additional obligees may be added to this Performance Bond without the express, prior, written consent of all obligees.

Except as herein modified, the Performance Bond shall be and remains in full force and effect.

[Signatures continued on following page]

IN WITNESS WHEREOF, the said PRINCIPAL, OBLIGEE, CO-OBLIGEEES and SURETY have duly executed this Bond under seal the day and year first above written.

Principal: _____ **[Lead Construction Contractor]**

By: _____

Name: _____

Its: _____ (Seal)

Obligee: [_____] **/Development Entity/**

By: _____

Name: _____

Its: _____ (Seal)]

Co-Obligee: Pennsylvania Department of Transportation, an agency of the Commonwealth of Pennsylvania

By: _____

Name: _____

Its: _____ (Seal)

Co-Obligee: [_____] **/NTD: Collateral Agent to the Lender(s)/**

By: _____

Name: _____

Its: _____ (Seal)

[Co-Surety: [_____] **/NTD: Co-Surety/ies/**

By: _____

Name: _____

Its: _____ * (Seal)

Attorney-in-Fact Certification: The undersigned attorney-in-fact by executing this Performance Bond Dual Obligor Rider certifies that he or she is licensed with the company named as Surety for this Performance Bond and that to the best of his or her knowledge the said Surety is licensed with the Pennsylvania Insurance Department.

FORM OF PAYMENT BOND

(Bond No. _____)

KNOW ALL BY THESE PRESENTS, That we, [_____] *[Lead Construction Contractor]* of [_____] *[NTD: Principal's full address]* as PRINCIPAL, and [_____] *[NTD: surety's full legal name]*, as SURETY *[NTD: if co-sureties, add in additional surety information]*, are held and firmly bound unto [_____] *[Development Entity]*, as OBLIGEE in the full and just sum of \$[_____] *[NTD: value as determined under PA Section Error! Reference source not found. (P&P B onds)]*, lawful money of the United States of America, to be paid to the OBLIGEE, or its assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents. As used herein, "OBLIGEE" shall include the additional obligee(s) identified in the Dual Obligee Rider(s) to this Bond.

Sealed with our respective seals and dated this [_____] day of [_____] , A.D. 202[_____].

Whereas, the OBLIGEE has undertaken to contract with the Commonwealth of Pennsylvania, acting by and through the Secretary of Transportation, for the Pennsylvania Department of Transportation, an agency of the Commonwealth of Pennsylvania, to perform work necessary to design, construct, finance, and maintain the [_____] *[NTD: name of Project] (the "Project")*, part of the PennDOT Major Bridges Project, pursuant to that certain Public-Private Transportation Partnership Agreement to Design, Build, Finance And Maintain the PennDOT Major Bridges Project "Package One" Major Bridges P3 Project (the "Project Agreement"); and

Whereas, the above bounden PRINCIPAL entered into that certain Design-Build Contract dated November 29, 2022 with the OBLIGEE (as amended, the "Contract"), the DB Work (as defined in the Contract) with respect to the Project in accordance with the requirements specified in the Project Agreement; and

WHEREAS, it was one of the conditions of the Project Agreement and the Contract that these presents should be executed, to become binding upon the date the said Project Agreement is approved for the office of Budget, by the Comptroller.

NOW, THEREFORE, the conditions of this obligation is such that if the above bounden PRINCIPAL shall and will promptly or cause to be paid in full all sums of money which may be due by contractor, for all materials furnished or labor supplied or performed in the prosecution of PRINCIPAL'S obligations under the Contract, whether or not the said material or labor entered into and became component parts of the DB Work or improvement contemplated, and for rental of the equipment used and services rendered by public utilities in, or in connection with, the prosecution of such DB Work, then this obligation to be void, otherwise to remain in full force and effect.

The PRINCIPAL and SURETY hereby, jointly and severally, agree with the OBLIGEE herein that any individual, firm, partnership, association or corporation, which has performed labor or furnished material in the prosecution of the DB Work as provided, and any public utility which has rendered services in, or in connection with, the prosecution of such DB Work, and which has not been paid in full therefor, may sue *assumpsit* on this Payment Bond in its own name and may prosecute the same to final judgement for such sum or sums as may be justly due to it, and have execution thereon. Provided, however, that the OBLIGEE shall not be liable for the payment of any costs or expenses of such suit.

Recovery by any individual, firm, partnership, association or corporation hereunder shall be subject to the provisions of the "Public Works Contractors' Bond Law of 1967", Act No. 385, approved December 20, 1967, P.L. 869, which Act, as amended from time to time, shall be incorporated herein and made a part hereof, as fully and completely as though its provisions were fully and at length herein recited.

It is further provided that any alteration which may be made in the terms of the Contract or in the DB Work to be done or materials to be furnished or labor to be supplied or performed under it or the giving by the OBLIGEE of any extension of time for the performance of the Contract or any other forbearance on the part of either the OBLIGEE or the PRINCIPAL to the other shall not in any way release the PRINCIPAL and the SURETY [or co-SURETIES] or either or any of them, their heirs, executors, administrators, successors or assigns, from their liability hereunder, notice to the SURETY [or CO-SURETIES] of any such alteration, extension, or forbearance being hereby waived.

The aggregate liability of the SURETY under the Bond, to any or all of the OBLIGEEES, is limited to the penal sum of the Bond.

[/NTD: Use in case of multiple or co-sureties] The CO-SURETIES agree to empower a single representative with authority to act on behalf of all of the CO-SURETIES with respect to this bond, so that the OBLIGEE, and claimants will have no obligation to deal with multiple sureties hereunder. All correspondence from the OBLIGEE, or claimants to the CO-SURETIES and all claims under this bond shall be sent to such designated representative. The designated representative may be changed only by delivery of written notice (by personal delivery or by certified mail, return receipt requested) to the OBLIGEE designating a single new representative, signed by all of the CO-SURETIES. The initial representative shall be [____], and correspondence to be directed at the following address(es): [____].]

This bond shall be governed by, and construed under, the laws of the Commonwealth of Pennsylvania. Any dispute brought by the SURETY [(or CO-SURETIES)], the PRINCIPAL or, the OBLIGEE, directly relating to the rights and obligations of any of the foregoing persons or entity under this bond shall be filed, heard, and decided in the Commonwealth courts, which shall have exclusive jurisdiction and venue.

[remainder of page intentionally blank]

IN WITNESS WHEREOF, the said PRINCIPAL and SURETY have duly executed this Bond under seal the day and year first above written.

Principal: [_____] **/NTD: Lead Construction Contractor**

By: _____

Name: _____

Its: _____ (Seal)

Obligee: [_____] **/NTD: The Development Entity**

By: _____

Name: _____

Its: _____ (Seal)]

Surety: [_____] **/NTD: Surety**

By: _____

Name: _____

Its: _____ * (Seal)

[Co-Surety: [_____] **/NTD: Co-Surety/ies**

By: _____

Name: _____

Its: _____ * (Seal)

Attorney-in-Fact Certification: *The undersigned attorney-in-fact by executing this Payment Bond certifies that he or she is licensed with the company named as Surety for this Payment Bond and that to the best of his or her knowledge the said Surety is licensed with the Pennsylvania Insurance Department.

PAYMENT BOND DUAL OBLIGEE RIDER (Concurrent Execution)

This Rider is executed concurrently with and shall be attached to and form a part of Performance Bond No. _____.

WHEREAS, on or about the ___ day of 2022, _____ **[Development Entity]** ("Primary Obligee"), entered into a written agreement with _____ the Pennsylvania Department of Transportation, an agency of the Commonwealth of Pennsylvania, for the design, construction, financing, and maintenance of the _____ **[Name of Project]** (the "Project Agreement") and

WHEREAS, on or about the ___ day of 2022, _____ **[Lead Construction Contractor]** ("Principal"), entered into a written agreement with the Primary Obligee for the design and construction of the Project (the "Contract") and

WHEREAS, the Primary obligee is required by the Project Agreement to provide a performance bond naming the Pennsylvania Department of Transportation, an agency of the Commonwealth of Pennsylvania and _____ as Collateral Agent to the Lenders as additional obligee under the performance bond; and

WHEREAS, Principal is required by the Contract to provide such performance bond; and

WHEREAS, Principal and _____ ("Surety") have agreed to execute and deliver this Dual Obligee Rider in conjunction with Payment Bond No. _____ (the "Payment Bond").

NOW, THEREFORE, the undersigned hereby agree to and stipulate that the Pennsylvania Department of Transportation, an agency of the Commonwealth of Pennsylvania and _____ as Collateral Agent to the Lenders are added to said bond as named obligees (hereinafter referred to as Additional Obligees"), subject to the conditions set forth below:

1. All of the terms, conditions and provisions of the Payment Bond are hereby incorporated herein by this reference as if fully set forth herein. Additional Obligees shall have only such rights under the Payment Bond that Primary Obligee would have.
2. All defined terms set forth in the Payment Bond shall have the same meanings herein.
3. Nothing herein shall alter or affect any of the terms, conditions and other provisions of the Payment Bond, including especially but without limitation, the aggregate liability of Surety as described in the Payment Bond, to any or all of the Obligees (Primary Obligees and Additional Obligees), which is limited to the penal sum of the Payment Bond.
4. Except as expressly set forth in the Project Agreement, no additional obligees may be added to this Payment Bond without the express, prior, written consent of all obligees.

Except as herein modified, the Payment Bond shall be and remains in full force and effect.

[Signatures continued on following page]

IN WITNESS WHEREOF, the said PRINCIPAL, OBLIGEE, CO-OBLIGEEES and SURETY have duly executed this Bond under seal the day and year first above written.

Principal: _____ **[Lead Construction Contractor]**

By: _____

Name: _____

Its: _____ (Seal)

Obligee: [_____] **/Development Entity/**

By: _____

Name: _____

Its: _____ (Seal)]

Co-Obligee: Pennsylvania Department of Transportation, an agency of the Commonwealth of Pennsylvania

By: _____

Name: _____

Its: _____ (Seal)

Co-Obligee: [_____] **/NTD: Collateral Agent to the Lender(s)/**

By: _____

Name: _____

Its: _____ (Seal)

[Co-Surety: [_____] **/NTD: Co-Surety/ies/**

By: _____

Name: _____

Its: _____ * (Seal)

Attorney-in-Fact Certification:

* The undersigned attorney-in-fact by executing this Payment Bond Dual Obligor Rider certifies that he or she is licensed with the company named as Surety for this Payment Bond and that to the best of his or her knowledge the said Surety is licensed with the Pennsylvania Insurance Department.

Exhibit 17A

LIST OF INITIAL FUNDING AGREEMENTS AND SECURITY DOCUMENTS

1. Loan Agreement, dated as of December 1, 2022, between the Pennsylvania Economic Development Financing Authority, as issuer, and the Development Entity, as borrower;
2. Deposit Account Control Agreement, dated as of December 22, 2022, by and among the Development Entity, US Bank Trust Company, National Association, as secured party, and Wells Fargo Bank, National Association, as account bank;
3. Collateral Agency Agreement, dated as of December 22, 2022, by and among the Development Entity, U.S. Bank Trust Company, National Association, as the collateral agent and the trustee, and U.S. Bank, National Association, as the securities intermediary;
4. Trust Indenture, dated as of December 1, 2022 (the “Indenture”), between the Pennsylvania Economic Development Financing Authority, as issuer, and U.S. Bank Trust Company, National Association, as trustee;
5. Direct Agreement, dated as of December 22, 2022, among the Development Entity, PennDOT, and U.S. Bank Trust Company, National Association, as the collateral agent;
6. Lead Construction Contractor Lenders’ Direct Agreement, dated as of December 22, 2022, by and among Bridging Pennsylvania Constructors, an unincorporated joint venture of Shikun & Binui – America Inc. and FCC Construction, Inc., the Development Entity, and U.S. Bank Trust Company, National Association, as collateral agent;
7. The Series 2022 Bonds (as defined in the Indenture), the form of which is attached as Exhibit A to the Indenture;
8. Security Agreement, dated as of December 22, 2022 by and between the Development Entity, as borrower and grantor, and U.S. Bank Trust Company, National Association, as the collateral agent;
9. Financing statements (UCC-1s), filed or to be filed on behalf of the following debtors in favor of U.S. Bank Trust Company, National Association, as the collateral agent:
 - a. the Development Entity;
 - b. Bridging Pennsylvania Holdco LLC; and
 - c. S&B USA Concessions – Pathways LP;
10. Equity Contribution Agreement, dated as of December 22, 2022, by and among the Development Entity, as borrower and grantor, and U.S. Bank Trust Company, National Association, as the collateral agent, Bridging Pennsylvania Holdco LLC, and S&B USA Concessions – Pathways LP;
11. Account Control Agreement, dated as of December 22, 2022, by and among Bridging Pennsylvania Constructors, an unincorporated joint venture of Shikun & Binui – America Inc. and FCC Construction, Inc., as pledgor, the Company, HSBC Bank USA, National Association, as account bank, and U.S. Bank Trust Company, National Association, as collateral agent;

12. Pledge Agreement, dated as of December 22, 2022 by and between Bridging Pennsylvania Holdco LLC, as pledgor, and U.S. Bank Trust Company, National Association, as collateral agent;
13. Pledge Agreement, dated as of December 22, 2022 by and between S&B USA Concessions – Pathways LP, as pledgor, and U.S. Bank Trust Company, National Association, as collateral agent;
14. Amended and Restated DB Work Guarantee, dated on or around December 22, 2022, by Shikun & Binui Ltd., for the benefit of the Development Entity; and
15. Amended and Restated DB Work Guarantee, dated on or around December 22, 2022, by FCC Construcción, S.A., for the benefit of the Development Entity.

Exhibit 22

TECHNICAL PROVISIONS

[see separate attachment]

PennDOT Pathways Major Bridge P3 Initiative

Technical Provisions

**Execution Version
November 29, 2022**



Table of Contents

1	Technical Provisions Introduction	1-1
1.1	Technical Provisions.....	1-1
1.2	Order of Precedence, Modifications, and Interpretations	1-1
1.3	<i>Section 1, Technical Provisions Introduction Submittal Requirements.....</i>	<i>1-3</i>
2	General	2-1
2.1	General Requirements	2-1
2.2	Standard Special Provisions	2-1
2.3	Bridge-Specific Requirements	2-1
2.4	Coordination with Governmental Entities and Third Parties.....	2-1
2.5	Related Transportation Facilities.....	2-2
2.6	Federal Highway Administration Coordination.....	2-2
2.7	Permitted Design Variances and Permitted Design Exceptions	2-2
2.8	Design Variances and Design Exceptions	2-2
2.9	District Standard Special Provisions	2-3
2.10	Quality of the Work.....	2-4
2.11	Independent Quality Firm	2-4
2.11.1	Independent Quality Firm Construction Material Inspection and Testing	2-6
2.11.2	Independent Quality Firm Supply Source and Material Quality Inspection and Testing.....	2-7
2.11.3	Independent Quality Assurance and Quality Acceptance Plan	2-8
2.12	Noncompliance Events	2-10
2.12.1	Noncompliance Event Notice	2-10
2.12.2	Notification of Noncompliance Events by the Department	2-11
2.12.3	Following Notification of Noncompliance Events	2-11
2.12.4	Implementation and Notification of NCE Cure	2-11
2.12.5	Corrective Action Plan	2-12
2.13	[Reserved].....	2-12
2.14	Progression Management Software	2-12
2.15	Highway Occupancy Permits.....	2-13
2.16	Existing Right of Way Exhibit.....	2-13
2.17	Resiliency.....	2-13
2.17.1	Resiliency Scope Items	2-13
2.17.2	Resiliency Submittals	2-14
2.18	<i>Section 2, General Submittal Requirements</i>	<i>2-16</i>
3	Work Management and Administration	3-1
3.1	General Requirements	3-1
3.2	Project Facilities	3-1
3.2.1	Project Office	3-1
3.2.2	Satellite Offices.....	3-2
3.3	Project Management Plan.....	3-2
3.3.1	Component Plans as a Condition Prior to NTP2.....	3-3
3.3.2	Component Plans as a Condition Prior to NTP3.....	3-4
3.3.3	Project Management Plan and Component Plan Update	3-5
3.3.4	Management and Staffing Plan	3-5
3.3.5	Document and Data Management Plan.....	3-19
3.3.6	Equal Employment Opportunity Plan	3-21
3.3.7	Risk Management Plan	3-23
3.3.8	Department-Development Entity Communication Plan	3-23

3.3.9	Quality Management Plan.....	3-24
3.3.10	Affected Third Party Plan	3-34
3.3.11	Safety and Security Plan	3-35
3.3.12	Emergency Management and Disaster Recovery Plan	3-36
3.3.13	Public Information and Communications Plan	3-37
3.3.14	Comprehensive Environmental Protection Plan	3-37
3.3.15	Environmental Protection Training Plan.....	3-38
3.3.16	Waste Management Plan.....	3-38
3.3.17	Noise Study Work Plan.....	3-38
3.3.18	Utility Work Plan	3-38
3.3.19	Emergency Response Utility Plan.....	3-38
3.3.20	Right of Way Acquisition Report	3-38
3.3.21	Transportation Management Plan	3-38
3.3.22	Design and Construction Closeout Plan.....	3-38
3.3.23	Maintenance Management Plan	3-39
3.3.24	Handback Work Plan	3-39
3.4	Project Schedules.....	3-39
3.4.1	General Schedule Requirements	3-39
3.4.2	Schedule Submittal and Report Requirements.....	3-41
3.4.3	Baseline Project Schedule	3-42
3.4.4	Baseline Schedule of Values	3-44
3.4.5	Revised Baseline Project Schedule	3-44
3.4.6	Revised Baseline Schedule of Values	3-45
3.4.7	Project Schedule Update	3-45
3.4.8	Schedule of Values Update	3-46
3.4.9	Monthly Schedule Progress Meetings.....	3-46
3.4.10	Recovery Schedule.....	3-46
3.4.11	Record D&C Work Schedule.....	3-47
3.4.12	Time Impact Analysis	3-47
3.5	Submittal Review and Oversight.....	3-48
3.5.1	Submittal Packaging Plan	3-48
3.5.2	Design Documents	3-50
3.5.3	Construction Documents.....	3-56
3.5.4	Department and Governmental Entity Review Processes.....	3-57
3.6	Section 3, Work Management and Administration Submittal Requirements	3-57
4	Public Information and Communication	4-1
4.1	General Requirements	4-1
4.2	Project Standards	4-1
4.3	Bridge-Specific Requirements	4-1
4.4	Personnel	4-1
4.5	Public Information and Communications Plan	4-1
4.5.1	Stakeholders.....	4-3
4.5.2	Outreach and Information	4-4
4.6	Environmental Coordination.....	4-6
4.7	Public Information Office	4-6
4.8	Section 4, Public Information and Communication Submittal Requirements.....	4-7
5	Environmental	5-1
5.1	General Requirements	5-1
5.2	Environmental Standards	5-1
5.3	Bridge-Specific Requirements	5-1
5.4	[Reserved].....	5-1

5.5	Environmental Approvals.....	5-1
5.6	Personnel	5-2
5.7	Software.....	5-2
5.8	Comprehensive Environmental Protection Plan	5-2
5.8.1	Environmental Commitment and Mitigation Tracking System	5-4
5.8.2	Waste Management Plan.....	5-4
5.8.3	Well Impacts and Requirements	5-7
5.8.4	National Flood Insurance Program Compliance	5-7
5.8.5	Environmental Protection Training Plan.....	5-8
5.8.6	Avoidance and Minimization.....	5-9
5.8.7	Environmental Authorizations and Revisions.....	5-10
5.9	Department Actions and Responsibilities.....	5-24
5.9.1	Department Review and Approval of Development Entity Submissions	5-24
5.9.2	Permits and Approvals	5-25
5.10	Section 5, Environmental Submittal Requirements	5-26
6	Noise Analysis and Mitigation	6-1
6.1	General Requirements	6-1
6.2	Project Standards	6-1
6.3	Bridge-Specific Requirements	6-1
6.4	[Reserved].....	6-1
6.5	Design and Analysis Software.....	6-1
6.6	Noise Analysis	6-2
6.6.1	Noise Study Work Plan.....	6-2
6.6.2	Construction Requirements.....	6-4
6.7	Section 6, Noise Analysis and Mitigation Submittal Requirements.....	6-4
7	Utilities.....	7-1
7.1	Utility Clearances	7-1
7.2	Project Standards	7-1
7.3	Bridge-Specific Requirements	7-1
7.4	[Reserved].....	7-1
7.5	Utility Contacts	7-1
7.6	Utility Relocation Management System.....	7-1
7.7	Coordination	7-2
7.7.1	Verify Utility Locations	7-2
7.7.2	Subsurface Utility Engineering.....	7-2
7.7.3	Utility Conflicts.....	7-2
7.7.4	Utility Agreements.....	7-3
7.8	[Reserved].....	7-3
7.9	Utility Property Interest.....	7-3
7.10	Utility Work Plan.....	7-3
7.10.1	Emergency Response Utility Plan.....	7-4
7.10.2	Utility Impact Analysis	7-4
7.10.3	Preliminary Utility Status Report.....	7-5
7.11	Authorizations and Notices.....	7-5
7.11.1	Authorization to Start Engineering	7-5
7.11.2	Authorization to Proceed with Work	7-5
7.11.3	Notice to Start Work	7-5
7.12	Construction Requirements.....	7-6
7.12.1	Care During Construction	7-6
7.12.2	Access to Utilities	7-6
7.12.3	Inspection.....	7-6

7.12.4	Survey Control	7-6
7.12.5	Permits	7-7
7.13	Meetings and Documentation	7-7
7.14	Section 7, Utilities Submittal Requirements	7-7
8	Right of Way	8-1
8.1	General Requirements	8-1
8.2	Project Standards	8-1
8.3	Bridge-Specific Requirements	8-1
8.4	Notice	8-1
8.5	Right of Way Acquisition Plans.....	8-1
8.5.1	Preliminary Right of Way Acquisition Plans.....	8-1
8.5.2	Final Right of Way Acquisition Plans	8-2
8.6	Condemnation Support.....	8-2
8.7	Railroad Property Acquisitions.....	8-2
8.8	Utility Property Acquisitions	8-3
8.9	Agricultural Lands Condemnation Approval Board	8-3
8.10	Final Right of Way Clearance Certificate	8-3
8.11	Right of Way Acquisition Report.....	8-3
8.12	Section 8, Right of Way Submittal Requirements.....	8-3
9	Geotechnical and Pavement.....	9-1
9.1	General Requirements	9-1
9.2	Project Standards	9-1
9.3	Bridge-Specific Requirements	9-1
9.4	[Reserved].....	9-1
9.5	Existing Data	9-1
9.6	Design and Analysis Software.....	9-1
9.7	Geotechnical Investigations, Testing, and Reporting	9-1
9.7.1	Supplemental Subsurface Exploration Planning Submission and Laboratory Testing Plan	9-2
9.7.2	Foundation Design Parameters Assumptions and Model Assumptions Report.....	9-5
9.7.3	Geotechnical Analysis and Design	9-5
9.7.4	Final Geotechnical Engineering Report	9-7
9.7.5	Final Structure Foundation Report with Foundation Submission Letter	9-8
9.8	Impacts to Adjacent Properties and Infrastructure.....	9-10
9.8.1	Blasting and Vibration Monitoring Plan	9-10
9.8.2	Vibration and Movement Monitoring Plan	9-11
9.8.3	Instrumentation Plan	9-12
9.9	Pavement Design.....	9-15
9.9.1	Pavement Materials.....	9-16
9.9.2	Pavement Widening	9-17
9.9.3	Preservation and Rehabilitation	9-17
9.9.4	Reinstatement of Open Cuts	9-17
9.10	Construction Requirements.....	9-17
9.10.1	Foundations	9-17
9.10.2	Pavement.....	9-18
9.10.3	Instrumentation	9-18
9.11	Section 9, Geotechnical and Pavement Submittal Requirements	9-27
10	Land Surveying.....	10-1
10.1	General Requirements	10-1
10.2	Project Standards	10-1

10.3	Bridge-Specific Requirements	10-1
10.4	Construction Surveying	10-1
10.5	Survey Control.....	10-1
10.5.1	Units.....	10-1
10.5.2	Horizontal Accuracy	10-1
10.5.3	Vertical Accuracy	10-2
10.6	Unmanned Aircraft Systems.....	10-2
10.7	Survey Records and Reports	10-2
10.7.1	Baseline Stakeout.....	10-3
10.7.2	Right of Way Monumentation and Benchmarks.....	10-3
10.8	Section 10, Land Surveying Submittal Requirements	10-4
11	Roadway and Grading	11-1
11.1	General Requirements	11-1
11.2	Project Standards	11-1
11.3	Bridge-Specific Requirements	11-1
11.4	Design and Analysis Software.....	11-1
11.5	Roadway Design Requirements.....	11-1
11.5.1	Design Criteria.....	11-2
11.5.2	Design Exceptions.....	11-2
11.5.3	[Reserved].....	11-2
11.5.4	Intersecting Roadways and Driveways	11-2
11.5.5	Roadside Appurtenances and Safety.....	11-3
11.5.6	Grading	11-3
11.5.7	Access Control Fencing	11-4
11.5.8	Transitions to Adjoining Roadway	11-4
11.5.9	Approach Work to Bridges	11-4
11.5.10	Disposal of Existing Highway Structures and Material within the Project.....	11-4
11.6	Section 11, Roadway and Grading Submittal Requirements	11-5
12	Bicycle and Pedestrian Facilities	12-1
12.1	General Requirements	12-1
12.2	Project Standards	12-1
12.3	Bridge-Specific Requirements	12-1
12.4	[Reserved].....	12-1
12.5	Bicycle and Pedestrian Design Requirements.....	12-1
12.6	Construction Requirements.....	12-3
12.7	Section 12, Bicycle and Pedestrian Facilities Submittal Requirements	12-3
13	Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control	13-1
13.1	General Requirements	13-1
13.2	Project Standards	13-1
13.3	Bridge-Specific Requirements	13-1
13.4	[Reserved].....	13-1
13.5	Design and Analysis Software.....	13-1
13.6	Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control Design Requirements	13-2
13.6.1	Data Collection	13-2
13.6.2	Coordination with Other Agencies.....	13-3
13.6.3	Design Criteria.....	13-3
13.6.4	Hydrologic Analysis	13-4
13.6.5	Hydraulic Analysis.....	13-4

13.6.6	Bridge and Culvert Waterway Design	13-5
13.6.7	Bridge Deck Drainage.....	13-5
13.6.8	Roadway Drainage.....	13-6
13.6.9	Inspection and Use of Drainage System	13-6
13.6.10	Post-Construction Stormwater Management	13-6
13.6.11	Erosion and Sediment Pollution Control.....	13-7
13.6.12	National Pollutant Discharge Elimination System Permit	13-7
13.6.13	Aids to Navigation	13-8
13.7	Construction Requirements.....	13-8
13.8	<i>Section 13, Hydrology and Hydraulics, Drainage/Stormwater Management, and Erosion and Sediment Control Submittal Requirements</i>	13-8
14	Structures	14-1
14.1	General Requirements	14-1
14.2	Bridge-Specific Requirements	14-1
14.3	Bridges.....	14-1
14.3.1	Fracture Critical Members	14-3
14.3.2	Design Loads and Load Ratings	14-3
14.3.3	Foundations.....	14-4
14.3.4	Substructures.....	14-4
14.3.5	Tendons.....	14-4
14.3.6	Decks and Deck Systems	14-4
14.3.7	Railings and Barriers.....	14-5
14.3.8	Utilities.....	14-5
14.3.9	Intelligent Transportation System Conduit	14-6
14.3.10	Drainage Systems.....	14-6
14.4	Hauling Permits.....	14-6
14.5	Scour	14-6
14.6	Retaining Walls.....	14-7
14.7	Culverts.....	14-8
14.8	Noise Barriers	14-8
14.9	Sign Structures.....	14-8
14.10	Highway and Bridge Lighting	14-9
14.11	Hydrology and Hydraulics.....	14-9
14.12	Traffic Signals	14-9
14.13	Shop Drawings	14-10
14.14	Construction Requirements.....	14-10
14.14.1	Superstructures.....	14-11
14.14.2	Concrete Finishes	14-11
14.14.3	Steel Finishes	14-11
14.14.4	Photographic Documentation.....	14-12
14.15	Record Drawings	14-12
14.16	Pile Hammer Evaluations	14-12
14.17	<i>Section 14, Structures Submittal Requirements</i>	14-12
15	Railroad Coordination	15-1
15.1	General Requirements	15-1
15.2	Project Standards	15-1
15.3	Bridge-Specific Requirements	15-1
15.4	[Reserved].....	15-1
15.5	Railroad Design Standards	15-1
15.5.1	CSX Transportation	15-2
15.5.2	Norfolk Southern Railway Company.....	15-2

15.5.3	Reading Blue Mountain & Northern Railroad.....	15-3
15.5.4	Wheeling and Lake Erie Railway Company.....	15-3
15.5.5	AMTRAK	15-3
15.6	Administrative Requirements.....	15-4
15.6.1	Public Utilities Commission Coordination	15-4
15.6.2	Project Work Affecting Railroad Operations.....	15-4
15.6.3	Railroad Agreements.....	15-4
15.6.4	Railroad Property Acquisitions	15-5
15.6.5	Railroad Right-of-Entry Permit	15-5
15.7	Construction Requirements.....	15-5
15.7.1	Flagging	15-5
15.7.2	Safety Certification	15-5
15.7.3	Railway Highway Provisions.....	15-6
15.8	Bridge Inspection and Maintenance	15-6
15.9	Section 15, Railroad Coordination Submittal Requirements	15-6
16	Context Sensitive Design, Aesthetics, and Landscaping	16-1
16.1	General Requirements	16-1
16.2	Project Standards	16-1
16.3	Bridge-Specific Requirements	16-1
16.4	[Reserved].....	16-1
16.5	Aesthetics Design Requirements	16-1
16.5.1	Aesthetic Guidelines and Requirements	16-1
16.5.2	Asset Databases (Landscape Inventory)	16-2
16.5.3	Process and Recommendations of AASHTO's <i>Bridge Aesthetics Sourcebook: Practical Ideas for Short- and Medium-Span Bridges</i>	16-2
16.5.4	Alternate Aesthetic Concepts.....	16-3
16.5.5	Aesthetics and Landscaping Design Documents	16-3
16.5.6	Colors	16-4
16.5.7	Bridges	16-4
16.5.8	Abutment and Wing Walls.....	16-4
16.5.9	Retaining Walls and Fencing	16-4
16.5.10	Noise Barriers	16-4
16.5.11	Traffic Barriers.....	16-5
16.5.12	Lighting.....	16-5
16.6	Landscaping Design Requirements.....	16-5
16.6.1	Existing Vegetation.....	16-6
16.6.2	Replacement Locations	16-6
16.6.3	Wetland Mitigation Areas and Mitigation Site Planting Plans	16-7
16.7	Construction Requirements.....	16-7
16.8	Section 16, Context Sensitive Design, Aesthetic and Landscaping Submittal Requirements	16-7
17	Traffic Analysis.....	17-1
17.1	General Requirements	17-1
17.2	Project Standards	17-1
17.3	Bridge-Specific Requirements	17-1
17.4	Operational Assessment of the Work	17-1
17.5	Design and Analysis Software.....	17-1
17.5.1	Traffic Operational Analysis.....	17-2
17.5.2	Signal Warrant Analysis	17-2
17.5.3	[Reserved]	17-3
17.5.4	Safety Analysis	17-3

17.6	<i>Section 17, Traffic Analysis Submittal Requirements</i>	17-3
18	Signing, Pavement Markings, Traffic Signals, and Lighting	18-1
18.1	General Requirements	18-1
18.2	Project Standards	18-1
18.3	Bridge-Specific Requirements	18-1
18.4	[Reserved].....	18-1
18.5	[Reserved].....	18-1
18.6	Design and Analysis Software.....	18-1
18.7	Existing Inventory	18-1
18.8	Design Requirements.....	18-2
18.8.1	Signing	18-2
18.8.2	Project Signing Outside of the Project Right of Way	18-2
18.8.3	Third Party Signing	18-2
18.8.4	Pavement Marking	18-2
18.8.5	[Reserved]	18-3
18.8.6	Traffic Signals, Interconnect, and Pre-Emption.....	18-3
18.8.7	Lighting.....	18-4
18.9	Construction Requirements.....	18-5
18.9.1	Signing	18-5
18.9.2	Pavement Marking	18-6
18.9.3	Delineation.....	18-7
18.9.4	Traffic Signals.....	18-7
18.9.5	Lighting.....	18-7
18.10	<i>Section 18, Signing, Pavement Markings, Traffic Signals, and Lighting Submittal Requirements</i>	18-8
19	Intelligent Transportation System	19-1
19.1	General Requirements	19-1
19.2	Project Standards	19-1
19.3	Bridge-Specific Requirements	19-1
19.4	[Reserved].....	19-1
19.5	[Reserved].....	19-1
19.6	Design and Analysis Software.....	19-1
19.7	Intelligent Transportation System Principles and Strategies	19-1
19.8	Intelligent Transportation System Design Requirements.....	19-2
19.8.1	Closed-Circuit Television	19-3
19.8.2	Dynamic Message Signs	19-3
19.8.3	Intelligent Transportation System Equipment Cabinets.....	19-4
19.9	Construction Requirements.....	19-5
19.10	Intelligent Transportation System Integration and Testing	19-6
19.10.1	Configuration, Commissioning, and Integration.....	19-6
19.10.2	Intelligent Transportation System Testing Plan	19-6
19.10.3	Factory and Bench Testing Plan	19-7
19.10.4	Field Acceptance Test Plan.....	19-7
19.10.5	Systems Integration Test Plan.....	19-7
19.10.6	Systems Operations Test Plan.....	19-7
19.10.7	Testing Execution	19-8
19.10.8	Certification of Testing Results and Acceptance	19-8
19.11	Warranties.....	19-8
19.12	<i>Section 19, Intelligent Transportation System Submittal Requirements</i>	19-8
20	Maintenance and Protection of Traffic	20-1

20.1	General Requirements	20-1
20.2	Project Standards	20-1
20.3	Bridge-Specific Requirements	20-1
20.4	[Reserved].....	20-1
20.5	Design and Analysis Software.....	20-1
20.6	Maintenance and Protection of Traffic Design Requirements	20-2
20.6.1	Transportation Management Plan	20-2
20.6.2	Traffic Control Plan	20-4
20.6.3	Contingency Plan	20-5
20.7	Automated Speed Enforcement in Work Zones	20-5
20.8	Maintenance and Protection of Traffic Construction Requirements	20-5
20.8.1	Driveway Closures	20-6
20.8.2	Local Road Detour Usage	20-7
20.8.3	Pedestrian and Bicycle Access.....	20-7
20.8.4	Pavement Marking	20-8
20.8.5	Hauling Equipment and Materials	20-8
20.8.6	Temporary and Existing Intelligent Transportation Systems, Traffic Signals, and Lights	20-9
20.8.7	Emergency Response and Incident Management Plan	20-9
20.8.8	Lane Closures.....	20-10
20.8.9	Traffic Control Devices	20-11
20.8.10	Final Clean-Up.....	20-11
20.8.11	Stockpiles.....	20-11
20.9	Opening Portions of the Project to Traffic.....	20-11
20.10	Maintenance and Protection of Traffic During the Maintenance Period.....	20-11
20.11	Aides to Navigation Plan.....	20-11
20.12	<i>Section 20, Maintenance and Protection of Traffic</i> Submittal Requirements	20-11
21	[Reserved].....	21-1
22	Maintenance.....	22-2
22.1	General Requirements	22-2
22.2	Project Standards	22-2
22.3	Bridge-Specific Requirements	22-2
22.4	[Reserved].....	22-2
22.5	Software.....	22-2
22.6	Specific Maintenance Requirements.....	22-2
22.6.1	Maintenance Limits.....	22-4
22.6.2	Maintenance During Construction	22-4
22.6.3	Self-Monitoring and Self-Reporting Requirements	22-5
22.6.4	[Reserved]	22-5
22.6.5	Planned Maintenance	22-5
22.6.6	Unplanned Maintenance Activities.....	22-5
22.6.7	Hazardous Materials	22-6
22.6.8	Landscape Management, Vegetation Control, and Use of Herbicides and Pesticides.....	22-8
22.6.9	Winter Maintenance	22-8
22.6.10	Department's Inspections, Planned Maintenance, and Lane Closures.....	22-9
22.7	Performance Requirements	22-9
22.7.1	Department's Responsibilities within the Maintenance Limits	22-10
22.7.2	Noncompliance Events	22-11
22.7.3	National Bridge Inspection Standards Bridge Rating Requirements	22-12
22.8	Maintenance Management Plan.....	22-12

22.8.1	Maintenance Management Information System	22-15
22.8.2	[Reserved]	22-18
22.8.3	Maintenance Manual.....	22-18
22.8.4	Rehabilitation Work Plan.....	22-19
22.8.5	Maintenance Safety and Security Plan.....	22-21
22.8.6	Transition and Coordination Plan	22-22
22.9	Inspections.....	22-22
22.9.1	Inspection Requirements.....	22-23
22.9.2	Inspection Personnel Requirements	22-24
22.9.3	Department Inspections and Auditing.....	22-25
22.9.4	Baseline Inspections.....	22-25
22.10	Reporting Requirements.....	22-25
22.10.1	Maintenance Monthly Report	22-26
22.10.2	Maintenance Annual Report	22-28
22.10.3	Rehabilitation Work Annual Report	22-28
22.10.4	Baseline Element Condition Report.....	22-29
22.11	Section 22, Maintenance Submittal Requirements.....	22-29
23	Handback	23-1
23.1	General Requirements for Handback.....	23-1
23.1.1	Handback Requirements for Early Handback Elements	23-1
23.1.2	Handback Requirements	23-2
23.2	Project Standards	23-2
23.3	Bridge-Specific Requirements	23-2
23.4	[Reserved].....	23-2
23.5	Handback Work Plan.....	23-2
23.5.1	Residual Life Methodology	23-4
23.5.2	Inspection during the Handback Period	23-4
23.5.3	Assessment of Conditions, Performance, and Residual Life	23-6
23.5.4	Rehabilitation Work during the Handback Period	23-6
23.5.5	[Reserved]	23-7
23.5.6	Execution of the Handback Work Plan.....	23-7
23.5.7	Annual Updates of the Handback Work Plan	23-7
23.6	Section 23, Handback Submittal Requirements	23-7

Tables

Table 1-1.	<i>Section 1, Technical Provisions Introduction</i> Submittal Requirements	1-3
Table 2-1.	Project Bridges.....	2-1
Table 2-2.	[Reserved]	2-2
Table 2-3.	Material Quality Control, Assurance, and Acceptance	2-8
Table 2-4.	Highway Occupancy Permits.....	2-13
Table 2-5.	<i>Section 2, General</i> Submittal Requirements	2-16
Table 3-1.	Department Concurrence Points	3-31
Table 3-2.	Design Document and Plan Development	3-50
Table 3-3.	<i>Section 3, Work Management and Administration</i> Submittal Requirements.....	3-57
Table 4-1.	<i>Section 4, Public Information and Communication</i> Submittal Requirements	4-7
Table 5-1.	Major Bridge Project Environmental Process.....	5-25
Table 5-2.	<i>Section 5, Environmental</i> Submittal Requirements	5-26
Table 6-1.	<i>Section 6, Noise Analysis and Mitigation</i> Submittal Requirements.....	6-4
Table 7-1.	<i>Section 7, Utilities</i> Submittal Requirements	7-7
Table 8-1.	<i>Section 8, Right of Way</i> Submittal Requirements	8-4
Table 9-1.	Limiting Values for Grout-to-Ground Strength for Preliminary Design	9-6
Table 9-2.	<i>Section 9, Geotechnical and Pavement</i> Submittal Requirements	9-27
Table 10-1.	<i>Section 10, Land Surveying</i> Submittal Requirements	10-4
Table 11-1.	<i>Section 11, Roadway and Grading</i> Submittal Requirements.....	11-5
Table 12-1.	<i>Section 12, Bicycle and Pedestrian Facilities</i> Submittal Requirements	12-3
Table 13-1.	<i>Section 13, Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control</i> Submittal Requirements	13-9
Table 14-1.	<i>Section 14, Structures</i> Submittal Requirements.....	14-13
Table 15-1.	<i>Section 15, Railroad Coordination</i> Submittal Requirements.....	15-6
Table 16-1.	The 10 Determinants of Appearance.....	16-3
Table 16-2.	<i>Section 16, Context Sensitive Design, Aesthetics and Landscaping</i> Submittal Requirements	16-7
Table 17-1.	<i>Section 17, Traffic Analysis</i> Submittal Requirements.....	17-3
Table 18-1.	<i>Section 18, Signing, Pavement Markings, Traffic Signals, and Lighting</i> Submittal Requirements	18-8
Table 19-1.	<i>Section 19, Intelligent Transportation System</i> Submittal Requirements.....	19-9
Table 20-1.	<i>Section 20, Maintenance and Protection of Traffic</i> Submittal Requirements.....	20-12
Table 22-1.	Inspections Requirements within the Maintenance Limits	22-24
Table 22-2.	<i>Section 22, Maintenance</i> Submittal Requirements	22-29
Table 23-1.	Useful and Residual Life Requirements	23-6
Table 23-2.	<i>Section 23, Handback</i> Submittal Requirements.....	23-8

Attachments

Attachment 1 Project Standard

Table A1-1. Applicable Non-Department Publications

Attachment 2 Bridge-Specific Requirements – Lenhartsville

Table A2-1. Mainline Design Criteria

Table A2-2. Ramp Design Criteria

Table A2-3. MPT Restrictions

Table A2-4. Holiday Restrictions

Table A2-5. Lane Closure Rental Fees

Table A2-6. Submittal Requirements

Attachment 3 [Reserved]

Attachment 4 Bridge-Specific Requirements – Canoe Creek

Table A4-1. Mainline Design Criteria

Table A4-2. Table Ramp Design Criteria

Table A4-3. MPT Restrictions

Table A4-4. Holiday Restrictions

Table A4-5. Lane Closure Rental Fees

Table A4-6. Submittal Requirements

Attachment 5 Bridge-Specific Requirements – Nescopeck

Table A5-1. Mainline Design Criteria

Table A5-2. Ramp Design Criteria

Table A5-3. MPT Restrictions

Table A5-4. Holiday Restrictions

Table A5-5. Lane Closure Rental Fees

Attachment 6 Bridge-Specific Requirements – North Fork

Table A6-1. Mainline Design Criteria

Table A6-2. Ramp Design Criteria

Table A6-3. MPT Restrictions

Table A6-4. Holiday Restrictions

Table A6-5. Lane Closure Rental Fees

Table A6-6. Submittal Requirements

Attachment 7 Bridge-Specific Requirements – White Haven

Table A7-1. Mainline Design Criteria

Table A7-2. Ramp Design Criteria

Table A7-3. MPT Restrictions

Table A7-4. Holiday Restrictions

Table A7-5. Lane Closure Rental Fees

Attachment 8 Bridge-Specific Requirements – Susquehanna

Table A8-1. Mainline Design Criteria

Table A8-2. Ramp Design Criteria

Table A8-3. MPT Restrictions

Table A8-4. Holiday Restrictions

Table A8-5. Lane Closure Rental Fees

Attachment 9 [Reserved]

Attachment 10 [Reserved]

Attachment 11	District 4 Standard Special Provisions
Attachment 12	[Reserved]
Attachment 13	[Reserved]
Attachment 14	[Reserved]
Attachment 15	District 10 Standard Special Provisions
Attachment 16	[Reserved]
Attachment 17	[Reserved]
Attachment 18	[Reserved]
Attachment 19	[Reserved]
Attachment 20	Coordination with Governmental Entities and Third Parties
Attachment 21	Permitted Design Variances and Exceptions
Attachment 22	Standard Special Provisions
Attachment 23	Existing Right of Way
Attachment 24	[Reserved]
Attachment 25	Utility Contacts
Attachment 26	[Reserved]
Attachment 27	[Reserved]
Attachment 28	[Reserved]
Attachment 29	EDMS Plan Sheet File Naming Convention
Attachment 30	IQF Inspection Qualification Charts
	Table A30-1. Construction Inspector Qualifications
	Table A30-2. Coating Inspector Qualifications
	Table A30-3. Fabrication Inspector Qualifications
Attachment 31	Maintenance Responsibilities
	Table A31-1. Construction Period Maintenance Responsibilities
	Table A31-2. Maintenance Period Maintenance Responsibilities
Attachment 32	Noncompliance Events and Performance Requirements
	Table A32-1. D&C Period Noncompliance Events
	Table A32-2. Maintenance Performance Requirements During the Construction Period
	Table A32-3. Maintenance Period Noncompliance Events
	Table A32-4. Maintenance Performance Requirements During the Maintenance Period
Attachment 33	[Reserved]
Attachment 34	[Reserved]

1 Technical Provisions Introduction

1.1 Technical Provisions

These Technical Provisions, known throughout the entirety of the document as Technical Provisions, set forth Work requirements the Development Entity shall perform or cause to be performed and/or coordinate as described herein. Without limiting other provisions of the Contract Documents, the Development Entity shall ensure the Work meets or exceeds the requirements of these Technical Provisions. For avoidance of doubt, wherever within these Technical Provisions a particular technically prescriptive requirement is specified, such technical solution shall constitute a Mandatory Configuration Element.

The Project consists generally in a “Package” (as defined under the Predevelopment Agreement), accepted by the Department, and described in the Package Proposal. The Development Entity shall develop and implement the Technical Provisions necessary for one or more Projects. The Development Entity shall maintain separate Technical Provision documents for each Project in Microsoft Word format. The Technical Provisions necessary for one or more Projects shall be uniquely identified and versioned and shall utilize track-changes during their development.

1.2 Order of Precedence, Modifications, and Interpretations

The Development Entity shall perform the Work in accordance with the Contract Documents and these Technical Provisions. In the event of any conflict, ambiguity or inconsistency among the Technical Provisions, the order of precedence, shall be in accordance with the Project Agreement Section 1.2 (Contract Documents; Order of Precedence).

The Development Entity shall apply the following modifications and interpretations to the District Standard Special Provision, Standard Special Provisions, and Project Standards:

- The Development Entity shall construe District Standard Special Provision, Standard Special Provisions, and Project Standards to fit the context of the Work and the Project Agreement. In the event that the Development Entity believes a modification and/or interpretation is unclear, the Development Entity shall notify and coordinate with the Department, and in each case the modification and/or interpretation shall be determined in accordance with Project Agreement Sections 1.2 and 1.6, as applicable. For avoidance of doubt, the Department will always have the right to notify the Development Entity if the Development Entity is interpreting the modification incorrectly;
- In the event of a conflict between a Department publication and a non-Department publication, the Department publication will prevail as set forth in Project Agreement Section 1.2.1.7;
- Notwithstanding that certain District Standard Special Provisions, Standard Special Provisions, and Project Standards including Department publications are drafted in the style of guidance documents, provisions of District Standard Special Provisions, Standard Special Provisions, and Project Standards, including the figures and tables, shall be mandatory. The following modifications and definitions shall apply unless expressly stated otherwise in these Technical Provisions, the Contract Documents, or where the use of an alternative value has been accepted by the Department as a Design Exception or a Design Variance or a deviation from the applicable Technical Provision in accordance with the terms of the Project Agreement:

1. Technical Provisions Introduction

- “should”, “must”, “preferred”, “recommended”, “will”, or “require”: the use of these words indicates that the Development Entity shall follow the design criteria unless doing so would be inconsistent with the Provided Environmental Approvals or would require Work outside the Project Limits;
- “may”, “can”, “could”, “might”, “permitted”, “where practical”, and other words indicating a permissive condition: the use of these words indicates a permissive condition;
- “not normally”, “is not good practice”, “should never”, “cannot”, “should be avoided” and other words indicating a prohibited condition: the use of these words indicates that the Development Entity shall construe these as prohibited, unless accepted in writing by the Department;
- the Development Entity shall disregard qualifying words such as “usually”, “normally”, “commonly”, “in general”, and “generally”;
- where design criteria are designated as “desirable” values these shall be the minimum criteria for Design Work and Construction Work;
- references related to “additional time”, “pay items”, “measurement for payment”, “method of measurement”, “cost to the Department”, “compensation for”, “quantity adjustment”, “payment”, “basis of payment”, “payment quantities”, “extra work”, “additional work”, “unit prices”, and “adjustment of unit prices”, or similar phrases where implied time or money relief would be anticipated shall be disregarded;
- references to “invitations for bids” and “value engineering” shall be disregarded;
- references to “engineer”, “the engineer”, “contractor”, “the contractor”, “bidder”, “fabricator”, “inspector”, “inspector-in-charge”, “joint venture”, “manufacturer”, “second-tier or lower-tier subcontractor”, “superintendent”, “supplier” or similar terms for construction or design professionals shall mean the Development Entity (unless such a requirement specifically governs subconsulting or subcontracting);
- references to “PennDOT”, “the Pennsylvania Department of Transportation”, “the Department”, “project owner”, “owner”, “contracting officer”, “chief bridge engineer”, “director of project delivery”, “district executive”, “representative”, “state”, “vendor” shall mean the Department. References to individual Department offices or employees (or Department offices and employees generally) shall mean the Department;
- The Development Entity shall disregard provisions within the District Standard Special Provision, Standard Special Provisions, and Project Standards relating to the mechanism for submitting clarification requests. Requests for clarification shall be submitted in accordance with the Contract Documents;
- When a District Standard Special Provision, Standard Special Provisions, and Project Standard refers to an action being necessary or needed, the Development Entity shall construe the action as required unless the context requires otherwise;
- The Development Entity shall construe provisions regarding measurement of quantities for the sole purpose of identifying Quality Control (QC) and Quality Assurance and Acceptance testing and inspection activities;

1. Technical Provisions Introduction

- References to approved products, materials, or equipment shall mean approved by the Department and/or the Independent Quality Firm (IQF);
- References to Department practices and policies shall be construed to be mandatory requirements unless the context requires otherwise;
- References to “as-built plans” means the Record Drawings, unless otherwise expressly indicated or where the context requires otherwise; and
- References to an engineer or contractor in the context of quality judgement may mean the Quality Assurance Manager, the Maintenance Quality Assurance Manager, the Design Quality Manager, the Construction Quality Manager, the Maintenance Quality Manager, or the Independent Quality Firm, as the context may require.

1.3 Section 1, Technical Provisions Introduction Submittal Requirements

Whenever a Submittal identified in the following Table 1-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions, and incorporates Table 1-1 information. The Department will conduct reviews and provide Department Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 1-1 and Project Agreement Section 6.3.

Table 1-1. Section 1, Technical Provisions Introduction Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Project Agreement Technical Provisions	—	—	—	—	Submitted as part of the Package Proposal

2 General

2.1 General Requirements

As part of the Technical Provisions, the Development Entity shall list and include the Project Bridges as defined in Recital B of the Project Agreement (Table 2-1). The general scope of work for a Project shall be as defined by the Development Entity and accepted by the Department in the Package Proposal. The Development Entity shall include the Package Proposal, as an attachment to the Technical Provisions.

Table 2-1. Project Bridges

Bridge
I-81 Susquehanna
I-80 Nescopeck Creek Bridge
I-78 Lenhartsville Bridge
I-80 Over Lehigh River Bridge
I-80 Canoe Creek Bridge
I-80 North Fork Bridge

The Development Entity shall provide the necessary resources and expertise to perform the Work in accordance with the Contract Documents. The Development Entity shall coordinate activities with the Department, Governmental Entities, third parties, Utility Owners, and Railroads impacted by the Work as required by the Contract Documents.

The Development Entity is not required to deliver 3D design as part of the Work.

2.2 Standard Special Provisions

The Development Entity is specifically directed to *Attachment 22, Standard Special Provisions* included within these Technical Provisions. Standard Special Provisions include requirements of the Work in the form most recently published and in effect on the Technical Setting Date. The Development Entity shall include the requisite Standard Special Provisions that are part of the Package Proposal, as an attachment to the Technical Provisions.

2.3 Bridge-Specific Requirements

The Development Entity is specifically directed to *Attachments 2 through 10, Bridge-Specific Requirements* included within these Technical Provisions. Bridge-Specific Requirements include Work that is unique to each Bridge. The Development Entity shall include the requisite Bridge-Specific Requirements that are part of the Package Proposal, as attachments to the Technical Provisions.

2.4 Coordination with Governmental Entities and Third Parties

The Department has or will enter into Third Party Agreements, Memorandums of Agreement (MOAs), Memorandums of Understanding (MOUs), and agreements with Governmental Entities and third parties that are included in *Attachment 20, Coordination with Governmental Entities and Third Parties* of these Technical Provisions, which, under no circumstances, establishes an exhaustive list. The Development Entity shall work with the Department to identify work to be delegated to the Development Entity, at the

Department's sole discretion, with regard to such Third Party Agreements, MOAs, MOUs, and/or agreements with Governmental Entities and third parties.

The Development Entity shall coordinate with impacted first responders, businesses, Property owners, school districts, municipalities, agencies, and their respective relevant Constituents, as necessary to complete the Work, all in accordance with the Contract Documents.

Additionally, the Development Entity shall comply with 49 U.S.C., Section 44718 and FAA Title 14, Chapter I, Subchapter E, Part 77 – Safe, Efficient Use, and Preservation of the Navigable Airspace and shall coordinate with the Federal Aviation Administration, as necessary to complete the Work in accordance with the Contract Documents.

2.5 Related Transportation Facilities

As part of the Technical Provisions, the Development Entity shall list and include the Related Transportation Facilities, per Bridge, that are part of the Project, as of the Technical Setting Date (Table 2-2). The Development Entity shall ensure the list remains current throughout the Design and Construction (D&C) Period and shall provide the list to the Department upon request.

Table 2-2. [Reserved]

2.6 Federal Highway Administration Coordination

The Development Entity shall provide the Department such assistance and information as may be required by the Department to comply with the U.S. Federal Highway Administration (FHWA) reporting requirements, and assist the Department to cooperate with FHWA in the reasonable exercise of FHWA's duties and responsibilities in connection with the Project, as described in the Project Agreement.

2.7 Permitted Design Variances and Permitted Design Exceptions

Permitted Design Variances and Permitted Design Exceptions are summarized in *Attachment 21, Permitted Design Variances and Design Exceptions* of these Technical Provisions. In the event that the Development Entity elects to utilize Permitted Design Variances and/or Permitted Design Exceptions, the Development Entity shall verify with the Department Permitted Design Variances and Permitted Design Exceptions applicability for the intended use and perform additional data collection, investigation, testing, analysis, design, reporting, and other necessary functions needed to implement a Permitted Design Variance and/or a Permitted Design Exception. The Development Entity shall notify the Department of Errors and/or discrepancies found within a Permitted Design Variance and/or Permitted Design Exception at the earliest opportunity. The Development Entity shall ensure the accuracy and implementation of Permitted Design Variances and/or Permitted Design Exceptions and shall obtain/confirm necessary approvals from the Department, if required under the Contract Documents, as part of the Work.

2.8 Design Variances and Design Exceptions

In the event the Development Entity elects to amend a Permitted Design Variance and/or a Permitted Design Exception or elects to deviate from the controlling criteria as defined by FHWA and/or the Department that are not already included in a Permitted Design Variance and/or a Permitted Design Exception, the Development Entity shall coordinate with the Department and prepare the necessary Design Variance or Design Exception. The Development Entity shall submit such requests utilizing the Department's Design

Exception process as described in *Department Pub 10X: Design Manual Part IX, Appendices to Design Manuals 1, 1A, 1B, and 1C* and *Department Pub 10: Design Manual 1, Transportation Program Development and Project Delivery Process*.

The Design Variance and/or Design Exception shall be subject to review and acceptance first by the Department and then the FHWA (through the Department), as applicable. The Development Entity shall be solely responsible for obtaining Department and FHWA approval of Design Variances and Design Exceptions and for impacts resulting from their implementation. The Department will not consider Design Exceptions for design loading structural capacity.

The Development Entity shall prepare clear and accurate Design Variances and Design Exceptions. The Department may require revisions to Design Variances and/or Design Exceptions in the event of inaccuracies and/or incompleteness, or to provide additional information as may be reasonably needed to conduct review activities.

The Development Entity shall provide each Design Variance and/or Design Exception to the Design Quality Manager (DQM) for verification that they meet the requirements of the Contract Documents, inclusive of the Design Quality Management Plan, prior to submission to the Department, unless otherwise specified by the Department. The Development Entity shall utilize the Department supplied e-Builder system when providing Design Variances and/or Design Exceptions to the Department and for retaining records of such Design Variances and Design Exceptions. The Development Entity shall furnish electronic PDF copies, native electronic files, and a transmittal cover sheet in a form acceptable to the Department for Design Variances and Design Exceptions.

The Development Entity shall schedule and arrange Comment Resolution Meeting(s) (CRMs) with the Department as appropriate, if warranted, upon completed Design Variance and/or Design Exception review. The Development Entity shall provide written responses to Department and/or Governmental Entity Comments in accordance with Section 6.3 of the Project Agreement. No later than 5 Business Days following the CRM, the Development Entity shall revise the written responses as may be needed and provide the Department and/or the Governmental Entity with a record of the Comment resolution.

The Development Entity shall address Department and Governmental Entity Comments, Basis of Rejection items, and/or Errors in the Design Variances and/or Design Exceptions.

For avoidance of doubt, multiple Design Variance and/or Design Exception submissions may be required to achieve Department and/or Governmental Approvals in accordance with the Contract Documents.

2.9 District Standard Special Provisions

The Development Entity is specifically directed to *Attachments 11, 13, 14, 15, and 16, District Standard Special Provisions* included within these Technical Provisions. District Standard Special Provisions include requirements of the Work that are unique to each District in the form most recently published and in effect on the Technical Setting Date. The Development Entity shall include the requisite District Standard Special Provisions that are part of the Package Proposal, as attachments to the Technical Provisions.

2.10 Quality of the Work

The Development Entity and Development Entity-Related Entities shall ensure Work quality in accordance with the Contract Documents. The Development Entity shall perform Quality Control (QC) of the Work, which shall be directed as follows:

- Design Work QC shall be directed by the DQM;
- Construction Work QC shall be directed by the Construction Quality Manager (CQM); and
- Maintenance Work QC shall be directed by the Maintenance Quality Manager (MQM).

The Development Entity's and Development Entity-Related Entities' QC personnel shall remain independent of the Independent Quality Firm (IQF), inclusive of its Quality Assurance and Acceptance personnel, and shall have no responsibilities or involvement in the development, production, and/or supervision of the Work.

The IQF shall perform Independent Quality Assurance and Acceptance of the Work, except for Quality Acceptance of asphalt materials, in accordance with Table 2-3 in *Section 2.11.2.2, Material Quality Control, Assurance, and Acceptance* of these Technical Provisions. Independent Quality Assurance and Acceptance shall be directed and performed by personnel employed by the IQF, who shall report to the Quality Assurance Manager (QAM) during the D&C Period and to the Maintenance Quality Assurance Manager (MQAM) during the Maintenance Period.

At a minimum, the QAM, the MQAM, the DQM, the CQM, and the MQM, as well as personnel under their supervision, in addition to Department personnel, shall have the authority to stop Work for quality-related issues. The Department shall have rights and access for inspection, verification, sampling, and/or testing of the Work in accordance with the Contract Documents. Performance by the Department of such inspection, verification, sampling, and/or testing will not relieve the Development Entity of its obligations of the Contract Documents.

2.11 Independent Quality Firm

The Development Entity shall employ one or more IQFs, which shall employ the QAM, the MQAM, and Independent Quality Assurance and Acceptance personnel. Without limiting the Project Agreement Section 9.2.6, the Development Entity shall cause the IQF to report to the Department. The Development Entity shall cause the IQF to, at a minimum:

- perform Independent Quality Assurance and Acceptance activities of the Work, inclusive of material testing and inspection;
- certify that the Work achieves acceptance criteria;
- perform audits addressing the compliance of the Work with the Quality Management Plan (QMP);
- provide adequate personnel, equipment, and testing facilities to ensure appropriate Independent Quality Assurance and Acceptance activities occur;
- oversee the implementation of the QMP;
- approve the QMP in conjunction with the Department;

- be responsive to changes in the Work without affecting the Development Entity’s Baseline Project Schedule;
- coordinate with the DQM, the CQM, and the MQM and ensure QC activities are conducted in accordance with the Contract Documents and these Technical Provisions;
- incorporate monthly IQF quality reports as described in *Section 3.3.4.4.1, Monthly Progress Report* of these Technical Provisions summarizing, at a minimum:
 - the quality reviews, inspections, verifications, samples, and tests performed; and
 - occurrences and resolutions of Noncompliance Events.
- utilize the Department’s Engineering and Construction Management System (ECMS) and the Department’s Mobile Construction (MC) applications, available on an iPad, where applicable. Procure iPad devices with the following requirements:
 - IQF construction inspection staff (excluding IQF plant inspection staff) shall have an iPad with a minimum 4G service, capable of running the latest version of Apple iOS;
 - the Department MC applications are designed to support devices that are running the latest version of Apple iOS;
 - iPads shall have at least a minimum of 16 GB internal storage;
 - all Department MC applications are available through the Apple App Store for free and user accounts will be needed for access. Links for MC application user account registration are found on the ECMS home page screen; and
 - for any questions related to the Department approval process or ECMS credentials, please visit <https://www.penndot.pa.gov/Doing-Business/Pages/ConstructionContractor-Registration.aspx>.
- perform daily inspections and document the Development Entity and Development Entity-Related Entities onsite construction operations through the Project Site Activity (PSA) MC application and synchronize reports with ECMS daily. The daily PSA reports shall, at a minimum:
 - identify inspections conducted;
 - record inspection results;
 - identify the location and nature of Defects found;
 - record causes for rejection;
 - describe remedial and/or corrective actions taken or proposed; and
 - be signed by the responsible technician or supervisor.
- provide inspection results to the Department within 24 hours of the work shift; and
- utilize the established systems as coordinated between the Parties for recording material tests, which shall be signed by the responsible technician or supervisor and shall be provided to the Department in electronic format within two Business Days of test completion.

Performance of Independent Quality Assurance and Acceptance functions by the IQF shall not relieve the Development Entity of its responsibilities identified in the Contract Documents. The Development Entity

shall provide the Development Entity/IQF Contract to the Department for acceptance as a condition of NTP2.

2.11.1 Independent Quality Firm Construction Material Inspection and Testing

The Development Entity shall cause the IQF to perform construction reviews, inspection, verification, sampling, and/or testing by personnel with appropriate training and qualifications, in accordance with Table A30-1 (Construction Inspector Qualifications), and Table A30-2 (Coating Inspector Qualifications) in *Attachment 30, IQF Inspection Qualification Chart* of these Technical Provisions for each Work item using appropriate equipment accurately calibrated and maintained in good operating condition. The Development Entity shall cause the IQF to provide the Department with requisite records demonstrating appropriate training, qualifications, and good equipment operating conditions.

The Development Entity shall cause the IQF to provide the number of personnel in each Department classification as shown in Table A30-1 (Construction Inspector Qualifications) and Table A30-2 (Coating Inspector Qualifications) in *Attachment 30, IQF Inspection Qualification Chart* of these Technical Provisions to adequately perform the required Work.

2.11.1.1 Laboratory Requirements

The Development Entity shall cause the IQF to obtain material certifications and perform testing in accordance with the requirements of *Department Pub 408, Highway Construction Specifications* and *Department Pub 19, Field Testing and Laboratory Testing Manual*. The Development Entity shall cause the IQF to also comply with:

- the requirements of the AASHTO: Accreditation Program (AAP) (including AASHTO materials reference laboratory certification);
- ASTM cement and concrete reference laboratory certification as applicable; and
- appropriate accreditations acceptable to the Department for the pertinent test.

A copy of AAP accreditation certificate(s) shall be transmitted to the Department upon its receipt by the testing laboratory.

Equipment in laboratories shall be calibrated, standardized, and/or checked. Equipment found to be out of calibration, standardization, check tolerances, or defective shall be promptly removed from service. Equipment shall be maintained, as necessary, in regular intervals according to the equipment operating instructions.

2.11.1.2 Sampling and Testing

The Development Entity and the IQF shall adhere to the applicable sampling and testing policies and procedures of *Department Pub 408, Highway Construction Specifications*, *Department Pub 2, Project Office Manual*, and *Department Pub 25, Quality Assurance Manual* with respect to Quality Assurance and Acceptance functions.

Prefabrication shall be compliant with:

- the Contract Documents;

- *Department Pub 408, Highway Construction Specifications;*
- *Department Pub 135, Inspection of Fabricated Structural Steel; and*
- *Department Pub 145, Inspection of Prestressed/Precast Concrete Products & Reinforced Concrete Pipe.*

Disputes over specific test results may be resolved in a reliable, unbiased manner by referee testing and evaluation performed by a referee laboratory. The referee laboratory shall be the Department's central laboratory, or a testing laboratory qualified according to the Department's standards. The decision by the referee laboratory will be final and not subject to Dispute resolution.

2.11.2 Independent Quality Firm Supply Source and Material Quality Inspection and Testing

Quality of materials shall conform to requirements contained in the Contract Documents. The Development Entity shall cause the IQF to provide plant inspection and testing at steel and concrete precast plants. Manufacturers' test reports may supplement, but not replace, Independent Quality Assurance and Acceptance activities.

2.11.2.1 Precast and Prestressed Concrete and Metal Fabrication Inspection and Testing

The Development Entity shall cause the IQF to receive and verify "Accepted as Noted" or "Accepted" Shop Drawings before fabrication. The IQF shall have final acceptance of products before they leave the fabrication shop. For Shop Drawings stamped "Accepted as Noted" fabrication may begin, but materials shall not be released from the fabrication shop until the Shop Drawings are stamped "Accepted".

Fabrication testing and inspection documents include visual testing, ultrasonic testing, magnetic particle testing, radiographic testing, dye penetrant testing, phased array ultrasonic testing, and non-destructive testing. Reports, along with radiographic testing digital images of weld testing results, material mill certifications and test reports, and non-destructive testing documentation certifications shall be entered into the Department's Electronic Quality Management System (EQMS).

The Development Entity shall cause the IQF to perform precast & prestressed concrete, and metal fabrication reviews, inspection, verification, sampling, and/or testing by personnel with appropriate training and qualifications, in accordance with *Table A30-3 (Fabrication Inspector Qualifications)* in *Attachment 30, IQF Inspection Qualification Chart* of these Technical Provisions for each Work item using appropriate equipment accurately calibrated and maintained in good operating condition. The Development Entity shall cause the IQF to provide the Department with requisite records demonstrating appropriate training, qualifications, and good equipment operating conditions.

The Development Entity shall cause the IQF to provide the number of personnel in each Department classification as shown in *Table A30-3 (Fabrication Inspector Qualifications)* in *Attachment 30, IQF Inspection Qualification Chart* of these Technical Provisions to adequately perform the required work. The Development Entity shall cause the IQF to utilize the Department's EQMS to maintain a list of the assigned fabrication shops and names of the inspector(s) assigned at each location (fabrication shop) and shall provide the tentative hours of inspection.

At least 24 hours in advance of assignment, the Development Entity shall cause the IQF to submit to the Department, through the EQMS, IQF fabrication shop personnel resumes that identify the required

education, experience, certifications, and licenses of the individual along with their contact information. The Development Entity shall cause the IQF to provide direct supervision of IQF fabrication shop personnel by visiting assigned fabrication shops and shall provide the Department with a weekly proposed supervision schedule for Department review and acceptance. The IQF supervision may be part time or full, as accepted by the Department, according to the number of fabrication shops assigned by the IQF.

The Development Entity shall cause the IQF to provide IQF Fabrication Shop Managers (FSMs) to review complex repair proposals, provide expert interpretation of applicable codes, conduct specification review, and perform relevant duties as directed by the Department. The IQFs FSMs shall be registered and licensed Professional Engineers in the Commonwealth of Pennsylvania.

The Development Entity shall cause the IQF to not change IQF fabrication shop personnel without the advanced written approval of the Department.

The Development Entity shall cause the IQF to provide inspection at a plant or field within two Business Days of notification from the Department.

The Development Entity shall cause the IQF to attend periodic progress meetings as directed by the Department.

2.11.2.2 Material Quality Control, Assurance, and Acceptance

The Department, DE and/or IQF shall perform material quality control, assurance, and acceptance in accordance with Table 2-3.

Table 2-3 Material Quality Control, Assurance, and Acceptance

Material	Type	Quality Control	Quality Assurance	Quality Acceptance
Asphalt	Core (Density)	DE	IQF	Department
	Loose Box (Asphalt, Primary Control, 200 Sieve)			
Concrete	Structural			DE/IQF (Department Witness)
	Paving			
Aggregate	Gradation	At Source – Department Approved QC Plan and District Source Reviews	DE/IQF	By Certification from Source

DE – Development Entity

IQF – Independent Quality Firm

2.11.3 Independent Quality Assurance and Quality Acceptance Plan

The Development Entity shall cause the IQF to prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of an Independent Quality Assurance and Acceptance Plan (IQAAP) that adheres to the requirements of the Contract Documents and these Technical Provisions. The IQAAP shall incorporate activities of the D&C Period as well as the Maintenance Period. Design and construction related portions of the IQAAP shall be accepted prior to commencing Design Work. Maintenance related portions of the IQAAP shall be accepted as a condition of each Bridge Completion.

The IQAAPs procedures for precast and prestressed concrete as well as metal fabrication Independent Quality Assurance and Acceptance inspection and testing shall be similar to the Department's established program. The Development Entity shall cause the IQF to obtain specific precast and prestressed concrete as well as metal fabrication Independent Quality Assurance and Acceptance inspection and testing acceptance from the Department. The QAM and the MQAM shall implement, manage, and update respective portions of the accepted IQAAP when changes in the Work necessitate an update, as reasonably directed by the Department, and, at a minimum, on an annual basis. The IQAAP shall, at a minimum:

- be coordinated with the QMP;
- identify the QAM and the MQAM;
- meet the *Department Pub 25, Quality Assurance Manual* as well as *Department Pub 2, Project Office Manual* requirements for reporting and recordkeeping;
- define the number of personnel in each Department classification as shown within *Attachment 30, IQF Inspection Qualification Chart* of these Technical Provision to adequately perform the required work;
- maintain a list of the assigned fabrication shops and names of the inspector(s) assigned at each location (fabrication shop) and provide the tentative hours of inspection;
- define necessary training, certificates, and credentials to conduct Independent Quality Assurance and Acceptance activities;
- describe IQF roles, responsibilities, and reporting requirements including Nonconforming Work and Noncompliance Events;
- describe monitoring processes and procedures to certify Development Entity and Development Entity-Related Entities adherence to the Contract Documents;
- identify Independent Quality Assurance and Acceptance activities of the Work including the timing and frequency;
- identify Independent Quality Assurance and Acceptance activities in relation to material testing and inspection of the Work including the timing and frequency;
- describe the Work certification and acceptance processes;
- define Independent Quality Assurance and Acceptance record and document control procedures;
- identify audits addressing the compliance of the Work with the QMP;
- describe the personnel, equipment, and testing facilities utilized to ensure appropriate Independent Quality Assurance and Acceptance occurs;
- identify how the IQF will be responsive to changes in the Work without affecting the Development Entity's Baseline Project Schedule;
- identify the contents of the monthly IQF quality reports;
- describe how coordination with the DQM, the CQM, and the MQM will occur and detail how QC activities will be monitored and adjusted to ensure accordance with the Contract Documents and these Technical Provisions;

- identify daily inspection log processes and procedures;
- describe processes for observing the business operations of the Development Entity to assess the accuracy of records; and
- describe processes for utilizing the established data system for recording material tests.

As part of the IQAAP, the Development Entity shall cause the IQF to provide:

- an organizational chart identifying Independent Quality Assurance and Acceptance roles, authorities, and lines of reporting;
- a listing of IQF inspection and testing laboratories, including information related to each laboratory's capability, certifications, and equipment;
- a listing of the assigned fabrication shops; and
- QAM and MQAM resumes.

The IQFs IQAAP shall be consistent with ISO 9001 and ISO 14001 standards for quality and environmental management. Unless defined or modified elsewhere in the Contract Documents, terminology used in ISO 9001 and ISO 14001 shall have the meanings as follows:

- "Organization" shall mean the Development Entity and/or Development Entity-Related Entities;
- "Customers" shall mean the Department, Department-Related Entities, FHWA, third parties, Utility Owners, Railroads, and other Governmental Entities; and
- "Product" shall mean the Work.

2.12 Noncompliance Events

The Development Entity shall monitor and audit the Work for compliance with the Contract Documents and shall identify Noncompliance Events. The Department, the QAM, the DQM, or the CQM may identify Noncompliance Events (NCEs) as may be applicable in accordance with the Table A32-1 (D&C Period Noncompliance Events) and Table A32-2 (Maintenance Performance Requirements During the Construction Period) in *Attachment 32, Noncompliance Events and Performance Requirements*. The Department, the MQAM, or the MQM may identify NCEs as may be applicable in accordance with the Table A32-3 (Maintenance Period Noncompliance Events) and Table A32-4 (Maintenance Performance Requirements During the Maintenance Period) in *Attachment 32, Noncompliance Events and Performance Requirements* of these Technical Provisions.

2.12.1 Noncompliance Event Notice

The Development Entity shall notify Department in writing of the occurrence of any NCE as soon as reasonably practicable, and in any event within 24 hours after the applicable Noncompliance Start Date (each such Notice being an "NCE Notice"). NCE Notices shall, at a minimum:

- identify and describe the NCE;
- identify the Noncompliance Start Date;
- identify the Party that first detected the NCE;

- indicate if the NCE was the result of an Incident or an Emergency;
- identify the number of Noncompliance Points that are specified for that NCE in *Attachment 32, Noncompliance Events and Performance Requirements* of these Technical Provisions;
- identify the NCE Cure Period specified for that NCE in *Attachment 32, Noncompliance Events and Performance Requirements* of these Technical Provisions;
- identify the Development Entity's proposed disposition of such NCE as between (a) implementing an NCE Cure; and (b) "accept as-is" pursuant to Section 7.3.3.3 of the Project Agreement (and where "accept as-is" is the proposed disposition, and detailed justification therefor); and
- provide a description of the proposed NCE Cure and provide reasonable detail of how and when the Development Entity intends to rectify the NCE, and if not within the NCE Cure Period, why that is the case.

The Development Entity shall coordinate with the Department, the QAM, the MQAM, the DQM, the CQM, and the MQM as necessary to establish NCE Notice workflow processes and procedures, which designate the actions of each Party, provide consistent formatting, and facilitate efficient NCE identification, NCE Cure, and tracking.

NCE Notices shall simultaneously with written notice be logged and subsequently tracked within the e-Builder system or as designated by the Department during the D&C Period or the Maintenance Management Information System during the Maintenance Period. The Development Entity shall keep records of NCE Notices on the e-Builder system during the D&C Period and the Maintenance Management Information System during the Maintenance Period.

2.12.2 Notification of Noncompliance Events by the Department

In the event that the Department or the QAM observes an NCE during the D&C Period or the Department or the MQAM observes an NCE during the Maintenance Period, for which the Department, the QAM, or the MQAM has not received an NCE Notice from the Development Entity, the Department, the QAM, and/or the MQAM may issue an NCE Notice to the Development Entity.

In the event that the Development Entity does not dispute the subject Department NCE determination within 5 Business Days of receipt of the Department's written Notice to Development Entity of the subject NCE, then the Development Entity shall be deemed to have accepted such Department NCE determination.

2.12.3 Following Notification of Noncompliance Events

In the event that an NCE identified by the Development Entity or Department creates an immediate hazard, the Development Entity shall, immediately upon discovery, to the extent necessary and unless and until directed otherwise by the Department, respond to such NCE by deploying traffic control devices to close a lane, close multiple lanes, or close a bridge, as the case may be, to mitigate the hazard and ensure the safety of the Users and the general public.

2.12.4 Implementation and Notification of NCE Cure

The Development Entity shall rectify NCEs by implementing NCE Cures accepted by the Parties. The Development Entity shall notify the Department in writing of the NCE Cure as soon as practicable (and in any event within 5 Business Days of such NCE Cure) which shall, at a minimum:

- identify the subject NCE Notice or Department NCE determination;
- identify the Noncompliance Rectification Date;
- describe the manner in which the NCE was addressed; and
- specify measures taken by Development Entity to prevent the reoccurrence of the NCE and Incidents similar to the NCE.

The Development Entity shall, simultaneous with written delivery, record and track NCE Cures within the e-Builder system or as designated by the Department during the D&C Period and the Maintenance Management Information System during the Maintenance Period.

2.12.5 Corrective Action Plan

The Department or the QAM during the D&C Period, or the Department or the MQAM during the Maintenance Period, may require the Development Entity to prepare a Corrective Action Plan (CAP) to address reoccurring or systematic NCEs (three or more occurrences of the same NCE). In the event that the Department, the QAM, or the MQAM requires the Development Entity to prepare a CAP, the Development Entity shall investigate and report to the Department the causes for such reoccurring or systematic NCE(s) and shall develop preventive and remedial actions to minimize or eliminate future such occurrences, inclusive of any necessary amendment(s) to the Development Entity's Project Management Plan. The CAP shall be provided to the Department within 10 Business Days of the Department, the QAM, or the MQAs request thereof. CAPs shall, at a minimum:

- identify and describe the cause of the reoccurring or systematic NCE;
- identify the preventive and remedial actions to be taken;
- describe the process to obtain CAP acceptance from the Department; and
- identify the timeframe for implementing the CAP.

The Development Entity shall simultaneous, with written delivery, log and subsequently track CAPs within the e-Builder system or as designated by the Department during the D&C Period and the Maintenance Management Information System during the Maintenance Period.

2.13 [Reserved]

2.14 Progression Management Software

The Development Entity shall provide progression management software, similar in functionality to Reconstruct's Visual Command Center, and shall ensure the Department's access to the software. The Development Entity shall utilize Unmanned Aircraft Systems (UAS) in accordance with *Section 10.6, Unmanned Aircraft Systems* of these Technical Provisions to capture photogrammetry and create a 3D model visual of the constructed work using the progression management software. The Development Entity shall tie the 3D model visual to the Baseline Project Schedule to show Work progression and time lapse and shall provide the information on the e-Builder system.

The Development Entity shall capture photogrammetry of the Bridge Sites during the Construction Period at a minimum:

- monthly.

2.15 Highway Occupancy Permits

As part of the Technical Provisions, the Development Entity shall list the Highway Occupancy Permits that are part of the Project as of the Technical Setting Date (Table 2-4). The Development Entity shall ensure the list remains current throughout the D&C Period and shall provide the list to the Department upon request.

Table 2-4. Highway Occupancy Permits

Bridge	Highway Occupancy Permits

2.16 Existing Right of Way Exhibit

As part of the Technical Provisions, the Development Entity shall provide Existing Right of Way lines for each Bridge as of the Technical Setting Date in an exhibit(s) included as *Attachment 23, Existing Right of Way* of these Technical Provisions.

2.17 Resiliency

As part of the first Package, upon issuance of NTP2, the Development Entity shall prepare an initial and final resiliency report for each Bridge identifying potential impacts of future climate change along with proposed countermeasures for various components of each Bridge. The initial and final resiliency report for each Bridge shall identify cost effective future climate change countermeasures that improve the long-term viability of the facility and reduce long term maintenance costs. The Department, in its sole discretion, will select the countermeasures to be included for each Bridge in each Package.

2.17.1 Resiliency Scope Items

The Development Entity shall include the items identified in *Section 2.17.1.1, Hydrology and Hydraulics* through *Section 2.17.1.2, Structural* in preparation of each initial and final resiliency report. For the purposes of each resiliency report, “Standard Design” means the Bridge design that meets the Department’s design standards for present day climate conditions. “Adaptations” means countermeasures that increase the resiliency of the Bridge against future climate conditions.

2.17.1.1 Hydrology and Hydraulics

The Development Entity shall perform an impact analysis that documents the increases in discharges, water surface elevations, velocities, and shear stresses. The Development Entity shall use the results of the impact analysis to document changes associated with scour, stability of approach roadways, stability of roadway embankments, freeboard, flooding, bank/channel stability, and ice/debris freeboard impacts related to future climate scenarios over the design life for each Bridge. The Development Entity shall use the results of the future climate impact analysis to identify Adaptations.

For the structures carrying the Interstate, the Development Entity shall utilize 2D hydraulic analysis using the most current version of the Sedimentation and River Hydraulics – Two-Dimensional Model (SRH-2D) and increased discharge scenarios to identify localized high velocities and shear stresses that may require Adaptations for the design flood and 500-year check floods. The increases in discharges shall be based on the best available climate science for future conditions out to the year 2080 under representative concentration pathway (RCP) 8.5 or as a 30% increase in flows for all ranges of flows considered.

For the purposes of each resiliency report, best available climate science is defined as the Localized Constructed Analog (LOCA) method downscaled Group 1 General Climate Models (GCMs) for BCC-CSM 1.1-m, CCSM4, CSIRO-Mk.6.0, GFDL-CM3, GISS-E2-R, HadGEM2-AO, MIROC5, and MRI-CGCM3. The Development Entity's analysis performed using the GCMs shall include analysis of the entire range of future climate conditions projected by all eight models, consistent with the procedure presented in the Department's Resiliency Climate Study, "Development of Site-Specific Hydrologic and Hydraulic Analyses for Assessing Transportation Infrastructure Vulnerability & Risks to Climate Change (September 2020)".

The Development Entity shall perform additional sea level rise and storm surge evaluations as part of the initial and final resiliency report for the Girard Point Bridge (regardless of what Package the Girard Point Bridge is included in), as it is tidally influenced. The Development Entity shall analyze increases in sea level rise and storm surge levels based on the U.S. Army Corps of Engineers' (USACEs) Sea Level Change Curve Calculator for the USACE 2013 projections and the intermediate and high curves for the year 2080.

2.17.1.2 Structural

The Development Entity shall perform a future climate impact analysis that documents the impacts of increased discharges identified in *Section 2.17.1.1, Hydrology and Hydraulics* on the structural integrity of the Bridge's foundations, piers, abutments, and approach roadways. The Development Entity shall utilize a 2D hydraulic analysis in accordance with *Section 2.17.1.1, Hydrology and Hydraulics* to re-evaluate the design per *Department Pub 15M, Structures: DM-4, Chapter 7* to consider future climate conditions. The Development Entity shall also perform an impact analysis that documents the future structural risks associated with barge impacts, fire, and utility crossings due to changes in future climate. The Development Entity shall use the results of the analyses to identify Adaptations.

2.17.2 Resiliency Submittals

The Development Entity shall provide an initial and final resiliency report for each Bridge. Each report shall include impact analysis, risk assessment, Adaptations, and cost benefit analysis as described in *Section 2.17.2.1, Impact Assessment* through *Section 2.17.2.4, Cost Benefits Analysis*. The Development Entity shall submit an initial resiliency report for each Bridge no later than 60 days after the issuance of NTP2. The Development Entity shall submit a final resiliency report for each Bridge no later than 45 Business Days

after Adaptations are selected by the Department, but in any case, no later than the Final Design Document Submittal.

2.17.2.1 Impact Assessment

As part of the initial and final resiliency reports, the Development Entity shall provide an impact assessment. The assessment shall “stress” the Standard Design based on potential climate scenarios identified in *Section 2.17.1.1, Hydrology and Hydraulics* through *Section 2.17.1.2, Structural*. The impact assessment shall entail re-running hydrologic/hydraulic models with the new climate scenarios, developing a summary matrix of impacts, and depicting the limits of the impacts on color coded plans or schematics.

2.17.2.2 Risk Assessment

As part of the initial and final resiliency reports, the Development Entity shall provide a risk assessment that builds upon the impact assessment results and includes a detailed evaluation of future risks (climate and otherwise), potential damages/failure-modes, capital costs, maintenance costs, and other economic, engineering, social, and environmental concerns.

The Development Entity shall document potential failure-modes based on the impact assessment for each Bridge. A failure mode is defined as a cause of failure or one possible way a system can fail. Examples of failure modes include increase in upstream flooding, stream bank erosion, overtopping of approach roadways, overtopping of structure, loss of stability of roadway embankments, increased pier/abutment scour that threatens structure stability and increase in ability to pass ice/debris jams. Each resiliency report shall include a defined matrix of failure-modes identified. The limits of the failure-modes shall be shown graphically on the color coded plans or schematics.

2.17.2.3 Adaptations

The Development Entity shall develop Adaptations for each identified potential failure type based on the impact assessment for each Bridge. Each resiliency report shall include a defined matrix of Adaptations for each failure mode identified in *Section 2.17.2.2, Risk Assessment*. The limits of the Adaptations shall be shown graphically on the color coded plans or schematics.

2.17.2.4 Cost Benefit Analysis

The Development Entity shall develop life cycle dollar values (2023 dollars) of damage associated with the potential climate scenarios identified in *Section 2.17.1.1, Hydrology and Hydraulics* through *Section 2.17.1.2, Structural*. The life cycle cost estimates shall be developed for each identified failure-mode so the Department can evaluate the individual impacts for each Bridge associated with each failure type.

The Development Entity shall develop design and construction costs necessary to implement each of the Adaptations. The Development Entity shall develop life cycle dollar values (2023 dollars) of damage associated with the Adaptations in place. The life cycle cost estimates shall be developed for each identified failure-mode so the Department can evaluate the Adaptations.

The Development Entity shall develop a preliminary cost benefit analysis to allow the Department to evaluate the items to be included in design. The preliminary cost benefit analysis shall be based upon the preliminary life cycle cost estimates for the Standard Design, Adaptations, and the costs to implement the Adaptations. The preliminary costs shall be submitted with the initial resiliency report. The final costs shall

be submitted with the final resiliency report. The final costs for each Adaptation shall not vary more than +/- 30% of the preliminary cost analysis.

2.18 Section 2, General Submittal Requirements

Whenever a Submittal identified in the following Table 2-5 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions, and incorporates Table 2-5 information. The Department will conduct reviews and provide Department Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 2-5 and Project Agreement Section 6.3.

Table 2-5. Section 2, General Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	List of Project Bridges	—	—	—	—	Submitted as part of the Package Proposal
2	List of Related Transportation Facilities	—	—	—	—	Submitted as part of the Package Proposal
3	Design Variances and Exceptions	3	20	NTP3	—	—
4	IQF fabrication shop personnel resumes	1	5	—	—	—
5	Independent Quality Assurance and Acceptance Plan (IQAAP)	2	10	NTP2	—	—
6	Development Entity/IQF Contract	2	10	NTP2	—	—
7	Noncompliance Event Notice	2	—	—	Term	—
8	NCE Cure Notice	2	—	—	Term	—
9	Corrective Action Plan	2	10	—	Term	—
10	3D Model Visual	1	—	—	Construction Period	—
11	Initial Resiliency Report	3	10	NTP3	—	—
12	Final Resiliency Report	3	10	NTP3	—	—

3 Work Management and Administration

3.1 General Requirements

The Development Entity shall manage and administer the Work in an orderly fashion to allow for a well-organized process. The Development Entity shall coordinate with the Department to address issues at the lowest level possible while seeking opportunities to improve efficiency.

3.2 Project Facilities

The Development Entity shall plan and implement a Project Office. The Project Office shall be established at the earliest opportunity but in any event prior to NTP2. The Project Office shall be available for the duration of the respective Project Design and Construction (D&C) Period.

3.2.1 Project Office

The Development Entity shall establish the Project Office in the Harrisburg, Pennsylvania metropolitan area within two miles of the Department's Central Office, located at 400 North Street, Harrisburg, PA, 17120. The Development Entity shall provide separate, adjoining facilities for Department staff located within the same building or complex as the Development Entity. The location, condition, and amenities of the Project Office will be subject to the Department's written acceptance.

Department facilities shall be available for occupancy no later than 20 Business Days after NTP2. The Department and the Development Entity shall jointly participate in a facility condition survey prior to and at the completion of occupancy.

The Development Entity shall ensure that the Project Office, at a minimum:

- provides Class B or better office space;
- includes one dedicated office space or cubical for Department staff and consultants separate from the Development Entity;
- provides appropriate furnishings including chairs and desks for the total number of Department and Development Entity staff in the Project Office;
- includes at least two total conference rooms each with at least a ten-person capacity with dedicated audio/visual and presentation capabilities;
- provides appropriate technology including office internet and Wi-Fi; speakerphones, monitors/projectors in the conference rooms; computer network capability for plotters and printers, etc. for the total number of Department and Development Entity staff in the Project Office;
- ensures safety, security, and proper climate-control;
- provides sufficient restroom and break room facilities for the total number of Department and Development Entity staff in the Project Office;
- includes janitorial service and maintenance of the facility; and
- provide sufficient parking for the total number of Department and Development Entity staff in the Project Office and up to three Department guests at no cost to the Department.

3.2.2 Satellite Offices

Because of the geographically diverse locations of the Bridges, the Development Entity may establish, at its sole discretion, Satellite Offices in proximity to the Bridges, away from the Project Office. A “Satellite Offices”, in the event that the Development Entity elects to establish one and as defined in this section, shall contain the same basic features as the Project Office but may be sized according to the total number of Department and Development Entity staff assigned to the Satellite Office. Modular office space may be used for Satellite Offices. In addition, the Development Entity shall ensure that Satellite Offices, at a minimum:

- provides enclosed office space (minimum of 250 square feet) for Department use; and
- includes two dedicated cubicles (minimum of 100 square feet) for Department staff and Department-Related Entities separate from the Development Entity.

3.3 Project Management Plan

The Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Project Management Plan (PMP) prepared in accordance with the terms set forth in Section 9.1 of the Project Agreement, expanding upon the information submitted with the Package Proposal. The PMP shall be separate and apart from a project management plan prepared by the Department for use with the U.S. Federal Highway Administration (FHWA).

The Development Entity’s PMP shall generally:

- establish the organization, staffing, systems, strategies, approaches, procedures, and processes to manage and coordinate the Work;
- define responsibilities to administer, monitor, and control the Work; and
- describe the approach to deliver the Work in accordance with the Contract Documents.

The PMP is a collection of several component plans; however, there shall be only one PMP for the Development Entity and Development Entity-Related Entities. The component plans are standalone plans defining various aspects of the Work. Component plan development and Department approval timeframes shall be reflected in the Baseline Project Schedule. The PMP shall consist of the following component plans:

- Management and Staffing Plan (MSP);
- Document and Data Management Plan (DDMP);
- Equal Employment Opportunity Plan (EEOP);
- Disadvantaged Business Enterprise Performance Plan (DBEPP);
- On-the-Job Training Plan (OJTP);
- Risk Management Plan (RMP);
- Department-Development Entity Communication Plan (DDECP);

- Quality Management Plan (QMP):
 - Design Quality Management Plan (DQMP);
 - Construction Quality Management Plan (CQMP); and
 - Maintenance Quality Management Plan (MQMP).
- Affected Third Parties Plan (ATPP);
- Safety and Security Plan (SSP);
- Emergency Management and Disaster Recovery Plan (EMDRP);
- Public Information and Communications Plan (PICP);
- Comprehensive Environmental Protection Plan (CEPP);
- Environmental Protection Training Plan (EPTP);
- Waste Management Plan (WMP);
- Noise Study Work Plan (NSWP), in the event it becomes necessary for the Work;
- Utility Work Plan (UWP);
- Emergency Response Utility Plan (ERUP);
- Right of Way Acquisition Report (ROWAR);
- Transportation Management Plan (TMP);
- D&C Closeout Plan;
- Maintenance Management Plan (MMP); and
- Handback Work Plan (HWP).

The Development Entity shall ensure that each component plan Submittal is identified within the Submittal Packaging Requirement Database identified within *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates the requirements of Table 3-3.

3.3.1 Component Plans as a Condition Prior to NTP2

As a condition precedent for the issuance of NTP2, the Development Entity shall prepare and receive Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of the following component plans:

- Management and Staffing Plan (MSP);
- Document and Data Management Plan (DDMP);
- Disadvantaged Business Enterprise Performance Plan (DBEPP);
- Department-Development Entity Communication Plan (DDECP);
- Quality Management Plan (QMP):

- Design Quality Management Plan (DQMP);
- Affected Third Parties Plan (ATPP);
- Comprehensive Environmental Protection Plan (CEPP);
- Environmental Protection Training Plan (EPTP);
- Noise Study Work Plan (NSWP), in the event it becomes necessary for the Work; and
- Utility Work Plan (UWP).

The Development Entity shall prepare and receive Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of the following component plans within 90 days after NTP2:

- Risk Management Plan (RMP);
- Quality Management Plan (QMP):
 - Construction Quality Management Plan (CQMP); and
- Public Information and Communications Plan (PICP);

3.3.2 Component Plans as a Condition Prior to NTP3

As a condition precedent for the issuance of NTP3, the Development Entity shall prepare and receive Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of the following component plans:

- Quality Management Plan (QMP):
 - Maintenance Quality Management Plan (MQMP).
- On-the-Job Training Plan (OJTP);
- Safety and Security Plan (SSP);
- Emergency Management and Disaster Recovery Plan (EMDRP);
- Waste Management Plan (WMP);
- Emergency Response Utility Plan (ERUP);
- Transportation Management Plan (TMP);
- Maintenance Management Plan (MMP);
- Right of Way Acquisition Report
- Handback Work Plan (HWP); and
- D&C Closeout Plan

3.3.3 Project Management Plan and Component Plan Update

The Development Entity shall update and resubmit the PMP inclusive of applicable component plans for Department review and acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) when changes in the Work necessitate an update in accordance with the Contract Documents, and, at a minimum, on an annual basis.

3.3.4 Management and Staffing Plan

As part of the PMP, the Development Entity shall prepare and submit for Department review a Management and Staffing Plan (MSP) expanding upon the information submitted with the Package Proposal. The Development Entity shall implement, manage, and update the accepted MSP in accordance with the PMP requirements.

The Development Entity's MSP shall, at a minimum:

- provide a Development Entity organizational chart and roster for Key Personnel and Required Personnel regardless of their affiliation including their name, role, employer, email address, and contact phone number;
- establish reporting lines, responsibilities, locations, and authorities for Key Personnel and Required Personnel regardless of their affiliation;
- define Coordination and Discipline Groups (CDG) which shall be used to assemble and manage design, construction, maintenance, and handback personnel and interaction;
- present the Development Entity's plan for providing continuous Emergency contact information between NTP1 and the end of the Term;
- provide statements regarding Key Personnel and Required Personnel time commitments;
- detail how vital design, construction, maintenance, and handback personnel shall be integrated and how they shall interact;
- describe management structures and systems for design, construction, maintenance, and handback activities;
- define interface protocols the Development Entity shall utilize with the Department, Governmental Entities, third parties, Utility Owners, and Railroads;
- identify and describe meetings and reports needed to ensure the Work is coordinated within the Development Entity and with the Department, Governmental Entities, third parties, Utility Owners, and Railroads; and
- describe how the Baseline Project Schedule will be prepared, implemented, managed, and updated between NTP1 and the end of the Term.

3.3.4.1 Key Personnel

The Development Entity shall provide Key Personnel described within this *Section 3.3.4.1*. In the event that particular Key Personnel are replaced, the Development Entity shall ensure the replacement submitted satisfies Key Personnel requirements set forth herein. The Development Entity shall cause each individual

filling a Key Personnel position to dedicate the amount of time necessary for the proper prosecution and performance of the Work.

3.3.4.1.1 Development Entity's Project Manager

The Development Entity's Project Manager (DEPM) shall lead the Development Entity and shall serve as single point of contact with the Department for the Project. The DEPM shall ensure obligations of the Contract Documents are achieved with respect to the Work. The DEPM shall, at a minimum:

- be employed by the Development Entity (but not the Independent Quality Firm);
- have no less than two years in an executive position within an engineering firm, construction contractor, P3 developer, P3 investment firm or P3 special purpose vehicle or similar project-specific organization;
- have no less than 5 cumulative years of project management experience post-award that includes detailed design and construction in a commercial or technical role in at least one Highway transportation infrastructure project including roadway and bridge aspects of similar complexity, size, and scope procured under an alternative project delivery method; and
- have no less than 10 years of Highway transportation infrastructure project management experience as project manager involving roadway and bridge aspects.

3.3.4.1.2 Design-Build Project Manager

The Design-Build Project Manager (DBPM) shall control, plan, and execute the Administrative Work and D&C Work. The DBPM shall achieve the obligations of the Contract Documents. The DBPM shall report to the DEPM. The DBPM shall, at a minimum:

- have no less than 10 years of Highway transportation infrastructure project management experience as project manager involving roadway and bridge aspects of similar complexity, size, and scope; and
- have served as project manager on at least two Highway transportation infrastructure projects involving roadway and bridge aspects of similar complexity, size, and scope.

3.3.4.1.3 Construction Manager

The Construction Manager (CM) shall oversee the Construction Work, inclusive of Temporary Works, Permanent Works, and Utility Incorporated Work. The CM shall ensure Construction Work is delivered in accordance with the Plans, Design Documents, and Construction Documents. The CM shall ensure Bridge Punchlist and Punchlist items are addressed. The CM shall report to the DBPM. The CM shall, at a minimum:

- have no less than 10 years of Highway transportation infrastructure construction experience as a superintendent, construction manager, or the functional equivalent involving roadway and bridge; and

- have served as a superintendent, construction manager, or the functional equivalent on at least two Highway transportation infrastructure projects involving roadway and bridge aspects of similar complexity, size, and scope.

3.3.4.1.4 Quality Assurance Manager

The Quality Assurance Manager (QAM) shall oversee Independent Quality Assurance and Acceptance aspects of the D&C Work. The QAM shall be an employee of an Independent Quality Firm and shall have no responsibilities or involvement with the entity(ies) performing Quality Control (QC) for the D&C Work. The QAM shall report to the Department. The QAM shall, at a minimum:

- not be the same person serving as either the Design Quality Manager (DQM) or the Construction Quality Manager (CQM);
- have no less than 10 years of Highway transportation infrastructure design and construction experience as a lead design engineer (or functional equivalent) and/or construction project manager (or functional equivalent);
- have quality assurance experience on at least two Highway transportation infrastructure projects involving roadway and bridge aspects of similar complexity, size, and scope; and
- be a registered and licensed Professional Engineer in the Commonwealth of Pennsylvania.

3.3.4.1.5 Maintenance Quality Assurance Manager

The Maintenance Quality Assurance Manager (MQAM) shall oversee Independent Quality Assurance and Acceptance aspects of the Maintenance Work. The MQAM shall be an employee of an Independent Quality Firm with no Maintenance Work involvement. The MQAM shall report to the Department. The MQAM shall, at a minimum:

- not be the same person serving as the Maintenance Quality Manager (MQM);
- have no less than 10 years of Highway transportation infrastructure maintenance experience (or functional equivalent) and/or construction project manager (or functional equivalent);
- have experience on at least two Highway transportation infrastructure projects involving roadway and bridge aspects of similar complexity, size, and scope; and
- be a registered and licensed Professional Engineer in the Commonwealth of Pennsylvania.

3.3.4.1.6 Financing Manager

The Financing Manager (FM) shall oversee the financing of the Project. The FM shall report to the DEPM. The FM shall, at a minimum:

- have experience in successfully structuring, receiving commitments, and achieving financial close on a diverse range of financing structures for projects of a similar size, scope, and complexity.

3.3.4.1.7 Maintenance Manager

The Maintenance Manager (MM) shall oversee the Maintenance Work, inclusive of Maintenance Contracts and the Lead Maintenance Contractor. The MM shall ensure Maintenance Work is performed in accordance

with Planned Maintenance, the Performance Requirements, and Non-Discriminatory Maintenance Changes. The MM shall ensure Maintenance Records are prepared and maintained. The MM shall report to the DEPM. The MM shall, at a minimum:

- have no less than 15 years of recent experience with lifecycle costs, bridge and roadway Element analysis and maintenance, asset management, inspections, and reporting; and
- have a bachelor's degree or equivalent.

3.3.4.1.8 Lead Design Manager

The Lead Design Manager (LDM) shall oversee the Design Work, inclusive of Plans and Design Documents and shall be available as necessary throughout the duration of the D&C Work. The LDM shall report to the DBPM. The LDM shall, at a minimum:

- have no less than 10 years of Highway transportation infrastructure project design management experience as project manager involving roadway and bridge;
- have served as design project manager on at least two Highway transportation infrastructure projects involving roadway and bridge aspects of similar complexity, size, and scope;
- have no less than 5 years of design-build experience;
- have a bachelor's degree or equivalent;
- be an employee of the Lead Engineering Firm;
- be a registered and licensed Professional Engineer in the Commonwealth of Pennsylvania; and
- be the Engineer of Record (EOR) and/or oversee EORs for various portions of the Work.

3.3.4.2 Required Personnel

The Development Entity shall provide Required Personnel described with this *Section 3.3.4.2*. In the event that particular Required Personnel are replaced, the Development Entity shall ensure the replacement submitted satisfies Required Personnel requirements set forth herein. The Development Entity shall cause each individual filling a Required Personnel position to dedicate the amount of time necessary for the proper prosecution and performance of the Work.

3.3.4.2.1 Schedule Manager

The Schedule Manager (SM) shall prepare and oversee the Baseline Project Schedule for the D&C Work. The SM shall report to the DBPM. The SM shall, at a minimum:

- have no less than 10 years of recent experience with project schedules of similar complexity, size, and scope; and
- be proficient in the use of Critical Path Method (CPM) scheduling concepts and software.

3.3.4.2.2 Equal Employment Opportunity Manager

The Equal Employment Opportunity Manager (EEOM) shall identify and prepare the processes within the Equal Employment Opportunity Plan (EEOP) and shall oversee and ensure compliance with federal and state law, inclusive of:

- 49 C.F.R. Part 26 and all Disadvantaged Business Enterprise (DBE) requirements;
- OJT requirements during Construction Work; and
- community and workforce engagement under the environmental justice and Title VI of the Civil Rights Act of 1964 requirements.

The EEOM shall ensure DBE Contracts and DBE Contractor requirements are achieved and shall manage the DBE participation reports and DBE Recovery Plans. The EEOM shall report to the DEPM. The EEOM shall meet the requirements of the Contract Documents. The EEOM shall, at a minimum:

- have no less than 5 years of civil rights compliance and DBE experience on at least two Highway transportation infrastructure projects involving roadway and bridge aspects of similar complexity, size, and scope; and
- have a bachelor's degree or equivalent.

3.3.4.2.3 Design Quality Manager

The Design Quality Manager (DQM) shall identify and prepare the methods and procedures within the Design Quality Management Plan (DQMP) and shall direct the QC of Design Work inclusive of Plans and Design Documents. The DQM may be an employee of a design firm associated with the Design Work but shall not be involved with the Baseline Project Schedule and shall have no responsibilities or involvement in the development, production, and/or supervision of the Design Work. The DQM shall coordinate and cooperate with the Quality Assurance Manager. The DQM shall report to the DBPM. The DQM shall, at a minimum:

- have no less than 10 years of Highway transportation and bridge infrastructure project design experience;
- have a bachelor's degree or equivalent;
- be an employee of a design firm;
- be a registered and licensed Professional Engineer in the Commonwealth of Pennsylvania; and
- have held a similar role on a minimum of two design-build projects of at least \$250 million in total construction cost.

3.3.4.2.4 Construction Quality Manager

The Construction Quality Manager (CQM) shall identify and prepare the methods and procedures within the Construction Quality Management Plan (CQMP) and shall direct the QC of Construction Work, inclusive of Temporary Works, Permanent Works, Utility Incorporated Work, and Construction Documents. The CQM may be an employee of a construction firm associated with the Construction Work but shall not be involved with the Baseline Project Schedule and shall have no responsibilities or

involvement in the development, production, and/or supervision of the Construction Work. The CQM shall coordinate and cooperate with the Quality Assurance Manager. The CQM shall report to the DBPM. The CQM shall, at a minimum:

- have no less than 10 years of Highway transportation and bridge infrastructure project experience; and
- have held a similar role on a minimum of two design-build projects of at least \$250 million dollars in total construction cost.

3.3.4.2.5 Maintenance Quality Manager

The Maintenance Quality Manager (MQM) shall identify, prepare, and enforce the methods and procedures within the Maintenance Quality Management Plan (MQMP) and shall direct the QC of Maintenance Work, inclusive of Planned Maintenance, the Performance Requirements, and Non-Discriminatory Maintenance Changes. The MQM shall coordinate and cooperate with the Maintenance Quality Assurance Manager. The MQM shall report to the DEPM. The MQM shall, at a minimum:

- have no less than 10 years of recent experience with inspections, analysis, maintenance and preservation, life-cycle cost analysis, asset management, and reporting for Highway bridge and roadway Elements;
- have a bachelor's degree or equivalent; and
- have held a similar role on a minimum of one design-build project of at least \$150 million in total construction cost.

3.3.4.2.6 Public Information and Communication Manager

The Public Information and Communication Manager (PICM) shall prepare and oversee implementation of the Public Information and Communications Plan (PICP) and shall coordinate public information and communication with the Department for the D&C Work. The PICM shall perform work from the Public Information Office as described in *Section 4, Public Information and Communication* of these Technical Provisions. The PICM shall report to the DBPM. The PICM shall, at a minimum:

- have no less than 10 years of public involvement and communications experience;
- have a bachelor's degree or equivalent;
- demonstrate a working knowledge of Department Pub 295, Transportation Project Development Process – Public Involvement Handbook; and
- have held a similar role on a project of similar scale and scope.

3.3.4.2.7 Environmental Compliance Manager

The Environmental Compliance Manager (ECM) shall prepare and oversee the Comprehensive Environmental Protection Plan (CEPP), the Environmental Protection Training Plan (EPTP), the Waste Management Plans (WMP), and in the event it becomes necessary, the Noise Study Work Plan (NSWP). The ECM shall fully understand Environmental Law, the NEPA Basic Configuration(s), the Environmental Survey Boundary (ESB), environmentally sensitive areas, Categorical Exclusions, Environmental Assessments, environmental commitments, and Environmental Approvals.

3. Work Management and Administration

The ECM shall coordinate with the Department regarding Provided Environmental Approvals, Environmental Site Assessments, Hazardous Materials, and Recognized Environmental Conditions. The ECM shall oversee Environmental Approval re-evaluation and Development Entity-Led Environmental Approvals and ensure environmental compliance. The ECM shall manage and track Provided Environmental Approvals, Development Entity-Led Environmental Approvals, and associated environmental commitments within ECMTS. The ECM shall report to the DBPM. The ECM shall, at a minimum:

- have no less than 15 years of relevant experience in coordinating complex environmental issues on Highway improvement projects with similar size and scope;
- have a bachelor's degree or equivalent;
- demonstrate a working knowledge of the National Environmental Policy Act (NEPA); and
- have held a similar role on a minimum of two design-build projects of at least \$250 million in total construction cost.

3.3.4.2.8 Hazardous Materials Manager

The ECM shall designate a Hazardous Materials Manager (HMM) to provide expertise in the safe handling and disposal of Hazardous Materials during the course of the D&C Work. The HMM shall schedule and/or conduct training for the Development Entity and Development Entity-Related Entity employees, verify employee certifications prior to and required for handling and/or disposal of Hazardous Materials, maintain records of incidents involving Hazardous Materials as indicated in the Waste Management Plan (WMP), and shall notify the ECM, the Department, and appropriate authorities in writing of Hazardous Materials Releases. The HMM shall report to the ECM. The HMM shall, at a minimum:

- be a qualified professional certified at least to the minimum requirements established under the current guidelines of OSHA 29 C.F.R. 1910.120 (HAZWOPER Training); and
- have no less than 5 years of experience with similar work and in developing Waste Management Plans (WMPs), Investigative Work Plans (IWP), and Site Investigation Reports (SIRs), and remedial action plans or equivalent reports necessary and acceptable to the Pennsylvania Department of Environmental Protection (DEP) in material discovery and remediation efforts for Hazardous Materials.

3.3.4.2.9 Natural Resource Biologist

The ECM shall designate a Natural Resource Biologist (NRB) to monitor wildlife and natural environment impacts during the course of the D&C Work. The NRB shall report to the ECM. The NRB shall, at a minimum:

- have a bachelor's degree or equivalent in biology;
- have no less than 5 years of relevant experience; and
- demonstrate a working knowledge of the NEPA.

3.3.4.2.10 Environmental Compliance Inspectors

The ECM shall designate Environmental Compliance Inspectors (ECIs) to conduct environmental monitoring and report to the ECM violations, compliance, and noncompliance with the Provided and Development Entity-Led Environmental Approvals during course of the D&C Work. ECIs shall include with such reports, the appropriate recommendations for corrective action. The ECIs shall report to the ECM. ECIs shall, at a minimum:

- demonstrate a working knowledge of environmental issues, mitigation, and associated permitting requirements; and
- have no less than one year environmental inspection experience.

3.3.4.2.11 Water Quality Specialist

The ECM shall designate a Water Quality Specialist (WQS) to provide expertise in permitting delineation, stormwater pollution prevention, and the protection of jurisdictional waters during the course of the D&C Work. The WQS shall report to the ECM. The WQS shall, at a minimum:

- have a bachelor's degree of equivalent in wetland biology, water pollution biology, or other related environmental sciences; and
- have no less than 5 years of relevant experience.

3.3.4.2.12 Utility Manager

The Utility Manager (UM) shall prepare and oversee the Utility Work Plan (UWP), the Emergency Response Utility Plan (ERUP), and shall oversee Utility Adjustment Work inclusive of Utility Coordination and Investigation Work, Utility Information, Subsurface Utility Engineering (SUE), SUE Plans, Utility Enhancements, Protection in Place, and Unidentified Utility Facilities. The UM shall coordinate with Utility Owners, relevant third parties, and the Department. The UM shall report to the DBPM. The UM shall, at a minimum:

- have no less than 10 years of relevant experience in coordinating Utility Work on Highway improvement projects;
- have at least three years of Department utility experience and demonstrate a working knowledge of the Department's utility relocation policies and procedures; and
- have a working knowledge of the Department's Utility Relocation Management System (URMS).

3.3.4.2.13 Right of Way Manager

The Right of Way Manager (ROWM) shall prepare and oversee the Right of Way Acquisition Report (ROWAR) and shall be the Department's point of contact for Right of Way (ROW) activities during the course of the D&C Work. The ROWM shall report to the DBPM. The ROWM shall, at a minimum:

- have no less than 10 years of relevant experience coordinating Highway ROW acquisition; and
- have at least three years of Department ROW acquisitions experience and demonstrate a working knowledge of the Department's ROW acquisition policies and procedures.

3.3.4.2.14 [Reserved]**3.3.4.2.15 Hydrology and Hydraulics Manager**

The Hydrology and Hydraulics Manager (HHM) shall oversee hydrology and hydraulic design aspects of the D&C Work. The HHM shall report to the LDM. The HHM shall, at a minimum:

- have no less than 10 years of experience managing hydrology and hydraulic modeling, scour analysis, and Federal Emergency Management Agency (FEMA) floodplain/floodway modeling and design for the Department or similar state Department of Transportations;
- have a bachelor's degree or equivalent;
- have no less than three years of design-build hydrology and hydraulic experience and/or experience on large, complex Highway projects;
- have no less than three years of 2D hydraulic modeling experience on Highway projects, and
- be a registered and licensed Professional Engineer in the Commonwealth of Pennsylvania.

3.3.4.2.16 Stormwater Management/Drainage Specialist

The Stormwater Management/Drainage Specialist (SMDS) shall oversee stormwater and drainage design aspects of the D&C Work. The SMDS shall report to the HHM. The SDS shall, at a minimum:

- have no less than 10 years of experience managing stormwater/drainage designs on large, complex projects for the Department or similar state Department of Transportations;
- have a bachelor's degree or equivalent;
- have no less than three years of design-build stormwater/drainage experience and/or experience on large, complex Highway projects;
- have no less than three years of National Pollutant Discharge Elimination System (NPDES) and Post-Construction Stormwater Management (PCSM) experience; and
- be a registered and licensed Professional Engineer in the Commonwealth of Pennsylvania.

3.3.4.2.17 Erosion and Sediment Control Specialist

The Erosion and Sediment Control Specialist (ESCS) shall oversee Erosion, Sedimentation, and Pollution Control Plan (ESPCP) design aspects of the D&C Work. The ESCS shall report to the HHM. The ESCS shall, at a minimum:

- have no less than 10 years of experience managing drainage/stormwater design and erosion and sediment control plan designs including complex multi-phase ESPCPs for the Department or similar state Department of Transportations;
- have a bachelor's degree or equivalent;
- have no less than three years of design-build erosion and sediment control design experience and/or experience on large, complex Highway projects; and
- be a registered and licensed Professional Engineer in the Commonwealth of Pennsylvania.

3.3.4.2.18 Vibration and Movement Monitoring Specialist

The Vibration and Movement Monitoring Specialist (VMMS) shall prepare and implement the vibration and movement monitoring plan and shall oversee other vibration and movement aspects of the D&C Work. The VMMS shall report to the LDM and the CM as appropriate. The VMMS shall, at minimum:

- have no less than 5 years of demonstrated experience in similar work and have professional level capability in related geotechnical and structural evaluations and engineering; and
- be a registered and licensed Professional Engineer in the Commonwealth of Pennsylvania.

3.3.4.2.19 Bicycle and Pedestrian Specialist

The Bicycle and Pedestrian Specialist (BPS) shall plan and design bicycle and pedestrian facilities including sidewalks, bike paths, shared-use paths, trails, and bicycle/pedestrian connections to transit design aspects for the D&C Work. The BPS shall report to the LDM. The BPS shall, at a minimum:

- have a minimum of 10 years of experience in planning and designing bicycle and pedestrian facilities, preferably with design-build delivery and large, complex Highway and transportation projects; and
- have a bachelor's degree or equivalent.

3.3.4.2.20 Traffic Control Manager

The Traffic Control Manager (TCM) shall oversee the design, implementation, updating, inspection, and coordination of Traffic Control Plans (TCP) and shall work to ensure safe and continuous traffic flow during the course of the D&C Work. The TCM shall report to the LDM. The TCM shall, at a minimum:

- have no less than 10 years of experience overseeing the design and management of TCP for the Department or similar state Departments of Transportation;
- have a bachelor's degree or equivalent; and
- have no less than three years of design-build experience and/or experience on large, complex Highway projects.

3.3.4.3 Meetings

The Development Entity shall convene regular meetings to coordinate the Work with the Department. Meetings shall include Department-Related Entities, Governmental Entities, third parties, Utility Owners, Railroads, and Development Entity-Related Entities as appropriate. Development Entity personnel with appropriate decision making authority shall attend meetings.

The Development Entity shall provide meeting locations, invitations, and agendas with specific purpose and stated objectives to attendees no less than 3 Business Days in advance of meetings. The Development Entity shall provide minutes, including a record of attendees, to attendees no more than 3 Business Days after meetings. Within 3 Business Days of receiving minutes from the Development Entity, the Department will provide corrections (if any) of the minutes to the Development Entity. Within 3 Business Days of receiving Department corrections to the minutes, the Development Entity shall issue final corrected minutes.

No more than 15 Business Days after NTP1, the Development Entity shall provide the Department with a list of meetings necessary for the D&C Work, including those identified throughout these Technical Provisions. The list of meetings provided by the Development Entity shall include, at a minimum:

- Project Initiation (Kick-Off) Meeting;
- Design Initiation Meeting;
- Teamwork Meetings;
- Construction Initiation Meeting;
- Maintenance Initiation Meeting;
- Weekly Construction Progress and Hold Point Meetings;
- Punchlist Meetings;
- Monthly Schedule Progress Meetings; and
- Monthly Progress Meetings.

3.3.4.3.1 Project Initiation (Kick-Off) Meeting

The Development Entity shall coordinate with the Department the agenda as well as the appropriate personnel to attend a Project Initiation (Kick-Off) Meeting to be held no more than 5 Business Days after the Effective Date. The Project Initiation (Kick-Off) Meeting shall, at a minimum:

- introduce key Department and Development Entity Project personnel;
- discuss key information and commitments submitted with the Package Proposal;
- review Project goals, schedule, organization, communication, and expectations;
- identify key stakeholders;
- briefly discuss the Project Management Plan (PMP);
- identify potential D&C risks and mitigation;
- discuss key processes; and
- discuss next steps.

3.3.4.3.2 Design Initiation Meeting

The Development Entity shall coordinate with the Department the agenda as well as the appropriate personnel to attend a Design Initiation Meeting held no more than 5 Business Days after NTP2. The Design Initiation Meeting shall, at a minimum:

- introduce key Department and Development Entity design personnel;
- discuss key design related information submitted with the Package Proposal;
- review Design Work schedule, organization, submission, review, and communication processes;

- review applicable Project Management Plans (PMPs);
- review Design Document requirements and the Submittal Packaging Requirements Database (SPRD);
- discuss Submittal review and oversight processes;
- review the contents of the Quality Management Plan (QMP) and specifically the Design Quality Management Plan (DQMP); and
- discuss next steps.

3.3.4.3.3 Teamwork Meetings

The Development Entity shall facilitate Teamwork Meetings to enable a more in-depth look at the Design Work as may be required from time to time. Teamwork Meetings shall be conducted with Department representatives from Central Office and the District where the Work is located. The Department, the QAM, and/or the Development Entity may initiate Teamwork Meetings. The location, content, duration, and format of the Teamwork Meetings, subsequent Comments, and resolution processes shall be established by mutual agreement of the Parties involved in the Teamwork Meetings.

3.3.4.3.4 Construction Initiation Meeting

The Development Entity shall coordinate with the Department the agenda as well as the appropriate personnel to attend a Construction Initiation Meeting held no more than 5 Business Days after NTP3. The Construction Initiation Meeting shall, at a minimum:

- introduce key Department and Development Entity Construction personnel;
- discuss key construction related information submitted with the Package Proposal;
- review Construction Work schedule, organization, and communication processes;
- identify Related Transportation Facilities;
- review applicable Project Management Plans (PMPs);
- briefly review applicable Design Documents;
- review Construction Document requirements and the SPRD;
- review the contents of the Quality Management Plan (QMP) and specifically the Construction Quality Management Plan (CQMP);
- discuss safety and health related protocols;
- review sensitive Project items such as but not limited to environmental issues, ROW constraints, utilities, geotechnical concerns, and other unique aspects of the Work;
- identify and discuss Hold Points;
- review Noncompliance Events; and
- discuss next steps.

3.3.4.3.5 Maintenance Initiation Meeting

The Development Entity shall coordinate with the Department the agenda as well as the appropriate personnel to attend Maintenance Initiation Meetings held no more than 5 Business Days after each Bridge Completion. The Maintenance Initiation Meeting shall, at a minimum:

- introduce key Department and Development Entity maintenance personnel;
- discuss key maintenance related information submitted with the Package Proposal;
- review Maintenance Work processes;
- review applicable Project Management Plans (PMPs);
- briefly review applicable Design Documents;
- review the contents of the Quality Management Plan (QMP) and specifically the Maintenance Quality Management Plan (MQMP);
- Discuss safety and health related protocols;
- review sensitive Project items such as but not limited to environmental issues, ROW constraints, utilities, geotechnical concerns, and other unique aspects of the Work;
- review Noncompliance Events; and
- discuss next steps.

3.3.4.3.6 Weekly Construction Progress and Hold Point Meetings

The Development Entity shall coordinate with the Department the agenda as well as the appropriate personnel to attend a Weekly Construction Progress and Hold Point Meetings beginning the first week after NTP3 which shall, at a minimum:

- briefly describe Work progress;
- identify Critical Path issues and potential/proposed solutions;
- discuss upcoming Milestones;
- identify impending Work start and completion dates;
- identify issues and provide potential/proposed solutions for the current week and summarize issues remaining to be resolved from the immediate prior week;
- status Noncompliance Events (NCEs);
- status Submittals;
- discuss relevant safety and health issues;
- describe progress for achieving the DBE and OJT Goals;
- summarize quality management activities including reviews, findings, and actions/resolutions;
- identify Department and/or IQF actions and/or decisions required for the upcoming week; and

- discuss impending Hold Points.

3.3.4.3.7 Punchlist Meetings

The Development Entity shall facilitate Punchlist meetings, which shall address Bridge Punchlist and Punchlist items. The Development Entity shall coordinate with the Department the agenda as well as the appropriate personnel to attend Punchlist meetings to be held as often as needed to facilitate Department acceptance which shall, at a minimum:

- introduce key Department and Development Entity Bridge Punchlist and Punchlist personnel;
- discuss Bridge Punchlist and Punchlist inspection requests;
- review conditions requiring correction and/or completion;
- provide, coordinate, and complete material certifications, forms, and other relevant documents; and
- record dates as necessary.

3.3.4.3.8 Monthly Schedule Progress Meetings

The Development Entity shall conduct Monthly Schedule Progress Meetings (MSPMs) in accordance with *Section 3.4.9, Monthly Schedule Progress Meetings* of these Technical Provisions.

3.3.4.3.9 Monthly Progress Meetings

The Development Entity shall coordinate with the Department to identify appropriate personnel to attend Monthly Progress Meetings (MPMs). MPMs will occur no more than 5 Business Days after the submission of Monthly Progress Reports (MPRs) identified within *Section 3.3.4.4.1, Monthly Progress Report* of these Technical Provisions starting from the first month following NTP1 until the end of Term. The MPM shall, at a minimum, discuss MPR topics.

3.3.4.4 Reporting

No more than 15 Business Days after NTP1, the Development Entity shall provide the Department a list of reports that need to be prepared by the Development Entity in accordance with the terms of these Technical Provisions, which, under no circumstances, establishes an exhaustive list.

3.3.4.4.1 Monthly Progress Report

The Development Entity shall prepare and submit a Monthly Progress Report (MPR) to the Department, inclusive of a Project Schedule Update (PSU) as described in *Section 3.4.7, Project Schedule Update* of these Technical Provisions, an OJT Monthly Progress Report, and a DBE Monthly Monitoring Report. The reporting period for the MPR shall be the end of the last day of the month.

The Development Entity shall provide the MPR to the Department no later than the tenth day of each month (reporting period) starting from the first full month following the date of issuance of NTP1 until the end of the Term. The Development Entity shall make corrections to the MPRs as coordinated with the Department and provide an updated MPR within 5 Business Days of receipt of written Department Comments.

The MPR shall, at a minimum, for the reporting period:

3. Work Management and Administration

- briefly describe Work progress;
- provide brief schedule narrative discussing Work progress inclusive of:
 - Critical Path issues and potential/proposed solutions;
 - Milestones providing dates for the immediate prior period, the current period, and an explanation regarding variance greater than 30 Days;
 - start and completion dates for major Work based on the Work Breakdown Structure (WBS); and
 - planned major Work for the upcoming period.
- identify issues and provide potential/proposed solutions for the current period and summarize issues remaining to be resolved from the immediate prior period;
- status Noncompliance Events (NCEs);
- incorporate the IQFs monthly quality report;
- status risk management activities;
- summarize Relief Events and Compensation Events accepted for the month immediately prior and the current period;
- status Change Orders, Field Design Changes, and Directive Letters;
- incorporate the latest SPRD and status Submittals;
- incorporate progress reports for achieving Equal Employment Opportunity (EEO) requirements, including progress on all requirements for DBE in the Project Agreement Exhibit 11, which includes but is not limited to, commercially useful function and prompt payment; and all requirements for OJT, which includes monthly reporting and any other EEO requirements;
- summarize quality management activities including reviews, findings, and actions/resolutions;
- identify Department actions and/or decisions required for the upcoming period; and
- provide digital progress photographs with descriptions (separate files logically named) accurately depicting and describing the progress of the Work noting that the Department is free to utilize the photographs and descriptions as the Department determines without restrictions and/or cost; and
- other reports as required in coordination with the Development Entity.

3.3.5 Document and Data Management Plan

As part of the PMP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Document and Data Management Plan (DDMP) expanding upon the information submitted with the Package Proposal. The Development Entity shall implement, manage, and update the accepted DDMP in accordance with the PMP requirements. As part of the DDMP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Submittal Packaging Plan (SPP) as described within *Section 3.5.1, Submittal Package Plan* of these Technical Provisions.

3. Work Management and Administration

The Development Entity shall utilize the Department supplied e-Builder system during the D&C Period and Construction Period for storing, cataloging, maintaining, controlling, accessing, searching, and retrieving Project Data inclusive of Project Management Plans, Design Documents, Construction Documents, Notices, Formal Communication, Submittals, and records. Documents placed within the Department supplied e-Builder system shall be electronically searchable and legible.

The Development Entity shall coordinate with the Department to determine access rights and processes associated with the various Department internal electronic storage and management systems applicable to the D&C Work, which shall be summarized in the DDMP.

Between each Bridge Completion and Final Acceptance, the Development Entity shall coordinate with and assist the Department to conduct the transfer of e-Builder system data to the Department's internal electronic storage and management systems.

The Development Entity shall provide the Maintenance Management Information System (MMIS) during the Maintenance Period as described in *Section 22, Maintenance* of these Technical Provisions. The DDMP shall reference the MMIS.

The Development Entity's DDMP shall, at a minimum:

- identify e-Builder system processes that will be used;
- identify necessary forms that will be used;
- require adherence to the requirements of *Attachment 29, EDMS Plan Sheet File Naming Convention* within these Technical Provisions;
- describe the version control procedures that will be utilized to ensure appropriate documents will be used for their intended purpose(s);
- require the use of systems, standards, and procedures that will be compatible with those employed by the Department;
- require the development and implementation of new operation procedures required as a result of Department amendments to systems, standards, and procedures;
- utilize applicable Bridge Key (BRKEY) numbers, Multi-Modal Project Management System (MPMS) number, Structural Number (S-Number), and Bridge Management System (BMS) number when making references to each Project and each individual bridge or structure;
- ensure only authorized personnel have access;
- summarize access rights and processes associated with the various Department internal electronic storage and management systems;
- develop and employ appropriate standards and procedures and train Development Entity personnel to operate applicable Department internal electronic storage and management systems; and
- provide electronic data storage and electronic data transfer in native formats as well as searchable Portable Document Format (PDF) images.

3.3.6 Equal Employment Opportunity Plan

As part of the PMP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of an Equal Employment Opportunity Plan (EEOP) addressing state and federal EEO requirements and expanding upon the information submitted with the Package Proposal. The EEOP shall consist of a Disadvantaged Business Enterprise Performance Plan (DBEPP) and an On-the-Job Training Plan (OJTP). The Development Entity shall implement, manage, and update the accepted EEOP in accordance with the PMP requirements and the Contract Documents.

The Development Entity shall ensure implementation of required federal, state, and Department EEO policies and programs. The Development Entity shall also ensure non-discrimination and to take affirmative action to assure equal opportunity as set forth under federal, state, and local laws, executive orders, rules, regulations as required by Executive Order 11246, “Equal Employment Opportunity” and Executive Order 11375, “Amending Executive Order No. 11246, Relating to Equal Employment Opportunity” as set forth in the Project Agreement; imposed pursuant to 23 U.S.C. Section 140 “Nondiscrimination”. The Development shall:

- Implement compliance procedures with the Equal Employment Opportunity requirements of Executive Order 11246, “Equal Employment Opportunity” as set forth in the Project Agreement;
- inform and educate subcontractors of EEO requirements and provide enforcement of the EEO program;
- implement EEO policy throughout the levels of the Development Entity’s organization, including executive leadership;
- ensure subcontractors managers, supervisors, and employees have access to and are provided EEO and diversity training;
- promote an inclusive culture in the workplace by fostering an environment of professionalism and respect for personal differences;
- recruit, hire, and promote individuals by implementing equal employment practices designed to widen and diversify the pool of candidates considered for employment openings on the Project, including openings in upper-level management as well as subcontractors;
- develop the potential of employees, supervisors, and managers by providing training and mentoring to give workers of various backgrounds the opportunity, skill, experience, and information necessary to perform well, and to ascend to upper-level jobs. In addition, employees of all backgrounds should have equal access to workplace networks;
- protect against retaliation by providing clear and credible assurances when employees make complaints or provide information related to complaints; the employer shall protect employees from retaliation and consistently follow through on this guarantee;
- adopt a strong anti-harassment policy, periodically train each employee on its contents, vigorously follow and enforce it, and develop a tracking system for participation;
- meet submission requirement for EEO reporting and documentation; and

- require, at a minimum, monthly EEO related meetings with the Department and other appropriate attendees to discuss issues, concerns, and status with regard to EEO related work performance, activities, and records.

3.3.6.1 Disadvantaged Business Enterprise Performance Plan

As part of the EEOP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Disadvantaged Business Enterprise Performance Plan (DBEPP) for the D&C Work.

The Development Entity's DBEPP shall, at a minimum:

- ensure compliance with the Department's Disadvantaged Business Enterprise (DBE) program according to 49 C.F.R. Part 26, "Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs";
- identify applicable forms to be utilized and meet submission requirements;
- detail how the Department's DBE supportive services center will be utilized;
- describe programs that will be implemented to ensure DBE firms successfully compete for Work;
- provide procedures and processes to ensure DBE firms successfully complete the Work;
- describe how the Work will be monitored to ensure DBE participation credit and compliance will be tracked and accounted for;
- detail how the Work will be managed to ensure DBE firms receive timely and prompt payments and that they will be informed about prompt payment requirements;
- describe how emerging risks associated with the DBE program will be identified and addressed, including ensuring that DBE firms will be performing commercially useful functions;
- identify how monthly updates to the DBE community regarding progress and upcoming Contract opportunities will be provided;
- provide narrative describing how ongoing good faith efforts to meet the DBE Goal will be conducted and detail efforts that will be undertaken to meet its DBE Commitments;
- detail how DBE participation and labor participation reports will be submitted and how records of compliance will be maintained, ensuring adherence to applicable civil rights requirements and the requirements of the Contract Documents; and
- identify the processes and procedures for a DBE Recovery Plan should the Department determine the DBE Commitments are not being achieved.

3.3.6.2 On-the-Job Training Plan

As part of the EEOP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of an On-the-Job Training Plan (OJTP) for the Construction Work.

The Development Entity's OJTP shall, at a minimum:

3. Work Management and Administration

- identify affirmative action training programs;
- describe OJT training programs;
- summarize goal setting criteria;
- identify a potential number of training slots including work classifications;
- define minimum lengths and type of training for work classifications;
- develop training plans ascribing to meaningful work toward journeyperson status;
- describe trainee certification processes;
- detail good faith efforts in identifying potential trainee and ongoing recruitment efforts;
- detail how the OJT Supportive Services Center will be utilized;
- detail how OJT required program documents and training reports will be submitted and how records of compliance will be maintained, ensuring adherence to applicable civil rights requirements and the requirements of the Contract Documents; and
- identify applicable forms to be utilized.

3.3.7 Risk Management Plan

As part of the PMP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Risk Management Plan (RMP) expanding upon the information submitted with the Package Proposal. The RMP shall include a risk matrix detailing the cause and effect of identified risks, the probability, impact, and exposure associated with the identified risks, actions/mitigations necessary to address the risk, and residual risk items that remain after the risk action/mitigation occurs. The Development Entity shall implement, manage, and update the accepted RMP in accordance with the PMP requirements.

The Development Entity's RMP shall, at a minimum:

- describe the approach for identifying, allocating, managing, and mitigating risk associated with the Work;
- detail risks associated with resiliency of bridges, pavements, and embankments in addition to other Project related risks;
- detail risk associated with not performing timely maintenance;
- group risks between design, construction, maintenance, and handback;
- provide specific mitigation strategies and measures to eliminate, prevent, and/or reduce risk impacts or to increase opportunity probability; and
- identify opportunities to enhance the outcome of the Work.

3.3.8 Department-Development Entity Communication Plan

As part of the PMP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Department-Development

Entity Communication Plan (DDECP) expanding upon the information submitted with the Package Proposal. The Development Entity shall implement, manage, and update the accepted DDECP in accordance with the PMP requirements.

The Development Entity's DDECP shall, at a minimum:

- describe the communication protocol between the Department and the Development Entity, inclusive of Development Entity-Related Entities, including roles and responsibilities and timing;
- detail how the various PMP component plan requirements will be coordinated with the Department;
- identify the Development Entity's procedures for notifying the Department about unexpected incidences that require Department input;
- define processes and procedures for monitoring, evaluating, and adjusting communication activities between the Department and the Development Entity; and
- describe processes and protocols for identifying and communicating dates associated with completing activities made necessary by these Technical Provisions.

3.3.9 Quality Management Plan

As part of the PMP, the Development Entity shall prepare and obtain Quality Assurance Manager (QAM), Maintenance Quality Assurance Manager (MQAM), and Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of the Quality Management Plan (QMP) expanding upon the information submitted with the Package Proposal. The Development Entity shall implement, manage, and update the accepted QMP in accordance with the PMP requirements, and in addition, shall update the accepted QMP when:

- it detects systematic or fundamental Nonconforming Work, inclusive of Noncompliance Events;
- it detects systematic issues with reviewing, inspection, testing, and/or accepting Work; or
- the Department provides Notice of systematic issues with the Development Entity's Work quality.

The Development Entity's QMP shall provide a single quality system that defines the processes and procedures to ensure Development Entity and Development Entity-Related Entities quality compliance. The Department, in its sole discretion, may grant exceptions for the need for a single quality system for subconsultants, subcontractors, fabricators, suppliers, and/or other Development Entity-Related Entities if a quality program that suitably adheres to the requirements of the QMP is in place.

The Development Entity's QMP shall be consistent with ISO 9001, "Quality Management Systems" and ISO 14001, "Environmental Management Systems" standards for quality and environmental management. For avoidance of doubt, the Development Entity may elect to obtain ISO 9001 and/or ISO 14001 certification but will not be required to do so. In any event, the Development Entity shall be responsible for Work quality consistent with ISO 9001 and ISO 14001 requirements. Unless defined or modified elsewhere in the Contract Documents, terminology used in ISO 9001 and ISO 14001 shall have the meanings as follows:

- "Organization" shall mean the Development Entity and/or Development Entity-Related Entities;

3. Work Management and Administration

- “Customers” shall mean the Department, Department-Related Entities, FHWA, third parties, Utility Owners, Railroads, and other Governmental Entities; and
- “Product” shall mean the Work.

The Development Entity’s QMP shall include complete descriptions of the quality objectives and procedures the Development Entity shall implement throughout its organization and in Work execution. The QMP shall define the procedures, roles, responsibilities, and requirements needed to ensure the Development Entity and Development Entity-Related Entities achieve Work quality. The QMP shall incorporate QC processes in addition to Quality Assurance and Acceptance procedures. The QMP shall demonstrate the Development Entity’s commitment to implement and continually improve the means, methods, inspection, verification, checking, testing, production, acceptance, and/or approaches to the Work.

The Development Entity’s QMP shall, at a minimum:

- be coordinated with the Independent Quality Assurance and Acceptance Plan (IQAAP) and clearly define Quality Assurance and Acceptance functions, procedures, interactions, and reporting as they relate to the Independent Quality Firm (IQF) within the D&C Period as well as the Maintenance Period;
- meet the *Department Pub 25, Quality Assurance Manual* as well as *Department Pub 2, Project Office Manual (POM)* requirements for reporting and recordkeeping;
- describe how quality shall be controlled and verified with respect to the information contained within the PMP;
- include QC and Quality Assurance and Acceptance processes and procedures, including the timing and frequency, to inspect, verify, sample, check, test, and review Work quality;
- define QC and Quality Assurance and Acceptance document control procedures;
- describe treatment of Noncompliance Events and Notices processes;
- describe QC and Quality Assurance and Acceptance roles and responsibilities;
- identify necessary QC and Quality Assurance and Acceptance training and certifications;
- describe QC and Quality Assurance and Acceptance functions and interactions;
- identify QC and Quality Assurance and Acceptance communication, auditing, and reporting processes and protocols; and
- outline QC and Quality Assurance and Acceptance roles, rights, and responsibilities of the QAM and Development Entity.

As part of the QMP, the Development Entity shall provide the following:

- an organizational chart identifying QC and Quality Assurance and Acceptance roles, authorities, and lines of reporting; and
- DQM, CQM, and MQM resumes.

The Development Entity's QMP shall include separate sections defining the Design Quality Management Plan (DQMP), the Construction Quality Management Plan (CQMP), and the Maintenance Quality Management Plan (MQMP) as described in:

- *Section 3.3.9.1, Design Quality Management Plan* of these Technical Provisions;
- *Section 3.3.9.2, Construction Quality Management Plan* of these Technical Provisions; and
- *Section 3.3.9.3, Maintenance Quality Management Plan* of these Technical Provisions.

3.3.9.1 Design Quality Management Plan

The Development Entity and Development Entity-Related Entities shall ensure Design Work quality. As part of the QMP, the Design Quality Manager (DQM) shall prepare and obtain Department and Quality Assurance Manager (QAM) acceptance of the Design Quality Management Plan (DQMP) expanding upon the information the Development Entity submitted with the Package Proposal. The Development Entity, specifically the DQM, shall implement, manage, and update the accepted DQMP in accordance with the QMP requirements. The DQMP shall establish the methods and procedures to ensure Design Work quality.

The Development Entity's DQMP shall, at a minimum:

- be coordinated with the overall QMP;
- specify methods and procedures that define the distinction, authority, and responsibility for the administration of the DQMP;
- identify specific interactions and coordination with the IQF performing Independent Quality Assurance and Acceptance;
- describe specific policies, procedures, and personnel necessary to implement and manage Design Work QC and Quality Assurance and Acceptance;
- describe the minimum qualifications for personnel conducting Design Work QC and Quality Assurance and Acceptance reviews;
- describe how Design Work QC and Quality Assurance and Acceptance personnel will be familiar with the DQMP and the Contract Documents;
- outline the scope and frequency of training and certification for personnel performing Design Work QC and Quality Assurance and Acceptance activities to ensure such personnel achieve and maintain reasonable proficiency, including the timing and distribution of training and certification results;
- define required Design Work QC and Quality Assurance and Acceptance forms and checklists;
- identify Design Work QC as well as Quality Assurance and Acceptance methods for preparing and ensuring Design Documents are independently reviewed for completeness, clarity, accuracy, and constructability;
- define Design Work QC as well as Quality Assurance and Acceptance procedures and responsibilities for verifying Design Work complies with the Contract Documents;
- Define the Design Document submission and review process;

3. Work Management and Administration

- establish the process to ensure that the designer and checker are identified for each Submittal;
- provide specific procedures for verifying software used to prepare the Design Work is acceptable;
- define SPRD update procedures;
- establish Design Document Compliance Certificate processes;
- describe the resolution process for Design Document Disputes;
- define the signing and sealing process for the Development Entity's Engineer of Record (EOR) and Professional Land Surveyor (PLS);
- describe the procedures for coordinating Design Work performed by different individuals, disciplines, or firms working in the same area, in adjacent areas, or on related tasks to ensure conflicts, omissions or misalignments do not occur including the coordination of the review, approval, release, distribution and revision of documents involving such parties;
- outline the process to be used to track and resolve Department Comments and Disputes;
- define procedures for performing Shop Drawing and Record Drawing QC as well as Quality Assurance and Acceptance reviews inclusive of their tracking and distribution;
- establish Design Work procedures to address Noncompliance Events;
- identify procedures associated with documentation and records, including the Department provided e-Builder system;
- outline the scope and frequency of Design Work QC audits, including the timing and distribution of results; and
- define reporting requirements.

The Development Entity shall present the personnel and organization responsible for:

- overseeing the implementation of the DQMP;
- resolving Design Work Disputes;
- resolving and tracking Comments;
- completing Design Document Compliance Certificates;
- signing and sealing processes;
- updating the SPRD;
- identifying Noncompliance Events;
- stopping Design Work;
- managing documentation and records; and
- performing audits.

3.3.9.2 Construction Quality Management Plan

The Development Entity and Development Entity-Related Entities shall ensure Construction Work quality. As part of the QMP, the Construction Quality Manager (CQM) shall prepare and obtain Department and QAM acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of the Construction Quality Management Plan (CQMP) expanding upon the information the Development Entity submitted with the Package Proposal. The Development Entity, specifically the CQM, shall implement, manage, and update the accepted CQMP in accordance with the QMP requirements. The CQMP shall establish the methods and procedures to ensure the quality of Construction Work.

In the event that the Department and/or the IQF determines Construction Work is advancing ahead of accepted Construction Document Submittals, the Department or the IQF may, at their discretion, require the Development Entity to stop Construction Work until such time as the requisite Construction Document Submittal has been accepted.

The Development Entity's CQMP shall, at a minimum:

- be coordinated with the overall QMP;
- specify methods and procedures that clearly define the distinction, authority, and responsibility for the administration of the CQMP;
- identify specific interactions and coordination with the IQF performing Independent Quality Assurance and Acceptance, inclusive of weekly and three-week rolling inspection and acceptance testing Notices;
- describe specific policies, procedures, and personnel necessary to implement and manage Construction Work QC as well as Quality Assurance and Acceptance;
- define required Construction Work QC as well as Quality Assurance and Acceptance forms and checklists, inclusive of reporting forms;
- define the methodology for performing daily Construction Work field inspections and preparing daily QC reports to document the inspections performed;
- define Development Entity Hold Points and Department Concurrence Points as described in *Section 3.3.9.2.1, Development Entity Hold Points and Department Concurrence Points* of these Technical Provisions;
- establish Construction Work methods and procedures for obtaining active personnel participation in QC operations;
- identify the material quality specifications approach for adherence to the targeted mean for material quality;
- specify time periods the QC staff member shall be present;
- specify how construction records and daily activities shall be maintained meeting the documentation requirements contained in the following Department publications:
 - *Department Pub 2, Project Office Manual*;
 - *Department Pub 19, Field and Laboratory Testing Manual*; and

3. Work Management and Administration

- *Department Pub 408, Highway Construction Specifications.*
- describe and, if needed, clarify how Department activities will be accommodated during Construction Work execution;
- establish procedures for inspecting, checking, documenting, and accepting the Construction Work;
- describe and, if needed, clarify processes to ensure activities affecting the quality of the Construction Work are accomplished using equipment appropriate for the task being performed;
- identify procedures to ensure the education, training, and certification of personnel performing CQMP activities are achieved and maintained;
- specify processes to ensure critical portions of the Construction Work are not started or continued without inspection and testing by the IQF;
- identify processes for providing descriptions of specific Construction Work procedures to ensure adherence to the requirements of the Contract Documents;
- establish procedures to ensure materials and constructed portions of the Work are accepted by the IQF and perform satisfactorily for the purpose intended;
- provide procedures for identification and control of materials that:
 - ensure identification is maintained by appropriate means; and
 - ensure the identification is part of the Project records traceable to the material and/or equipment as necessary, throughout fabrication, erection, installation and use of the material and/or equipment.
- identify processes to maintain records of Construction Work quality activities and provide to the Department utilizing the established systems;
- establish procedures to ensure materials and/or equipment not conforming to the Contract Documents are not used or installed including identification, documentation, segregation, disposition, and notification to the Department and, if appropriate, Governmental Entities, third parties, Utility Owners, and/or Railroads;
- define Noncompliance Events procedures and processes;
- identify, and if needed, clarify processes associated with Requests for Information (RFIs) to ensure changes are recorded and accepted with concurrence by the Department;
- provide procedures to indicate, by the use of markings such as stamps, tags, labels, routing cards, or other suitable means, the status of inspections and tests performed upon individual items of the Construction Work;
- establish a program for coordinating inspections and testing with the inspections and tests of applicable Governmental Entities, third parties, Utility Owners, and/or Railroads;
- define the testing approach required to demonstrate materials and constructed portions of the Construction Work perform satisfactorily for the purpose intended and meet the Contract Documents including:
 - specific written test procedures including provisions for ensuring prerequisites for the given test have been met and adequate test instrumentation is available and used;

3. Work Management and Administration

- requirements for the test results to be documented and evaluated to ensure test requirements have been satisfied; and
- processes to demonstrate how testing frequencies are tracked to ensure compliance with the Contract Documents.
- specify procedures for reviewing and approving acceptance test results, categorizing test results in a manner acceptable to the Department, transmitting acceptance test results to the Department using the established system for use in fulfilling its statistical validation requirements, and working collaboratively with the Department to resolve statistical non-validation between the Development Entity's and the IQFs test results;
- identify, and if needed, clarify processes for providing quality records to the Department for review and providing the Department with copies of quality records when requested;
- specify procedures for submitting results of internal quality audits to the Department;
- provide detailed descriptions of the inspection and test plans, including the timing, quantities represented and frequency of testing the Development Entity shall use to meet QC requirements of the Construction Work;
- identify measures to ensure tools, gauges, instruments, and other measuring and testing devices used in activities affecting quality are properly maintained, controlled, handled, stored, shipped, calibrated, certified, and adjusted at specified periods to maintain accuracy within industry standards;
- establish procedures to control the handling, storage, shipping, cleaning and preservation of materials and equipment to prevent damage or deterioration;
- specify processes to ensure conditions adverse to quality, such as failures, malfunctions, deficiencies, defective material and equipment, and deviations are promptly identified and corrected;
- identify, and if needed, clarify activities to control the receipt and issuance of controlled documents, such as instructions, procedures, training manuals and drawings, including changes thereto, which prescribe activities affecting quality to ensure:
 - approved documents, including authorized changes thereto, are reviewed for adequacy and approved for release by authorized personnel of the Development Entity;
 - approved documents are distributed to and used at the location where the prescribed activity is performed; and
 - changes to documents are reviewed and approved by the same organizations performing the original review and approval unless the Department consents, in writing, to another responsible organization.
- prescribe procedures and identify personnel to be used to assure specified instrumentation is installed and monitored in accordance with applicable specification, inclusive of those discussed in *Section 9, Geotechnical and Pavement* of these Technical Provisions; and

3. Work Management and Administration

- specify activities for achieving each Bridge Completion, Substantial Completion, and Final Acceptance, including procedures to certify to the Department that Construction Work meets acceptance criteria.

The Development Entity shall present the personnel and organization responsible for:

- overseeing the CQMP;
- checking Construction Work Submittals;
- resolving Construction Work Disputes;
- preparing, checking, and tracking Construction Document Submittals;
- identifying and tracking Noncompliance Events;
- stopping Construction Work;
- managing documentation and records; and
- performing audits.

Construction QC personnel are not required to be direct employees of the Development Entity; however, in any case, they shall not be involved in scheduling activities.

3.3.9.2.1 Development Entity Hold Points and Department Concurrence Points

The Development Entity shall identify and provide the Department with a list of Hold Points for acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) that facilitate and ensure appropriate review and inspection activities will be completed for the identified Work. The list of Hold Points shall be submitted to the Department as a condition precedent for the issuance of NTP3 and shall be included in the Baseline Project Schedule. In addition to the Development Entity identified Hold Points, the Development Entity shall implement the Department Concurrence Points identified in Table 3-1, which shall also be included in the Baseline Project Schedule.

Table 3-1. Department Concurrence Points

Construction Activity	Department Concurrence Point	Notes	
Structure Demolition	Demo Plan Concurrence	Submit a signed & sealed demolition plan 10 Business Days in advance of pre-demolition meeting per Section 1018 (Removal of Existing Bridge) of <i>Department Pub 408, Highway Construction Specifications</i> .	
	Pre-Demolition Meeting	Per Section 1018 (Removal of Existing Bridge) of <i>Department Pub 408, Highway Construction Specification</i>	
Foundations	Test Pile Concurrence	Per Section 1005 (Piles) of <i>Department Pub 408, Highway Construction Specifications</i> . Prior to start of production piles.	The Development Entity shall jointly schedule inspection of foundation testing with the IQF and the Department during the Department's normal business hours at least 2 Business Days in advance
	Pile Location Concurrence	Post-installation, ensure each pile is within specified tolerances per Section 1005.3(d) of <i>Department Pub 408, Highway Construction Specifications</i> .	

3. Work Management and Administration

Construction Activity	Department Concurrence Point	Notes	
	Micropile testing and verification	To ensure the Department and the IQF are present; coordinate the date of testing 2 Business Days in advance of testing to coordinate the actual date for witnessing this test	for foundation testing, including rescheduling of testing. The Development Entity shall not perform foundation testing without the Department’s District Structure Control Engineer and District Geotechnical Engineer, or their designated representatives, present.
	Pile Driving Analyzer Verification	Ensure pile capacity is reached prior to completion of foundation	
	Sub Soil Concurrence including in-situ capacity verification test review	Perform an IN SITU bearing capacity verification test using a method such as the dynamic cone penetrometer test.	
MSE Walls, T-Walls, etc.	Pre-Installation Concurrence	Submit a construction plan 10 Business Days in advance of retaining wall pre-installation conference	
Concrete/Steel Beam Setting	Concrete/Steel Beam Setting	Per Section 1050.3c (Steel Beam Erection) of <i>Department Pub 408, Highway Construction Specifications</i> and Section 1080.3c (Prestressed Beam Erection) of <i>Department Pub 408, Highway Construction Specifications</i> :	
Beam and Box Culvert Fabrication	Shop Inspection QA review Concurrence	Per Technical Provision <i>Section 2.11.2, Independent Quality Firm Supply Source and Material Quality Inspection and Testing</i>	
Concrete Deck Placement	Pre-Placement Deck Inspection including Dry Run Concurrence	Ensure the methods, sequence, and schedule for placing concrete is in accordance with the Quality Management Plan and <i>Department Pub 408, Highway Construction Specifications</i>	
Scour Protection	Pre-Placement Meeting	Submit a construction plan 10 Business Days in advance of pre-placement meeting for excavation and geotextile placement	
Concrete Approach Slabs	Pre-Pour Concurrence	Ensure the methods, sequence, and schedule for placing concrete is in accordance with the Quality Management Plan and <i>Department Pub 408, Highway Construction Specifications</i>	
Concrete Box Culverts	Sub Soil Concurrence	Perform an IN SITU Bearing Capacity verification test using a method such as the Dynamic Cone Penetrometer test. The Development Entity shall jointly schedule inspection of foundation testing with the IQF and the Department during the Department’s normal business hours at least 2 Business Days in advance for foundation testing, including rescheduling of testing. The Development Entity shall not perform foundation testing without the Department’s District Structure Control Engineer and District Geotechnical Engineer, or their designated representatives, present.	
	Post-tensioning of precast sections verification review	To ensure the Structure Control Engineer and the IQF are present; coordinate the date of inspection 2 Business Days in advance of inspection	

3. Work Management and Administration

Construction Activity	Department Concurrence Point	Notes
Flexible Paving	Pre-placement meeting	Schedule a pre-placement meeting 10 Business Days in advance of paving inspection
	Pavement inspection acceptance	To ensure the Department and the IQF are present; coordinate the date of inspection 2 Business Days in advance of inspection
Rigid Paving	Pre-placement meeting	Schedule a pre-placement meeting 10 Business Days in advance of paving inspection
	Pavement Inspection Acceptance	Ensure the methods, sequence, and schedule for placing concrete is in accordance with the Quality Management Plan

3.3.9.3 Maintenance Quality Management Plan

The Development Entity and Development Entity-Related Entities shall ensure Maintenance Work quality. As part of the QMP, the Maintenance Quality Manager (MQM) shall prepare and obtain Department and MQAM (which Department review, comment and acceptance shall be subject to Project Agreement Section 6.3) acceptance of the Maintenance Quality Management Plan (MQMP) expanding upon the information submitted with the Package Proposal. The Development Entity, specifically the MQM, shall implement, manage, and update the accepted MQMP in accordance with the QMP requirements. The MQMP shall establish the methods and procedures to ensure the quality of Maintenance Work.

The Development Entity's MQMP shall, at a minimum:

- be coordinated with the overall QMP;
- specify methods and procedures that define the distinction, authority, and responsibility for the administration of the MQMP;
- identify specific interactions and coordination with the IQF performing Independent Quality Assurance and Acceptance;
- describe specific policies, procedures, and personnel necessary to implement required inspections and ensure proper reporting and tracking of inspection findings;
- describe Development Entity's policies and procedures for QA of its inspection program throughout the Term;
- describe specific policies, procedures, and personnel necessary to implement and manage Maintenance Work QC as well as Quality Assurance and Acceptance;
- define required Maintenance Work QC as well as Quality Assurance and Acceptance forms and checklists;
- identify Maintenance Work QC as well as Quality Assurance and Acceptance methods for ensuring Submittals are reviewed for completeness, clarity, accuracy, and constructability;
- describe the resolution process for Maintenance Work Disputes;
- define Maintenance Work QC as well as Quality Assurance and Acceptance procedures and responsibilities for verifying Maintenance Work complies with the Contract Documents;

3. Work Management and Administration

- describe the minimum qualifications for qualified personnel conducting Maintenance Work quality reviews;
- describe how Maintenance Work personnel will be familiar with MQMP and the Contract Documents;
- outline the scope and frequency of training and certification for personnel performing Maintenance Work QC as well as Quality Assurance and Acceptance activities to ensure such personnel achieve and maintain reasonable proficiency, including the timing and distribution of results;
- describe the procedures for coordinating Maintenance Work performed by different individuals, disciplines, or firms working in the same area, in adjacent areas, or on related tasks to ensure conflicts, omissions or misalignments do not occur including the coordination of the review, approval, release, distribution and revision of documents involving such parties;
- establish Maintenance Work procedures to address Noncompliance Events;
- define the maintenance document submission and review process;
- define SPRD update procedures;
- describe the resolution process for Maintenance Document Disputes;
- outline the process to be used to track and resolve Department Comments and Disputes;
- define procedures for performing Shop Drawing and Record Drawing QC as well as Quality Assurance and Acceptance reviews as well as their tracking and distribution;
- identify procedures associated with documentation and records, including the Development Entity's supplied MMIS;
- outline the scope and frequency of Maintenance Work QC audits, including the timing and distribution of results; and
- define reporting requirements.

The Development Entity shall present the maintenance staff organization and personnel responsible for:

- overseeing the implementation of the MQMP;
- resolving Maintenance Work Disputes;
- resolving and tracking Comments;
- updating the SPRD;
- identifying and initiating Noncompliance Events;
- stopping Maintenance Work;
- managing documentation and records; and
- performing audits.

3.3.10 Affected Third Party Plan

3. Work Management and Administration

As part of the PMP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of an Affected Third Parties Plan (ATPP) expanding upon the information submitted with the Package Proposal. The Development Entity shall implement, manage, and update the accepted ATPP in accordance with the PMP requirements.

The Development Entity's ATPP shall, at a minimum:

- list third party approvals, permits, agreements, and reviews that may be required to perform the Work;
- describe the processes and timeframes the Development Entity shall utilize to obtain third party approvals, permits, agreements, and reviews that may be required for the Work inclusive of appropriate review and resubmission timeframes;
- detail how the Development Entity shall coordinate the Work with third parties and mitigate impacts to third party work;
- describe how the Development Entity shall keep the Department informed of third party related issues;
- identify how the Development Entity shall confirm the Work adheres to Third Party Agreements; and
- describe how the Development Entity shall resolve third party complaints, whether received directly or forwarded by the Department.

3.3.11 Safety and Security Plan

As part of the PMP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Safety and Security Plan (SSP) expanding upon the information submitted with the Package Proposal. The Development Entity shall implement, manage, and update the accepted SSP in accordance with the PMP requirements.

The Development Entity's SSP shall, at a minimum:

- confirm the Development Entity's approach to ensuring the safety of its personnel and the general public;
- define how applicable Occupational Safety and Health Administration (OSHA) requirements will be followed;
- provide the ability for Safety Compliance Orders to be issued by the Department and/or Department-Related Entities - for safety related issues;
- identify how the Development Entity shall ensure that during Construction Work, Maintenance Work, and/or Rehabilitation Work at the Bridge Site shall be a hardhat area, inclusive of personnel in cement concrete and bituminous concrete plants operated exclusively for the Work, even if the facility is remotely located;
- describe the policies, plans, training programs, controls, precautions, and responses to ensure the health, safety, and security of personnel affected by the Work;

3. Work Management and Administration

- describe reasonable precautions the Development Entity shall take to provide protection and prevent damage from injury, vandalism, theft, or loss;
- discuss the roles, responsibilities, and reporting line for the Development Entity's safety and security personnel;
- identify the security measures to be used for the Work, including Department occupied locations and spaces;
- describe the procedures to ensure appropriate safety and security monitoring, reporting, and communication is occurring;
- detail whistleblower protections;
- identify available medical facilities and discuss Emergency procedures that Development Entity personnel shall follow;
- discuss actions the Development Entity shall take to modify equipment, devices, processes, and/or procedures to protect against hazards in the event that the Department, the QAM, and/or the MQAM identifies, in their sole discretion, extraordinary Bridge Site conditions that constitute a safety hazard;
- present how the Development Entity shall comply with the applicable Law, regulations, provisions, and policies governing health and safety, including:
 - Federal Construction Safety Act (Public Law 91-54, "Occupational Safety and Health Act of 1970");
 - 29 C.F.R. Chapter XVII, Part 1926 "Safety and Health Regulations for Construction" and Public Law 91-596, "Occupational Safety and Health Act of 1970"; and
 - 29 C.F.R. Chapter XVII, Part 1910 "Occupational Safety and Health Standards".
- identify processes for ensuring personnel in work zones exposed to either traffic or construction activities wear high-visibility safety apparel intended to provide conspicuity during daytime and nighttime usage meeting the performance class 3 requirements of the American National Standards Institute and the International Safety Equipment Association (ANSI/ISEA) Standard 107; and
- identify how the Development Entity shall make necessary arrangements with local authorities to provide fire protection and keep fire hydrants adjacent to the Work readily accessible for firefighting equipment.

3.3.12 Emergency Management and Disaster Recovery Plan

As part of the PMP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of an Emergency Management and Disaster Recovery Plan (EMDRP) expanding upon the information submitted with the Package Proposal. The Development Entity shall implement, manage, and update the accepted EMDRP in accordance with the PMP requirements.

The Development Entity's EMDRP shall, at a minimum:

- outline the procedures for Emergencies, Incidents, and Force Majeure Events with the potential to disrupt the Work and/or damage the Project including, but not limited to:
 - severe weather events, including but not limited to, tornados, hailstorms, snowstorms, earthquakes, and flooding;
 - power Utilities affecting traffic operations and/or safety;
 - vehicular incidents that damage facilities or significantly interfere with traffic operations; and
 - environmental and Hazardous Materials Release.
- describe the Development Entity's systems and procedures for limiting disruption to the Work, protecting documents and data, and promptly resuming Work after Emergencies, Incidents, and/or Force Majeure Events;
- establish response procedures and identify relevant personnel, including their name, role, employer, email address, and contact phone number, responsible for organizing the Development Entity's response and for implementing the EMDRP on a continual basis between NTP1 and the end of the Term;
- define categories for the different types of events, data, systems, and operations according to their importance and the impact caused by a disruption;
- identify the levels of redundancy, security, verification, and other precautions required to protect and restore critical systems and data;
- describe how the Development Entity shall coordinate and cooperate with the Department, local law enforcement agencies, first responders, and third parties in response to Emergencies, Incidents, and Force Majeure Events;
- not restrict, limit, condition, constrain, or otherwise prevent or preclude the Department's unfettered access to the Bridge Sites and the use of applicable facilities for snow removal and evacuations;
- detail how the Development Entity shall notify the public about Emergencies, Incidents, and Force Majeure Events; and
- describe the training the Development Entity shall provide to the Department regarding relevant Emergency management and disaster recovery procedures and systems.

3.3.13 Public Information and Communications Plan

Public Information and Communications Plan (PICP) requirements are included within *Section 4, Public Information and Communication* of these Technical Provisions.

3.3.14 Comprehensive Environmental Protection Plan

Comprehensive Environmental Protection Plan (CEPP) requirements are included within *Section 5, Environmental* of these Technical Provisions.

3.3.15 Environmental Protection Training Plan

Environmental Protection Training Plan (EPTP) requirements are included within *Section 5, Environmental* of these Technical Provisions.

3.3.16 Waste Management Plan

Waste Management Plan (WMP) requirements are included within *Section 5, Environmental* of these Technical Provisions.

3.3.17 Noise Study Work Plan

Noise Study Work Plan (NSWP) requirements are included within *Section 6, Noise Analysis and Mitigation* of these Technical Provisions.

3.3.18 Utility Work Plan

Utility Work Plan (UW) requirements are included within *Section 7, Utilities* of these Technical Provisions.

3.3.19 Emergency Response Utility Plan

Emergency Response Utility Plan (ERUP) requirements are included within *Section 7, Utilities* of these Technical Provisions.

3.3.20 Right of Way Acquisition Report

Right of Way Acquisition Report (ROWAR) requirements are included within *Section 8, Right of Way* of these Technical Provisions.

3.3.21 Transportation Management Plan

Transportation Management Plan (TMP) requirements are included within *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions.

3.3.22 Design and Construction Closeout Plan

As part of the PMP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a D&C Closeout Plan. The Development Entity shall implement, manage, and update the accepted D&C Closeout Plan in accordance with the PMP requirements and as required to achieve each Bridge Completion, Substantial Completion, and Final Acceptance.

The Development Entity's D&C Closeout Plan shall, at a minimum:

- identify processes for inspecting and determining D&C Work completion;
- require a certificate of Final Acceptance issued by the QAM, notwithstanding the requirements of Section 7.7.3 of the Project Agreement;
- incorporate Bridge Punchlist, which shall be a Bridge-specific version of a Punchlist, and Punchlist processes, procedures, and schedules (which shall be consistent and coordinated with the inspections regarding Bridge Completion, Substantial Completion, and Final Acceptance);

3. Work Management and Administration

- include a training and transition plan that details how the Development Entity shall work with the Department to ensure a seamless transfer of responsibilities and safe traffic operations back to the Department;
- require an information tracking system to identify, record, and status D&C Work Elements to be inspected inclusive of the actions needed to complete the Work, highlighting portions of the Work that are incomplete, incorporating Noncompliance Events (NCEs), actions necessary to complete the Work, and responsible parties; and
- define required coordination with the Quality Assurance Manager (QAM) in order to administer the completed D&C Work confirmation processes and resolution of Disputes.

3.3.23 Maintenance Management Plan

Maintenance Management Plan (MMP) requirements are included within *Section 22, Maintenance* of these Technical Provisions.

3.3.24 Handback Work Plan

Handback Work Plan (HWP) requirements are included within *Section 23, Handback* of these Technical Provisions.

3.4 Project Schedules**3.4.1 General Schedule Requirements**

The Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Baseline Project Schedule for the Work expanding upon the information submitted with the Package Proposal. The Baseline Project Schedule shall, at a minimum:

- ensure adequate planning, scheduling, and resource allocation occurs;
- confirm a reasonable and executable approach;
- provide for continuous monitoring and reporting;
- identify and coordinate activities; and
- evaluate and measure progress.

The Baseline Project Schedule shall also, at a minimum:

- apply the Critical Path Method of network calculation;
- specify the longest path for defining critical activities with care taken to distinguish between the Critical Path and near-Critical Path (10 Days or less Float) activities;
- be compatible with the Department's scheduling software (currently Asta Powerproject) and implement new operating practices as a result of Department amendments to schedule-related software, standards, and/or procedures;
- be converted, if necessary, from native CPM scheduling software to the Asta Powerproject (.pp) format via the Department's ASTA Powerproject Client software, and validated against the native schedule prior to submittal;
- include a Work Breakdown Structure (WBS) based on a deliverable-orientated methodology;
- depict Milestones, Development Entity Hold Points, and Department Concurrence Points;
- show planned Work phasing;
- divide Work into activities with appropriate logic ties showing the overall sequencing and relationships between activities, avoiding open ends;
- avoid imposed constraint dates to begin or complete activities, unless the Contract Documents require;
- show time between the scheduled early completion date and Substantial Completion as Float;
- depict subcontractor, design consultant, Utility Owner, Governmental Entity, Railroad, and supplier coordination;
- identify approvals and permits; and
- provide unique activity identification numbers.

The Development Entity shall ensure Baseline Project Schedule titles and data dates are displayed on Development Entity produced schedules, charts, and diagrams. A legend shall be provided on schedules, charts, and diagrams which indicates the various symbols used and their meanings. Electronic versions shall likewise be uniquely identifiable by filename.

All Float shall be shown as such in the Baseline Project Schedule on each affected schedule path. The Department will have the right to examine the identification of (or failure to identify) Float on the Baseline Project Schedule in determining whether to accept the Baseline Project Schedule. Once identified, the Development Entity shall monitor and account for Float in accordance with the Critical Path Method.

Where not superseded by these Technical Provisions, the Development Entity shall prepare the Baseline Project Schedule and related submittals in accordance with *Department Pub 615, Scheduling Manual Procedures for PennDOT Schedules*.

3.4.2 Schedule Submittal and Report Requirements

The Development Entity shall ensure Baseline Project Schedule submittals and reports, at a minimum, include (as applicable):

- a transmittal letter identifying the submittal date and the schedule type submitted;
- a unique file name used to identify the schedule type and the submittal data date;
- a brief written narrative generally describing:
 - general sequence of design and construction;
 - assumptions;
 - Critical Path;
 - Milestones and key events;
 - sequence changes or other changes along with the reason those changes were necessary;
 - potential delays and problems along with the estimated effect;
 - specialty calendars used; and
 - whether the Work is on, ahead of, or behind schedule.
- an electronic copy of the schedule in Asta Powerproject (.pp) format;
- a schedule calculation log;
- a legible full schedule time-scaled bar-chart plot in PDF file format, organized by WBS, showing at a minimum:
 - activity identification;
 - activity name;
 - original duration;
 - remaining duration;
 - start date;
 - finish date;
 - activity percent complete (duration-type); and
 - total Float.
- a legible Critical Path time-scaled bar-chart plot in PDF file format;
- a tabular predecessor and successor report in PDF file format detailing each activity's predecessors and successors. The report shall be sorted by WBS (in ascending order by activity identification) and shall show for each activity:
 - activity identification;
 - activity name;

- original duration;
- remaining duration;
- early start;
- early finish;
- late start;
- late finish;
- free Float;
- total Float;
- critical (“yes” or “no”); and
- for each predecessor/successor activity, show the activity identification, activity name, relationship type, lag, free Float, total Float, driving (“yes” or “no”), and critical (“yes” or “no”).

3.4.3 Baseline Project Schedule

The Development Entity shall use the Proposal Schedule submitted with the Package Proposal as the foundation to prepare the NTP1 Baseline Project Schedule. The Development Entity shall include a separate report with the NTP1 Baseline Project Schedule that describes, in general fashion, the general sequence of design and construction required by the Contract Documents along with other items described within these Technical Provisions.

The NTP1 Baseline Project Schedule shall, at a minimum:

- provide items described for the Baseline Project Schedule in *Section 3.4.1, General Schedule Requirements* and *Section 3.4.2, Schedule Submittal and Report Requirements* of these Technical Provisions;
- detail the WBS in accordance with specific activities while retaining the ability to summarize each activity into major Work categories;
- identify the Work in sufficient detail to allow the Department to monitor and evaluate design, procurement, construction, and maintenance activities, for the period between NTP1 and the end of Term;
- include activities for:
 - D&C Work;
 - D&C Work Submittals inclusive of review and Comment resolution;
 - Record Drawings Submittals inclusive of review and Comment resolution;
 - coordination and acquisition of Third Party Agreements;
 - coordination and acquisition of approvals and permits;
 - quality management processes;

3. Work Management and Administration

- Milestones, Hold Points, and other constraining events; and
- Maintenance Work.
- be cost- and resource-loaded (optional for NTP1 Baseline Project Schedule, mandatory for NTP2 Baseline Project Schedule and subsequent Baseline Project Schedules);
- map each activity to a WBS code;
- divide the Work into activities not to exceed 21 Days, except for design, long lead procurement, and level of effort activities where a greater duration may be used;
- ensure activities are based on the actual duration and logical relationships and except for the first and last activities, each activity includes a minimum of one predecessor and one successor activity (no open ends);
- highlight the Critical Path;
- ensure that each Milestone is separately identified, conforms to the scheduling requirements set forth in the Contract Documents, and is assigned a “finish no later than” constraint date;
- depict Float; and
- incorporate long lead items.

The Development Entity shall utilize the following calculation settings consistent with industry best practices:

- Expected finish dates shall not be used;
- Resource-leveling shall not be used;
- Retained logic shall be used when scheduling progressed activities;
- “Start-to-start” lag shall be calculated from early start;
- Critical activities shall be defined as those activities whose total Float is less than or equal to zero Days;
- Total Float shall be calculated as finish Float;
- Relationship lag shall be calculated based on the predecessor calendar;
- Remaining duration shall be utilized to update schedule progress; and
- Duration percent complete shall be utilized.

The Development Entity shall apply cost- and resource-loading to materials, labor, and/or equipment quantities based upon available resources. Activity labor loading may be based upon the total number of workers but, at a minimum, upon the total number of crews. Major construction equipment shall be assigned to applicable activities. Quantity shall represent the estimated effort in-place for the cost and resource loading applied to the activities. Repairs during the Construction Period, including rehab and preservation to existing bridges, shall be incorporated.

The Development Entity shall first provide the NTP1 Baseline Project Schedule to the Department and shall subsequently prepare and submit to the Department for acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a NTP2 Baseline Project Schedule as a condition precedent to the issuance of NTP2, incorporating the latest understanding of the Baseline Project Schedule activities, productivity, and performance assumptions.

In the event that the Department does not accept the NTP1 Baseline Project Schedule as submitted, the Development Entity shall revise and resubmit it within 15 Business Days with changes clearly identified.

3.4.4 Baseline Schedule of Values

The Development Entity shall use the Package Proposal Schedule of Values submitted with the Package Proposal as the foundation to prepare the NTP1 Baseline Schedule of Values (BSOV) by allocating the total cost of design, procurement, construction, and maintenance activities to the schedule. This price breakdown shall accurately reflect Development Entity's cost for each Schedule of Value line item and shall not artificially inflate, imbalance, or front-load line items. The NTP1 BSOV shall be in conformance with *Section 3.4.2, Schedule Submittal and Report Requirements* of these Technical Provisions.

The NTP1 BSOV shall, at a minimum:

- include activity resources including materials, labor, and equipment;
- represent the planned labor and equipment hours necessary to achieve the estimated production rates used to develop the NTP1 Baseline Project Schedule; and
- ensure resource information includes (by category):
 - materials: type, unit of measure, and quantity;
 - labor: job hours planned by labor classification; and
 - equipment: job hours, number of pieces, types, and sizes.

The Development Entity shall first provide the NTP1 BSOV to the Department and shall subsequently prepare and submit for acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a NTP2 BSOV as a condition precedent to the issuance of NTP2, incorporating the latest understanding of the Baseline Project Schedule activities, productivity, and performance assumptions.

In the event that the Department does not accept the NTP1 BSOV as submitted, the Development Entity shall revise and resubmit it within 15 Business Days with changes clearly identified.

3.4.5 Revised Baseline Project Schedule

The Development Entity shall submit a Revised Baseline Project Schedule within 10 Business Days of executing a Change Order, Field Design Change, Directive Letter, Relief Event, or Compensation Event.

The Development Entity shall incorporate executed Change Orders, Field Design Changes, Directive Letters, Relief Events, or Compensation Events into the originally planned Work execution. Revised Baseline Project Schedules shall be in conformance with *Section 3.4.2, Schedule Submittal and Report*

Requirements of these Technical Provisions. Once accepted (which review, comment and acceptance shall be subject to Project Agreement Section 6.3), Revised Baseline Project Schedules shall remain in force until the Department accepts a subsequent Revised Baseline Project Schedule.

3.4.6 Revised Baseline Schedule of Values

The Development Entity shall submit a Revised BSOV within 10 Business Days of executing a Change Order, Field Design Change, Directive Letter, Relief Event, or Compensation Event.

The Development Entity shall incorporate executed Change Orders, Field Design Change, Directive Letters, Relief Events, or Compensation Events into the originally planned Work execution. Revised BSOVs shall be in conformance with *Section 3.4.2, Schedule Submittal and Report Requirements* of these Technical Provisions. Once accepted, Revised BSOVs shall remain in force until the Department accepts a subsequent Revised Baseline Project Schedule.

3.4.7 Project Schedule Update

The Development Entity shall prepare and submit a Project Schedule Update (PSU) monthly, in conformance with *Section 3.4.1, General Schedule Requirements* of these Technical Provisions, incorporated within the Monthly Progress Report (MPR) as described within *Section 3.3.4.4.1, Monthly Progress Report* of these Technical Provisions. The reporting period of the PSU shall align with the MPR.

The PSU shall, at a minimum, for the reporting period:

- incorporate information described in *Section 3.4.2, Schedule Submittal and Report Requirements* of these Technical Provisions;
- update the current Baseline Project Schedule and reflect current Work status including:
 - a detailed resource-loaded schedule of activities including the reporting period data date;
 - actual start and finish dates, percent complete, and remaining durations;
 - forecasted finishes for in-progress work;
 - re-forecasted early and late dates for remaining Work;
 - physically complete Work percentage; and
 - the Critical Path.
- provide, generally, the current plan for completing the Work;
- identify schedule revisions resulting from Change Orders, Field Design Changes, Directive Letters, Relief Events, and/or Compensation Events;
- include a monthly progress estimate based on the BSOV;
- provide supplementary filtered layouts of activities included in the Baseline Project Schedule to create:
 - a listing of:
 - anticipated D&C Work Submittals for the forthcoming reporting period; and
 - anticipated Maintenance Work activities for the forthcoming reporting period.

3. Work Management and Administration

- a simplified bar chart for each Bridge indicating the physical status of the Work;
- a graphical major item/WBS category summary report for each Bridge, comparing actual progress to planned progress;
- a tabular report listing Critical Path and near-Critical Path (10 Days or less Float) activities;
- a 30-Day D&C Work look ahead schedule;
- a 60-Day approval and permit look ahead report; and
- a 90-Day look ahead bar chart schedule sorted by WBS and activity early start dates.

The Development Entity shall correct Department identified PSU deficiencies within 10 Business Days of notification. For avoidance of doubt, the PSU shall not be deemed to revise or amend the current Baseline Project Schedule, but rather serve to update the Department on the progress of activities against the Baseline Project Schedule and forecast future Work activities.

3.4.8 Schedule of Values Update

The Development Entity shall prepare and submit a Schedule of Values Update (SOVU) monthly, in conformance with *Section 3.4.1, General Schedule Requirements* of these Technical Provisions, incorporated within the Monthly Progress Report (MPR) as described within *Section 3.3.4.4.1, Monthly Progress Report* of these Technical Provisions. The reporting period of the SOVU shall align with the MPR.

The SOVU shall provide updated price information for each line item on an earned value basis through the current reporting period and forecast the remaining costs through Final Acceptance.

The Development Entity shall correct Department identified SOVU deficiencies within 10 Business Days of notification. For avoidance of doubt, the SOVU shall not be deemed to revise or amend the current BSOV but shall rather serve to assist with Development Entity progress and earned value evaluation for current period activities.

3.4.9 Monthly Schedule Progress Meetings

The Development Entity shall coordinate with the Department to identify appropriate personnel to attend Monthly Schedule Progress Meetings (MSPMs). MSPMs shall occur no more than 5 Business Days after the submission of Monthly Progress Reports (MPRs) starting from the first month following NTP1 until the end of the Term. The MSPMs shall, at a minimum, discuss PSU topics identified within *Section 3.4.7, Project Schedule Update* as well as topics identified within *Section 3.4.8, Schedule of Values Update* of these Technical Provisions.

During the MSPMs, the Development Entity shall discuss Work progress and updates to the Baseline Project Schedule. The Development Entity shall reflect changes to sequencing or other adjustments discussed and accepted during the MPSMs in the next submittal of the PSU.

3.4.10 Recovery Schedule

The Development Entity shall, in the event of delays to either a Critical Path activity or the Critical Path as a whole for a period exceeding the greater of either 30 Days or the number of Days equal to 5 percent of the Days remaining until the Final Acceptance Date, provide a Recovery Schedule for the subsequent PSU.

The Recovery Schedule shall demonstrate the Development Entity's proposed plan to regain lost progress and to achieve the original Final Acceptance Date.

3.4.11 Record D&C Work Schedule

The Development Entity shall submit a draft PSU identified as the "Draft Record D&C Work Schedule" no less than 10 Business Days prior to the Bridge Completion of each Bridge.

The Development Entity shall submit a final PSU identified as the "Record D&C Work Schedule" no less than 10 Business Days prior to Bridge Completion of each Bridge included in the Project. The Record D&C Work Schedule shall reflect the exact manner Work was performed (including start and completion dates, schedule activities, actual durations, sequences, and logic) for the D&C Period for each Bridge included in the Project.

The Development Entity's Project Manager shall sign and certify that the Record D&C Work Schedule is a true Work record. The Department must accept the Record D&C Work Schedule for each Bridge as a requirement for Substantial Completion of the Project.

3.4.12 Time Impact Analysis

The Department and the Development Entity shall agree to address Baseline Project Schedule issues as quickly and contemporaneously as possible following:

- AACE International Recommended Practice No. 45R-08, Scheduling Claims Protection Methods (AACE International 2009).

The Department and the Development Entity shall address delay issues following:

- AACE International Recommended Practice No. 29R-03, Forensic Schedule Analysis (AACE International 2011); and
- AACE International Recommended Practice No. 52R-06, Time Impact Analysis – as Applied in Construction (AACE International 2006).

In the event that a Time Impact Analysis becomes necessary for Relief Events, Compensation Events, Change Orders, Field Design Changes, or Directive Letters, as applicable in accordance with the Contract Documents, the Development Entity shall submit a written Time Impact Analysis describing the nature and influence of the Relief Event, Compensation Event, Change Order, Field Design Change, or Directive Letter, as applicable. The Time Impact Analysis shall, at a minimum:

- establish the status of the Work before the event using the most recent PSU with the data date prior to and closest to the event, or as adjusted by mutual agreement between the parties;
- base the event on the alleged delay date, or, in the event of Relief Event or Compensation Event, base the event on the date which the implementation of such event would commence;
- identify the event, determine appropriate logic, and estimate impact duration;
- provide a Fragmentary Network (Fragnet) demonstrating how the change, delay, or request would impact the Baseline Project Schedule;

3. Work Management and Administration

- demonstrate event effects through layouts generated from the scheduling software;
- filter activities to show added or modified activities and activities impacted by the event;
- note other changes made to the schedule including modifications to calendars or constraints;
- include a narrative report describing the effects of the event to include:
 - identifying the schedule used for the analysis;
 - describing the procedures used to analyze schedule impacts, including additions, deletions, or modification to activities and or fragments of activities, modifications to the calendars or constraints and modifications to relationships;
 - describing the delay, including the time, date, and location of the event;
 - describing the impact or potential impact by comparing Work prior to the impact and Work affected or predicted to be affected after the impact;
 - identifying new activities, relationships with Milestones, and impacts to the Critical Path;
 - describing mitigation efforts taken to date; and
 - describing potential resolutions to mitigate or avoid impact.
- provide an electronic copy in Asta Powerproject (.pp) format of the impacted Baseline Project Schedule in addition to a copy in PDF; and
- provide other information or documentation pertinent to the analysis.

The Department must accept the Time Impact Analysis (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) in order to incorporate the Time Impact Analysis activities into the Baseline Project Schedule.

3.5 Submittal Review and Oversight

The Development Entity shall prepare the Development Entity Submittals identified throughout these Technical Provisions. The Development Entity shall deliver to the Department accurate and complete Submittals within the timeframe and form described within the Contract Documents, inclusive of these Technical Provisions. The Development Entity shall be solely responsible for meeting the Development Entity Submittal requirements under the Contract Documents.

3.5.1 Submittal Packaging Plan

The Development Entity shall conduct necessary coordination meetings with the Department to establish Submittal processes and procedures, consistent with the Contract Documents, inclusive of these Technical Provisions, and shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Submittal Packaging Plan (SPP) describing the Submittal processes and procedures for the Term. The SPP shall be included within the Document and Data Management Plan (DDMP). The Development Entity shall implement, manage, and update the accepted SPP in accordance with DDMP and PMP requirements.

The Development Entity's SPP shall include a SPRD that, at a minimum, incorporates the Submittals and associated requirements of the Contract Documents, inclusive of these Technical Provisions. The

Development Entity is specifically directed to the Section Submittal Requirements Tables at the end of each Technical Provision Section. The submission and acceptance of the SPRD shall not relieve the Development Entity of its Submittal obligations under the Contract Documents. The Development Entity shall ensure that each D&C Period Submittals identified in the SPRD are included in the Baseline Project Schedule and are assigned to a Coordination and Discipline Group (CDG).

For each Submittal, the Development Entity's SPRD shall, at a minimum:

- assign a unique item number to each Submittal;
- provide a description of each Submittal;
- identify the Submittal Type; and
- display the Time Period for Department Review.

For each Submittal, the Development Entity's SPRD shall also reflect the conditions precedent to certain activities or, if not precedent to a certain activity, the SPRD shall reflect the timeframe for the Submittal as described below:

- reflect the following dispositions as a condition to:
 - NTP2 or NTP3;
 - Design Work commencement for Submittal related Work;
 - Construction Work commencement for Submittal related Work;
 - each Bridge Completion;
 - Substantial Completion;
 - Final Acceptance; or
 - handback.
- reflect the following timeframes:
 - Construction Period;
 - Maintenance Period; or
 - Term.
- assign each Submittal to the appropriate CDG as coordinated with the Department.

The Development Entity shall provide a draft SPRD to the Department no later than 15 Business Days after NTP1. The Development Entity shall update the SPRD and provide it with the DDMP, to the Department at each Monthly Progress Meeting.

3.5.1.1 Coordination and Discipline Groups

The Development Entity shall coordinate with the Department and determine appropriate "Coordination and Discipline Groups" (CDG) which are groups established generally by technical discipline area to

3. Work Management and Administration

facilitate effective, efficient, and orderly Submittal processes. The CDG shall be organized by work type and shall be utilized to coordinate and control various Submittal activities between the Development Entity and the Department.

Whenever there are more than eight concurrent initial Submittals in review within a particular CDG, excluding structures, an additional 5 Business Days will be added to the prescribed time period for Department review for each additional increment of concurrent initial Submittals. For example, if there are between nine and fifteen initial Submittals in concurrent review within a particular CDG, then an additional 5 Business Days will be added to the prescribed review period for each initial Submittal; if there are more than 15 initial Submittals in concurrent review within a particular CDG, then an additional 5 Business Days will be added to the prescribed review period for each initial Submittal, and so forth. Whenever there are more than fifteen concurrent initial Submittals in review with the structures CDG an additional 5 Business Days will be added to the prescribed time period for Department review for each additional increment of concurrent initial Submittals. Initial Submittals are defined as the first Submittal to the Department of any Preliminary, Final, and Released for Construction Design Documents as described in *Section 3.5.2 Design Documents* of these Technical Provisions that have not been previously reviewed by the Department. Twin interstate bridges at one site can be combined into one initial Submittal. For the avoidance of doubt, this provision shall not apply to Submittals for which the Department has not responded within the original response period set forth in the Contract Documents.

3.5.2 Design Documents

The Development Entity shall execute Design Work in a collaborative manner, share and review Design Documents on a continual basis, and coordinate with the Department to address issues at the lowest level possible while seeking opportunities to improve efficiency. The Development Entity shall schedule and coordinate Design Document Submittals to allow for a well-organized process.

The Development Entity shall expand upon the information submitted with the Package Proposal and shall prepare and submit Preliminary, Final, and Released for Construction Design Documents as applicable and appropriate for the Submittal and in conformance with these Technical Provisions. Preliminary, Final, and Released for Construction Design Documents shall be prepared in accordance with the Project Standards and shall generally align with the Department's Preliminary Engineering, Design Field View, Pre-Final Design, and Plans, Specification, and Estimates plan development as identified throughout these Technical Provisions. The Development Entity is not required to provide specifications or estimates with the Released for Construction Design Documents. For the avoidance of doubt, the Development Entity shall prepare Design Documents in general conformance with Table 3-2.

Table 3-2. Design Document and Plan Development

Development Entity's Design Document	Department's Comparable Plan Development
Preliminary	Preliminary Engineering / Design Field View
Final	Design Field View / Pre-Final Design
Released for Construction	Plans, Specifications, and Estimates

The Development Entity shall prepare clear and accurate Design Document Submittals. The Department may require revisions to Design Documents in the event of inaccuracies and/or incompleteness, or to provide additional information as may be reasonably needed to conduct review activities. The Development

Entity shall ensure that each Design Document Submittal is identified within the SPRD described within *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions.

The Development Entity shall provide each Design Document Submittal to the Design Quality Manager (DQM) for verification that they meet the requirements of the Contract Documents, inclusive of the DQMP, prior to submission to the Department, unless otherwise specified. The Development Entity shall utilize the Department supplied e-Builder system when providing Design Document Submittals to the Department and for retaining records of Design Document Submittals not provided to the Department for review such as, but not limited to, Shop Drawings.

The Development Entity shall furnish PDF electronic copies, native electronic files, and a transmittal cover sheet in a form acceptable to the Department for Design Document Submittals. Design Document Submittals composed of multiple parts shall have each part clearly identified and the parts arranged in a logical sequence. The transmittal shall note every portion of the Design Document Submittal.

The Development Entity shall provide Design Document Submittals to the Department simultaneous with providing to Governmental Entities, third parties, Utility Owners, and/or Railroads pursuant to Section 6.2.2 of the Project Agreement. In the event that the Development Entity provides Design Document Submittals directly to Governmental Entities, third parties, Utility Owners, and/or Railroads, a record copy shall be placed on the Department supplied e-Builder system.

3.5.2.1 Staged Submittals

The Development Entity may elect to provide Staged Submittals. The Development Entity shall complete the Design Work required by the Contract Documents regardless of its election to provide staged Submittals. In the event that the Development Entity elects to provide Staged Submittals, they shall be submitted following a logical Design Work progression and shall be compatible with permitting and other environmental restrictions. The Staged Submittals shall be in accordance with *Section 3.5, Submittal and Review Oversight* of these Technical Provisions and shall be identified in the SPRD. The Development Entity shall, as applicable, provide any relevant accompanying information depicting additional portions of the Work with the Staged Submittals so that the relevant information can be reviewed in context.

3.5.2.2 Preliminary Design Documents

The Development Entity shall prepare and submit for Department review Preliminary Design Documents identified within the SPRD described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions. If the Development Entity elects to modify or revise an element of a previously reviewed and accepted Preliminary Design Documents Submittal, the Development Entity may submit an RFI to the Department to clarify minor changes rather than submitting a new Preliminary Design Document. The decision on whether the Development Entity shall submit a new Preliminary Design Document is at the Department's sole discretion. In addition to the applicable plan requirements of the Project Standards,

Preliminary Design Documents shall demonstrate the Development Entity's comprehensive understanding of the Project and shall, at a minimum:

- include a narrative describing the design modification(s);
- include redline markups which highlight the design modification(s);
- be in accordance with the requirements of the Contract Documents;
- provide relevant Project Data and Design Work;
- provide relevant Department and/or Governmental Entity required checklist(s);
- present the Development Entity's Design or other relevant information;
- identify necessary changes to the NEPA Basic Configuration, if applicable;
- incorporate NEPA Basic Configuration, if applicable;
- identify the Project Limits, if applicable;
- identify impacted Properties, if applicable;
- identify Permitted Design Exceptions and/or Permitted Design Variances needed to implement the NEPA Basic Configuration, if applicable; and
- identify Design Exceptions and/or Design Variances needed to implement the Development Entity's Design, if applicable.

3.5.2.3 Final Design Documents

The Development Entity shall prepare and submit for Department review Final Design Documents identified within the SPRD described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions. In addition to the applicable plan requirements of the Project Standards, Final Design Documents shall confirm the Development Entity's comprehensive understanding of the Project and shall, at a minimum:

- be in accordance with the requirements of the Contract Documents;
- provide relevant Project Data and Design Work, inclusive of comment responses from previous Submittals;
- provide relevant Department and/or Governmental Entity required checklist(s);
- verify the Development Entity's Design or other relevant information;
- verify necessary changes to the NEPA Basic Configuration, if applicable;
- incorporate NEPA Basic Configuration, if applicable;
- verify the Project Limits, if applicable;
- verify impacted Properties, if applicable;
- provide Permitted Design Exceptions and/or Permitted Design Variances needed to implement the NEPA Basic Configuration, if applicable;

3. Work Management and Administration

- provide Governmental Approvals of Design Exceptions and/or Design Variances needed to implement the Development Entity's Design, if applicable; and
- provide a Design Document Compliance Certificate signed by the DQM.

The Development Entity shall not submit Final Design Documents until Department Comments, Basis of Rejection items, Errors in the Preliminary Design Documents, and/or other provided Comments have been satisfactorily addressed in accordance with the terms set forth in Project Agreement Section 6.3, and in the event the Development Entity's Design requires re-evaluation of NEPA Approvals, NEPA re-evaluation approval has been obtained. For avoidance of doubt, multiple Submittals of Design Documents may be required to achieve the Department's and/or commenting party's concurrence that Department Comments, Basis of Rejection items, Errors in the Preliminary Design Documents, and/or other provided comments have been addressed.

3.5.2.4 Released for Construction Design Documents

The Development Entity shall prepare and provide Released for Construction (RFC) Design Documents to the Department identified within the SPRD described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions. In addition to the applicable plan requirements of the Project Standards, RFC Design Documents shall, at a minimum:

- be in accordance with the requirements of the Contract Documents;
- provide relevant Project Data and Design Work, inclusive of comment responses from previous Submittals;
- provide relevant Department and/or Governmental Entity required checklist(s);
- confirm the Development Entity's Design or other relevant information;
- confirm adherence to or clearly identify necessary changes to the NEPA Basic Configuration, if applicable;
- confirm NEPA Basic Configuration, if applicable;
- confirm the Project Limits, if applicable;
- confirm impacted Properties, if applicable;
- provide Permitted Design Exceptions and/or Permitted Design Variances needed to implement the NEPA Basic Configuration, if applicable;
- provide Governmental Approvals of Design Exceptions and/or Design Variances needed to implement the Development Entity's Design, if applicable;
- provide approvals obtained from applicable Governmental Entities, third parties, Utility Owners, and/or Railroads, if applicable;
- ensure RFC Design Documents are signed and sealed by the Development Entity's Engineer of Record (EOR) as applicable for the Design Work, if applicable; and
- Provide a Design Document Compliance Certificate signed by the DQM and the QAM.

The Development Entity shall not provide RFC Design Documents until Department Comments, Basis of Rejection items, Errors in the Final Design Documents, and/or other provided comments have been satisfactorily addressed in accordance with the terms of Project Agreement Section 6.3 and Governmental Approvals have been provided. For avoidance of doubt, multiple Submittals of Design Documents may be required to achieve the Department's and/or commenting party's concurrence that Department Comments, Basis of Rejection items, Errors in the Final Design Documents, and/or other provided have been addressed and to achieve Governmental Approvals in accordance with the Contract Documents.

3.5.2.5 Design Document Compliance Certificate

The Development Entity shall submit Design Document Compliance Certificates for Final Design Documents and RFC Documents prepared and signed by the DQM and the QAM that:

- certifies the Design Documents achieve the requirements of the Contract Documents;
- certifies the Design Documents are ready for Construction Work (RFC Design Documents only);
- verifies the Design Documents have been checked in accordance with the accepted Quality Management Plan (QMP); and
- confirms necessary Governmental Entities, third parties, Utility Owners, and/or Railroad approvals have been obtained.

The Development Entity's provision of Design Document Compliance Certificates shall not constitute approval of the Design Documents or subsequent construction, nor shall a Design Document Compliance Certificate relieve the Development Entity's responsibility to meet the necessary requirements of the Contract Documents.

3.5.2.6 Shop Drawings

The Development Entity shall prepare and submit Shop Drawings to the Development Entity's Engineer of Record for review and acceptance in accordance with Design Documents and Contract Documents requirements. Shop Drawings shall depict details needed for fabrication, handling, and transportation as applicable and shall be accepted before fabrication begins. Fabricator QC as well as Independent Quality Assurance and Acceptance shall be included on the Shop Drawing.

3.5.2.7 Field Design Change

The Development Entity may initiate Field Design Changes (FDCs) for Construction Work after RFC Design Documents have been provided. "FDCs" as defined in this *Section* are submittals that may be necessary to address changes in construction material and/or approach, design, or in response to field conditions that do not constitute minor changes. For avoidance of doubt, FDCs shall not be used as a Change Order or to modify Contract Document requirements. The Development Entity shall submit the FDC to the Department for review and acceptance.

The FDC shall, at a minimum:

- utilize a form acceptable to the Department;
- assign a unique identification number;

3. Work Management and Administration

- provide the origination date and originator information;
- identify changes attributable to the FDC applicable to the following:
 - the NEPA Basic Configuration;
 - the Project Limits;
 - impacted Properties;
 - Environmental Approvals and/or environmental commitments; and
 - approvals obtained from applicable Governmental Entities, third parties, Utility Owners, and/or Railroads.
- identify and describe impacts and/or changes attributable to the FDC applicable to the following:
 - D&C Work;
 - Environmental Approvals;
 - ROW and Utility Adjustment Work;
 - Maintenance Work; and
 - Handback Requirements.
- provide a Time Impact Analysis; and
- provide supporting Project Data and Design Work.

The Department may accept or reject FDC proposed by the Development Entity. The Development Entity shall be solely responsible for impacts attributable to the FDC. The Development Entity shall prepare and maintain an FDC log which shall be provided to the Department upon request.

Changes submitted under the FDC process shall adhere to the submission review and oversight procedures described in the Contract Documents, inclusive of processes associated with Preliminary Design Documents, Final Design Documents, RFC Design Documents, and Design Document Compliance Certificates. The EOR of the original design shall approve the FDC. In the event that the EOR of the original design is not available, then after notification of the original EOR, another qualified EOR shall approve the FDC.

3.5.2.8 Record Drawings

The Development Entity shall prepare and submit to the Department Record Drawings. The Development Entity shall ensure Record Drawings reflect actual constructed Work conditions, with adjustments made in the electronic computer program files, inclusive of Requests for Information and minor changes as well as Field Design Changes. The Development Entity's Design-Build Project Manager shall sign and certify that the Record Drawings are a true Work record. The Department must accept the Record Drawings as a requirement for Bridge Completion for each Bridge included in the Project.

The Development Entity shall submit and obtain Department acceptance on draft Record Drawings prior to achieving each Bridge Completion. The Development Entity shall provide the Department with revised draft Record Drawings of actual constructed Work conditions no later than 10 Business Days after Bridge

Punchlist field inspections. After completing Bridge Punchlist items, the Development Entity shall incorporate Department Comments, make necessary adjustments to the draft Record Drawings, and submit final Record Drawings to the Department for review and acceptance.

3.5.3 Construction Documents

The Development Entity shall execute Construction Work in an orderly fashion and shall coordinate with the Department to address issues at the lowest level possible while seeking opportunities to improve efficiency. The Development Entity shall schedule and coordinate Construction Document Submittals to allow for a well-organized process.

The Development Entity shall prepare clear and accurate Construction Document Submittals. The Department may require revisions to Construction Document Submittals in the event of inaccuracies and/or incompleteness, or to provide additional information as may be reasonably needed to conduct review activities. The Development Entity shall ensure that Construction Document Submittals are identified within the SPRD described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions.

The Development Entity shall provide Construction Document Submittals to the CQM for verification that they meet the requirements of the Contract Documents, inclusive of the CQMP, prior to submission to the Department, unless otherwise specified. The Development Entity shall utilize the Department supplied e-Builder system and Electronic Quality Management System (EQMS) as appropriate, when providing Construction Document Submittals to the Department.

The Development Entity shall furnish PDF electronic copies, native electronic files, and a transmittal cover sheet in a form acceptable to the Department for Construction Document Submittals. Construction Document Submittal composed of multiple parts shall have each part clearly identified and the parts arranged in a logical sequence. The transmittal shall note every portion of the Construction Document Submittal.

The Development Entity shall provide Construction Document Submittals to the Department simultaneous with providing to Governmental Entities, third parties, Utility Owners, and/or Railroads pursuant to Section 6.2.2 of the Project Agreement. In the event that the Development Entity provides Construction Document Submittals directly to Governmental Entities, third parties, Utility Owners, and/or Railroads, a record copy shall be placed on the Department supplied e-Builder system.

3.5.3.1 Requests for Information and Minor Changes

Requests for Information (RFIs) may be utilized to clarify information presented in Design Documents but may not be used to supplant Change Requests or modify Contract Document requirements. The Development Entity shall prepare and maintain an RFI log, which shall be provided to the Department upon request. The Lead Design Manager shall be responsible for preparing and maintaining responses to RFIs and providing them to the Department for review and concurrence.

RFIs that constitute Minor Work Changes (MWCs) may be used to transfer RFI information to the Record Drawings. The Lead Design Manager and the EOR shall evaluate the RFI and if the RFI constitutes MWC, then the EOR may transfer the information from the RFI to a Field Design Change (FDC) log of MWCs and transfer the MWCs to the Record Drawings. The Lead Design Manager shall be responsible for

3. Work Management and Administration

preparing and maintaining the FDC log of MWCs for the purpose of verifying completeness of the Record Drawings.

3.5.4 Department and Governmental Entity Review Processes

The Development Entity shall coordinate with the Department, Governmental Entities, the QAM, the MQAM, the DQM, the CQM, and the MQM as appropriate to establish Design, Construction, and Maintenance Document review workflow processes and procedures which designate the actions of each party, provide consistent formatting, and facilitate efficient Comment resolution. The Department will conduct reviews and provide written Comments in accordance with the Project Agreement Section 6.3 and these Technical Provisions. The Department will conduct reviews with representatives from Central Office and the District from where the Work is located. The Department will review Submittals for compliance with the Contract Documents and sound engineering judgment and practice.

The Development Entity shall schedule and arrange Comment Resolution Meeting(s) (CRMs) with the Department and Governmental Entities as appropriate, if warranted, upon completed review. No less than 5 Business Days prior to the CRM, the Development Entity shall provide written responses to Department and/or Governmental Entity Comments. No later than 5 Business Days following the CRM, the Development Entity shall revise the written responses as may be needed and provide the Department and/or the Governmental Entity with a record of the Comment resolution.

The Development Entity shall address Department and Governmental Entity Comments, Basis of Rejection items, and/or Errors in the Design and Construction Documents. The Development Entity shall correct Design and Construction Documents to achieve the Department's concurrence that Department Comments have been addressed and to achieve Governmental Approvals in accordance with the Contract Documents.

For avoidance of doubt, multiple Submittals may be required to achieve Department and/or Governmental Approvals in accordance with the Contract Documents.

3.6 Section 3, Work Management and Administration Submittal Requirements

Whenever a Submittal identified in the following Table 3-3 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 3-3 information. The Department will conduct reviews and provide Department Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 3-3 and Project Agreement Section 6.3.

Table 3-3. Section 3, Work Management and Administration Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Project Management Plan (PMP)					Refer to items 2 through 34 of this table

3. Work Management and Administration

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
2	Management and Staffing Plan (MSP)	2	10	NTP2	—	—
3	List of meetings necessary for the Work	2	10	Design Work commencement for Submittal related Work	—	—
4	List of reports necessary for the Work	2	10	Design Work commencement for Submittal related Work	—	—
5	Meeting Invitations and Agendas	1	—	—	Term	—
6	Meeting Minutes	2	3	—	Term	—
7	Monthly Progress Report	2	10	—	Term	—
8	Document and Data Management Plan (DDMP)	2	10	NTP2	—	—
9	Submittal Packaging Plan (SPP)	2	10	NTP2	—	—
10	Submittal Packaging Requirements Database (SPRD)	2	15	NTP2	—	—
11	Equal Employment Opportunity Plan (EEOP)	Refer to items 12 and 13 of this table				
12	Disadvantaged Business Enterprise Performance Plan (DBEPP)	2	20	NTP2	—	—
13	On-the-Job Training Plan (OJTP)	2	20	NTP3	—	—
14	Risk Management Plan (RMP)	2	10	NTP2	—	—
15	Department-Development Entity Communication Plan (DDECP)	2	10	NTP2	—	—
16	Quality Management Plan (QMP)	Refer to items 17 through 19 of this table				
17	Design Quality Management Plan (DQMP)	2	10	NTP2	—	—
18	Construction Quality Management Plan (CQMP)	2	10	NTP2	—	—
19	Maintenance Quality Management Plan (MQMP)	2	10	NTP3	—	—

3. Work Management and Administration

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
20	Affect Third Parties Plan (ATPP)	2	10	NTP2	—	—
21	Safety and Security Plan (SSP)	2	10	NTP3	—	—
22	Emergency Management and Disaster Recovery Plan (EMDRP)	2	10	NTP3	—	—
23	Public Information and Communications Plan (PICP)	Refer to Table 4-1 <i>Section 4, Public Information and Communication</i> Submittal Requirements				
24	Comprehensive Environmental Protection Plan (CEPP)	Refer to Table 5-2 <i>Section 5, Environmental</i> Submittal Requirements				
25	Environmental Protection Training Plan (EPTP)	Refer to Table 5-2 <i>Section 5, Environmental</i> Submittal Requirements				
26	Waste Management Plan (WMP)	Refer to Table 5-2 <i>Section 5, Environmental</i> Submittal Requirements				
27	Noise Study Work Plan (NSWP)	Refer to Table 6-1 <i>Section 6, Noise Analysis and Mitigation</i> Submittal Requirements				
28	Utility Work Plan (UWP)	Refer to Table 7-1 <i>Section 7, Utilities</i> Submittal Requirements				
29	Emergency Response Utility Plan (ERUP)	Refer to Table 7-1 <i>Section 7, Utilities</i> Submittal Requirements				
30	Right of Way Acquisition Report (ROWAR)	Refer to Table 8-1 <i>Section 8, Right of Way</i> Submittal Requirements				
31	Transportation Management Plan (TMP)	Refer to Table 20-1 <i>Section 20, Maintenance and Protection of Traffic</i> Submittal Requirements				
32	D&C Closeout Plan	2	15	NTP3, each Bridge Completion, and Substantial Completion	—	—
33	Maintenance Management Plan (MMP)	Refer to Table 22-2 <i>Section 22, Maintenance</i> Submittal Requirements				
34	Handback Work Plan (HWP)	Refer to Table 23-2 <i>Section 23, Handback</i> Submittal Requirements				
35	Baseline Project Schedule	Refer to items 36 and 37 of this table				
36	NTP1 Baseline Project Schedule	1	15	NTP2	—	—
37	NTP2 Baseline Project Schedule	2	15	NTP2	—	—
38	Baseline Schedule of Values (BSOV)	Refer to items 39 and 40 of this table				
39	NTP1 BSOV	1	15	NTP2	—	—
40	NTP2 BSOV	2	15	NTP2	—	—

3. Work Management and Administration

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
41	Revised Baseline Project Schedule	2	10	—	Term	—
42	Revised Baseline Schedule of Values	2	10	—	Term	—
43	Project Schedule Update	2	10	—	Term	—
44	Schedule of Values Update	2	10	—	Term	—
45	Recovery Schedule	2	10	—	Term	—
45a	Draft Record D&C Work Schedule	3	10	Each Bridge Completion	—	—
46b	Record D&C Work Schedule	3	15	Bridge Completion	—	—
47	Time Impact Analysis	2	10	—	Term	—
48	List of Hold Points	2	5	NTP3	—	—
49	Preliminary Design Documents	Refer to Sections 4 through 23 of these Technical Provisions				
50	Final Design Documents					
51	Released for Construction					
52	Design Document Compliance Certificate	1	—	—	Term	—
53	Shop Drawings	1	—	—	Construction Period	—
54a	Bridge Punchlists	2	—	Each Bridge Completion	—	—
54b	Punchlists	2	—	Substantial Completion	—	—
55a	Draft Record Drawings	3	15	Each Bridge Completion	—	—
55b	Record Drawings	3	15	Final Acceptance	—	—
56	Requests for Information	1	—	—	Term	—
57	Field Design Change	3	—	—	Construction Period	—

4 Public Information and Communication

4.1 General Requirements

The Development Entity shall create and implement a Public Information and Communications Plan (PICP) throughout the Term in coordination with the Department as required under this section. The Development Entity shall coordinate public information and communication with ongoing Department public information activities to ensure a consistent message is distributed to the stakeholders. The Development Entity shall provide copies of materials to be presented to the public or the media to the Department for review and acceptance at least 10 Business Days prior to dissemination unless an alternative timeline is approved by the Department. Public information and communications shall be in accordance with *Department Pub 295, Project Level Public Involvement Handbook* and *Department Pub 746, Project Level Environmental Justice Guidance*, and 23 C.F.R. 771.111(h), “Early coordination, public involvement, and project development” for the purposes of NEPA-related public involvement.

4.2 Project Standards

A list of Project Standards applicable to the Work are included in *Attachment 1, Project Standards* of these Technical Provisions.

4.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

4.4 Personnel

The Development Entity shall provide a Public Information and Communication Manager to lead the Development Entity’s responsibility for public involvement activities during the D&C Work and to serve as the single point of contact throughout the Project Term. Personnel requirements applicable to the Work are included within this document in *Section 3, Work Management and Administration* of these Technical Provisions.

4.5 Public Information and Communications Plan

The Development Entity shall prepare and obtain Department acceptance of a Public Information and Communications Plan (PICP) that establishes the public information and communication procedures, and processes as relates to the Project. The Development Entity shall submit to the Department for acceptance an updated PICP within 30 Days of NTP1, based upon the preliminary PICP submitted with the Package Proposal. The Development Entity shall obtain Department acceptance of the updated PICP as a condition precedent of NTP2. The PICP shall identify specific activities to inform, educate, and engage stakeholders, the frequency of those activities, who is responsible for implementing such activities, which modes of communication shall be used and what process the Development Entity shall use to measure the effectiveness of the PICP. The PICP shall also discuss the role and responsibilities of the Public Information and Communication Manager. The Submittal shall be in PDF format.

The Department will conduct PICP reviews and provide review Comments in accordance with *Section 4.8, Section 4, Public Information and Communication Submittals* of these Technical Provisions. The Department will request a Comment Resolution Meeting between the Department and the Development Entity, if warranted. No less than two Business Days prior to the Comment Resolution Meeting, the

4. Public Information and Communication

Development Entity shall provide written responses to the Department-provided Comments. No later than two Business Days following the meeting, the Development Entity shall revise the written responses as may be needed and provide the Department with a record of the Comment resolution.

The Development Entity shall address Department provided conditions, Comments, or requirements identified during Department reviews and for obtaining Department acceptance.

In preparing the updated PICP, the Development Entity shall identify the stakeholders as specified in *Section 4.5.1, Stakeholders* of these Technical Provisions and develop specific plans to respond to their concerns and needs regarding the Project. After the Department's approval of the PICP, the Development Entity shall implement the various activities and initiatives contained therein.

The Development Entity shall ensure that the updated PICP has appropriate provisions to accomplish the public information and communication goals and strategies established by the Department, including:

- providing information to the Department in a timely and accurate manner;
- collaborating with and involving the Department in materials, meetings, or communications involving the program, especially where program policy is a focal point;
- informing and seeking support from stakeholders, building on existing community partnerships and communication networks;
- providing stakeholders with regular opportunities for input early, often, and with timely responses as necessary throughout the development process;
- collaborating with the Department to notify stakeholders in advance of key environmental, Project ROW acquisition (only after NEPA approval), construction and maintenance activities and communicate the potential impacts of these activities;
- providing timely information to Users which facilitates trip planning during construction; and
- documenting and responding to the specific concerns of stakeholders, including first responder's vehicle access, business owner and patron driveway access, delivery access, adjacent neighborhood access, changes to bicycle and pedestrian access and neighborhood traffic patterns, compliance with the Americans with Disabilities Act (ADA), and construction noise and lighting issues.

The PICP shall be flexible to capture the full magnitude of anticipated and unforeseen impacts from Project activities such as design, construction, and maintenance, and the public's likely reaction to these and other impacts. The strategies outlined in the PICP shall accommodate changes in the depth, breadth, and frequency of information needed by stakeholders throughout the Term. The PICP shall include a general timeline listing public information activities for the Project over the entire Term and shall be coordinated with stakeholder event calendars. This timeline shall be used as an initial guide and shall be updated by the Development Entity as the Project is implemented but no less than on a yearly basis. The Development Entity shall implement, manage, and update the accepted PICP in accordance with the Project Management Plan (PMP) requirements.

The Department may audit the Development Entity's performance of the activities set forth in the PICP. The Development Entity shall make appropriate changes to the PICP as required to meet the findings of an

audit or review and to suit the changing goals and needs of the Project. The Development Entity shall cooperate with the Department to amend the PICP as required to suit circumstances yet unknown, including public reaction to the impacts, real or perceived, from the Work and the depth, breadth and frequency of information necessitated by stakeholders. The Development Entity shall document the efforts and results of the PICP in measurable terms to clearly indicate compliance.

4.5.1 Stakeholders

To support and collaborate with the Department as the public face of the Project, the Public Information and Communication Manager shall identify, actively engage, inform, and seek appropriate support from stakeholders for the Project throughout the Term. Stakeholders shall include the following:

- the Department;
- media;
- Governmental Entities;
- regulatory and law enforcement agencies;
- general public residing or working within the general vicinity of the Project;
- Users;
- business owners within a mileage radius of the Project corridor determined in consultation with the Department;
- Utilities, Railroads, transportation authorities and providers (such as local airports, transit, operators, toll authorities, and other Highway concessionaires) affected by the Project;
- neighborhood associations, community groups, and other organizations with special interest in the Project;
- major traffic generators which could be affected by Lane Closures or construction (such as universities, major employers) and sponsors/coordinators of major regional special events;
- elected officials;
- schools;
- first responders;
- chambers of commerce and visitors' bureaus; and
- any other group as determined by the Department.

4.5.2 Outreach and Information

The Development Entity shall develop a forum to coordinate ongoing dialogue among stakeholders, the Department, and the Development Entity. The Development Entity's responsibilities in this regard shall include the following:

- After Department aesthetic and content acceptance, prepare and distribute materials in a user-friendly format to inform stakeholders through appropriate means such as: meetings, interviews, media kits, news releases, telephone correspondence, newsletters, brochures, e-mail, text messaging service, social media (on existing Department-hosted assets), hotlines, dynamic message boards, internet alerts, videos, display booths, presentations, public access information kiosks, and special events. Materials shall include boilerplate or other form of consistent program message agreed upon with the Department.
- In consultation with the Department, and in accordance with *Department Pub 295, Project Level Public Involvement Handbook*, organize and manage meetings and communications with stakeholders affected by the Project for the purpose of building rapport with and gaining feedback from stakeholders.
- To facilitate Department attendance, meetings can be held on an ad hoc basis or, as appropriate, on a regular basis as established in consultation with the Department. The Development Entity shall notify the Department at least 10 Business Days prior to meeting with a public official, 10 Business Days prior to public notice of public meetings held with respect to Bridge(s), and shall provide the meeting materials and/or press releases, where applicable, to the Department with the notification.
- Respond to invitations and seek opportunities to attend meetings, in-state conferences, and other events at which Project information can be exchanged with stakeholders.
- In coordination with the Department, develop, disseminate, and display timely, accurate, clear, and concise information concerning the Project, including Project plans, Project ROW acquisition, Traffic Control Plans (TCP), proposed detours, mitigation approaches for impacted environmental features, and proposed aesthetic characteristics.
- Conduct working meetings with stakeholders such as Emergency responders and Governmental Entities to help prepare for potential Emergencies during the Construction Period.
- Compile a database of stakeholder contacts and make such database readily available to the Department in a format approved by the Department.
- Coordinate with the Department to assess the need for multi-lingual communications and, where appropriate, also furnish Project-related materials in Spanish or other languages. The Public Information and Communication Manager (PICM) shall develop materials that are ADA compliant and provide public accommodations as requested.

4.5.2.1 Public Information and Involvement

The Development Entity shall:

- coordinate with the Department to place messaging in the appropriate media, including providing content for applicable Department social media;

- develop and implement communications plans anticipating and minimizing traffic impacts on public, special and seasonal events; and
- monitor local, state, and national media coverage for accuracy and to gauge local opinion and coordinate with the Department regarding response to inaccurate information as soon as possible in the same media.

4.5.2.2 Website and Digital Media

The Development Entity shall coordinate and develop website content to be posted to the website for each Bridge (see links) and the Project page (<https://www.penndot.gov/about-us/funding/Pages/Solutions.aspx> or <https://www.penndot.gov/ProjectAndPrograms/p3forpa/Pages/Major-Bridges.aspx>, as applicable) that is consistent with Department and Project brand management and concurrence. The PICM shall provide updates to information on each Project website as needed throughout the Project to provide current and appropriate information. The Development Entity shall review the Project page(s) for accuracy and needed updates on a monthly basis, at a minimum, and shall provide feedback to questions and public communications within 5 Business Days.

As part of the PICP, the PICM shall develop and implement a plan to make the stakeholders aware of the Project page and applicable Department social-media assets. New social-media assets/accounts or separately hosted websites will not be developed but rather the PICM shall provide content for the applicable Department-hosted assets.

Paid media shall be limited to NEPA-related activities or Notices and will not be used for detour or routine Project update information, or for advocacy. Digital paid media on Department assets will be facilitated through the Department's communications office, via its online advertiser access, and shall be limited to \$1,000 per ad.

4.5.2.3 Branding

The Development Entity shall develop materials for public outreach and branding in coordination with the Department.

4.5.2.4 Lane Closures

The Development Entity shall provide effected Users with advance notifications of Lane Closures, traffic switches, or major traffic modifications as per the requirements established in *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions. The Development Entity shall prepare necessary materials to provide advance notices to Users in compliance with *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions. The Development Entity shall provide Lane Closure information to the Department at Milestones and at Department's request for dissemination through websites and other media.

4.5.2.5 Emergencies

The Development Entity's PICM shall take timely and appropriate action to inform the Department and affected Users of the pertinent details for Emergencies, such as major vehicle collisions and Hazardous Material spills. The PICM shall provide these details to the Department so the Department may notify

Users. The PICM shall continue to provide updated information to the Department and Users, as available and on a timely basis, until the Emergency no longer exists.

In the event of an Emergency, timely notification shall mean as soon as practicable, but in no event longer than within one hour of the occurrence. The Development Entity's response to an Emergency shall follow the Department's general guidelines requiring notification when delays for Users in traffic extend beyond two hours. In the event advanced warning is available for an Emergency such as ice/snow, timely notification shall mean as soon as practicable, but in no event longer than within one hour of the time the information is available. In both situations, the PICM shall continue to provide updated information to the Department and Users, as available and on a timely basis, until the Emergency no longer exists.

4.6 Environmental Coordination

The PICP shall detail the communication hierarchy for information distribution related to compliance with the Comprehensive Environmental Protection Plan (CEPP), as described in *Section 5.9, Department Actions* of these Technical Provisions. The PICP shall include names and contact information, including Emergency contact information, and the preferred methods of routine, and Emergency communication distribution.

4.7 Public Information Office

The Development Entity shall maintain a Public Information Office from NTP2 until the Final Acceptance Date. The "Public Information Office" as described in this section shall serve as the primary business location for the PICM during the D&C Period and shall be located in Harrisburg, Pennsylvania. The PICM shall respond within 24 hours from a Department request. The Public Information Office shall facilitate the exchange of information between the Development Entity and the Department and the public and provide a centralized location for stakeholders to obtain information on the Project, including maps and design plans, fact sheets, alternative routes, Lane Closures, construction updates, community impacts, and commute options.

The hours of operation of the Public Information Office shall be, at a minimum, as follows.

- Monday-Friday, open 8 a.m. – 5 p.m. and by appointment;
- Saturday, open by appointment; and
- Sunday, closed.

The Development Entity shall provide stakeholders reasonable access to the Bridge Sites for tours and media events as requested and/or approved by the Department. Approved visits must adhere to the Safety and Security Plan described in *Section 3.3.11, Safety and Security Plan* of these Technical Provisions.

In addition to the services listed above, from NTP2 to the Final Acceptance Date, the Development Entity shall provide a 24 hour telephone number for its PICM, who shall be available during normal business hours of the Public Information Office, with a recorded message describing Emergency procedures after hours. The Development Entity shall respond to voicemail messages left after hours within 24 hours of receiving the voicemail message.

4. Public Information and Communication**4.8 Section 4, Public Information and Communication Submittal Requirements**

Whenever a Submittal identified in the following Table 4-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 4-1 information. The Department will conduct reviews and provide Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 4-1 and Section 6.3 of the Project Agreement.

Table 4-1. Section 4, Public Information and Communication Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Public Information and Communications Plan (PICP)	2	10	NTP2	—	—
2	Materials to be Presented to the Public or Media	3	10	—	Term	—
3	Meeting Notes	2	10	—	Term	—

5 Environmental

The Development Entity shall comply with the existing and future environmental requirements set forth in the Contract Documents. The Development Entity shall prepare and obtain the Environmental Approvals and other Governmental Approvals (excepting only Provided Environmental Approvals) as required for the Work. The Department will provide the Development Entity with the Provided Environmental Approvals required for the Work. The Development Entity shall be responsible for obtaining and maintaining the Development Entity-Led Environmental Approvals, renewals, and extensions other than those identified within the Provided Environmental Approvals. The Project-specific Provided Environmental Approvals are identified within *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions. The Development Entity shall include the requisite Bridge-Specific Requirements that are part of the Package Proposal, as attachments to the Technical Provisions, as described in *Section 2.3, Bridge-Specific Requirements* of these Technical Provisions.

5.1 General Requirements

The Development Entity shall perform and/or coordinate as described or cause to be performed and/or coordinated as described, the requirements set forth within this section (inclusive of applicable referenced material) in accordance with the terms of the Contract Documents.

The Development Entity shall conduct construction, monitoring, inspection, and maintenance of the structures and required environmental mitigation measures using the Department's Environmental Commitment and Mitigation Tracking System (ECMTS) during the Term.

The Development Entity shall provide property owners with a Notice of Intent to Enter Letters (NOITE Form RW-983), as outlined in *Section 8, Right of Way* of these Technical Provisions if entry onto private property will be necessary to complete environmental analysis, approvals, or investigation of mitigation measures. The Department will supply PDF copies of the Categorical Exclusions, Environmental Assessments, and Environmental Approvals to the Development Entity.

5.2 Environmental Standards

The Development Entity shall comply with the Provided Environmental Approvals and applicable Environmental Law for the purposes of agency consultation, environmental surveys, and permit submission of Development Entity-Led Environmental Approvals. The Development Entity shall also, at a minimum, utilize and comply with Commonwealth and federal regulations, policy, and manuals related to the NEPA Basic Configuration, the Provided Environmental Approvals, and Development Entity-Led Environmental Approvals.

5.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

5.4 [Reserved]

5.5 Environmental Approvals

The Development Entity shall obtain and maintain the required Development Entity-Led Environmental Approvals (other than the Provided Environmental Approvals) required in connection with the Work.

Modifications, renewals, and extension of the Provided Environmental Approvals shall be subject to the terms of the Project Agreement.

5.6 Personnel

The Development Entity shall designate an environmental team consisting of Required Personnel, as detailed in *Section 3.3.4.2, Required Personnel* of these Technical Provisions.

5.7 Software

The Development Entity shall utilize the Department supplied e-Builder system for storing, cataloging, maintaining, controlling, accessing, searching, and retrieving Project Data inclusive of Project Management Plans, Design Documents, Construction Documents, Notices, Formal Communication, Submittals, and records. Documents placed within the Department supplied e-Builder system shall be electronically searchable and legible.

The Development Entity shall coordinate with the Department to determine access rights and processes associated with the various Department internal electronic storage and management systems applicable to the D&C Work, which shall be summarized in the Document and Data Management Plan (DDMP).

5.8 Comprehensive Environmental Protection Plan

As part of the Project Management Plan (PMP), the Environmental Compliance Manager (ECM) shall prepare and oversee the CEPP, applicable throughout the Term to establish the approach, requirements, and procedures to be employed to protect the Environment. All component parts shall reflect in order of priority: impact avoidance, minimization, and, as a last resort, mitigation. The CEPP shall satisfy applicable U.S. Federal Highway Administration (FHWA), Department and resource agency requirements, including those detailed as commitments in the Provided Environmental Approvals and Development Entity-Led Environmental Approvals and associated Preparedness, Prevention, and Contingency (PPC) Plans.

The dates by which component parts comprising the CEPP are to be submitted for the Department acceptance are set forth in *Section 3.3.3, Project Management Plan and Component Plan Update* of these Technical Provisions. Amendments and updates to the CEPP as necessary to address changing conditions and environmental requirements shall be in accordance with the procedures for amendments to the PMP.

The ECM shall review and update the CEPP on a monthly basis at a minimum. The Development Entity shall provide a means to track the CEPP reviews and results. At a minimum, the CEPP shall require documents in the following list to be on file within e-Builder system and available at any time for Department review:

- CEPP component parts;
- Environmental compliance procedures during construction and maintenance work;
- weekly environmental monitoring reports;
- Investigation Work Plans (IWP), Site Investigation Reports (SIRs), and remedial action plans as necessary for Hazardous Material discovery/remediation;

- wetland delineations and appropriate United States Army Corps of Engineers (USACE) Clean Water Act Section 404 and DEP Chapter 105 Dam Safety and Waterway Management Permit Applications;
- mitigation or resource monitoring reports, as required by resource-specific mitigation plans, if applicable;
- designs for wetland and floodplain mitigation, if applicable;
- DEP Chapter 102 Erosion and Sediment Control Permit Authorization with date of approval and expiration date, if applicable;
- DEP Chapter 105 Dam Safety and Waterway Management Permit Applications and Water Quality Certification under Section 401 of the Federal Clean Water Act Authorizations with date of approval and expiration date, if applicable;
- USACE Clean Water Act Section 404 Authorizations with date of approval, if applicable;
- a summary of completed permit applications and permits as issued within the Provided Environmental Approvals, as well as Development Entity-Led Environmental Approvals, including the current status of each application/permit, updated on a quarterly basis;
- completed permit applications and permits as issued within the Provided Environmental Approvals, as well as Development Entity-Led Environmental Approvals; and
- procedures for dewatering to prevent harm or death to threatened and endangered species, in-stream construction procedures, removal of potential basking habitat features, and photo documentation of threatened and endangered species within the work zone for notification to Pennsylvania Fish & Boat Commission (PFBC).

The Development Entity shall develop standard operating procedures for the following activities and include them in the CEPP:

- controlling dust during construction;
- complying with environmental permits including, at a minimum, jurisdictional waters and wetland permits, DEP Chapters 102 Erosion and Sediment Control, 105 Dam Safety and Waterway Management, and 106 Floodplain Management, and Water Quality Certifications under Section 401 of the Federal Clean Water Act, USACE Section 10 of the Rivers and Harbors Act of 1899, USACE Clean Water Act Section 404, and USACE Section 408 Taking Possession of, Use of, or Injury to Harbor or River Improvements; and
- mitigating noise and vibration during construction.

The CEPP shall also include the information described in *Section 5.8.1, Environmental Commitment and Mitigation Tracking System (ECMTS)* through *Section 5.8.5, Environmental Protection and Training Program (EPTP)* of these Technical Provisions. The submission process is further described in *Section 3.3.5, Document and Data Management Plan* of these Technical Provisions.

5.8.1 Environmental Commitment and Mitigation Tracking System

The “Environmental Commitment and Mitigation Tracking System” (ECMTS) is the system accessed through the “Mitigation” link on the Project’s site in ECMS, and shall be the overarching system by which Development Entity shall ensure environmental commitments are implemented. The environmental commitments will include those made during the Provided and Development Entity-Led Environmental Approval permitting processes, and other environmental requirements to be carried forward and reflected in the design and implemented throughout the Work and shall be inclusive of any modifications to the commitments or mitigation requirements. The Development Entity shall utilize the ECMTS within ECMS to track ongoing issues, identify compliances, Nonconforming Work and identify actions required or those already performed to correct such Nonconforming Work.

5.8.2 Waste Management Plan

The Development Entity shall prepare a Waste Management Plan (WMP) for the safe handling, storage, treatment, and/or disposal of Hazardous Materials. The Development Entity shall use the *Department Pub 281, Waste Site Evaluation Procedures Handbook* for guidance on the development of the WMP. The Development Entity shall submit the final WMP to the Department for acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) within 30 Days of NTP1; acceptance of the WMP by the Department will be a condition precedent for the issuance of NTP3. The submission process is further described in *Section 3.3.5, Document and Data Management Plan* of these Technical Provisions.

The WMP shall include procedures compliant with applicable Environmental Law and include, at a minimum:

- the process to keep and maintain material safety data sheets, per Occupational Safety and Health Administration (OSHA) requirements for chemicals to be used on the Project;
- the names and contact information for designated individuals implementing the WMP;
- procedures for identifying and documenting Hazardous Materials which might impact the Work;
- procedures for mitigation of known Hazardous Materials anticipated to impact construction;
- procedures for characterization and mitigation of unanticipated Hazardous Materials encountered during construction;
- procedures for mitigation of Hazardous Materials during the Maintenance Period;
- incorporation of the PPC Plan developed in accordance with *Section 5.8.2.5, Environmental and Waste Response Plan* of these Technical Provisions;
- process for training personnel for responding to and mitigating Incidents involving contamination or waste;
- provisions for appropriate storage and disposal of waste encountered on the Project for the Term; and
- process for removal and disposal of surplus material and performance of clean fill determinations in accordance with *Section 5.8.7.14, Waste, Borrow, and Staging Areas* of these Technical Provisions.

The WMP shall include provisions for making workers aware of and able to recognize the potential Hazardous Materials to which they may be exposed, limiting Development Entity and Development Entity-Related Entities and other Project workers' exposure to Hazardous Materials and providing necessary personal protection equipment to protect workers from exposure. The WMP shall require the Development Entity to provide any non-Development Entity personnel who visit the Project with the appropriate personal protection equipment.

The WMP shall require personnel of Development Entity-Related Entities handling Hazardous Materials be trained and certified at least to the minimum requirements established under the current guidelines of OSHA 29 C.F.R. 1910.120.

Further, the WMP shall include procedures for ensuring applicable certifications, licenses, authorizations, and Governmental Approvals for Development Entity-Related Entity personnel handling Hazardous Materials are current and valid through the duration of the Work.

The WMP shall also include the information described in *Section 5.8.2.1, Pre-Existing Hazardous Materials* through *Section 5.8.2.5, Environmental and Waste Response Plan* of these Technical Provisions.

5.8.2.1 Pre-Existing Hazardous Materials

The Development Entity shall identify Hazardous Material impacts. The Development Entity shall inspect and test to identify the presence of lead based paint and Asbestos Containing Materials (ACM) on the Bridges within the Project a minimum of 30 Days prior to start of bridge demolition and/or construction. The Development Entity shall comply with National Emission Standards for Hazardous Air Pollutants (NESHAP) and/or applicable state, county, or municipal asbestos notification requirements prior to the start of construction.

The Development Entity must submit Environmental Site Assessment reports to the Department for review during the design phase for any parcel or property interest for which the Environmental Site Assessment process has not been completed. Environmental Site Assessments shall meet the requirements of *Department Pub 281, Waste Site Evaluation Handbook*. The Development Entity shall conduct Environmental Site Assessments, as required, in accordance with *Department Pub 281, Waste Site Evaluation Handbook*.

The Department and the Development Entity shall undertake Hazardous Materials Management for Hazardous Materials in accordance with the terms set forth in Project Agreement Section 7.8. All Hazardous Materials Management provisions contained in these Technical Provisions shall be subject to those terms.

5.8.2.2 Investigative Work Plans and Site Investigation Reports

If previously unidentified Hazardous Materials are encountered within the Project Limits and/or Temporary Interests or additional properties used as the Development Entity's staging area, field office site, plant sites, borrow site, or stockpile location, the Development Entity shall prepare an IWP addressing the methods, techniques, and analytical testing requirements to adequately characterize the extent of the contaminated media (soil and/or groundwater) potentially affecting the Project. The Development Entity shall determine the likely source and extent of contamination and shall prepare the IWP and other necessary reports in accordance with Environmental Law and manuals, policies, and regulations, as outlined in *Attachment 1, Project Standards* of these Technical Provisions.

Upon satisfactorily completing the investigation, the Development Entity shall summarize the findings within an SIR and make recommendations regarding potential response actions necessary for Project development. During the Term the Development Entity shall account for waste management considerations including proper management of Hazardous Materials for negotiation, acquisition, and property management of any additional properties. Should additional investigations and/or remedial efforts be required, the Development Entity shall be conducted in accordance with *Department Pub 281, Waste Site Evaluation Handbook*.

The SIR shall address the characterization of the impacted area; sampling efforts and findings; opportunities to avoid the contamination by adjusting the design; level of response action warranted if the contamination cannot be avoided; feasibility of initiating response actions prior to construction; pursuit of cost-reimbursement from responsible parties; and the need for completing response actions concurrent with construction and nature of any special specifications and provisions necessary for incorporation into the Project.

The Development Entity may initiate a preventative or corrective action to address Hazardous Materials Management.

5.8.2.3 Asbestos Containing Material

The Development Entity shall identify, inspect, notify, amend notifications as necessary, pay notification fees and abate Asbestos Containing Material (ACM) found on any structure, within the Temporary Interests and Project Limits, in accordance with Environmental Law and manuals, policies, and regulations, as outlined in the following:

- *Department Pub 100A, Bridge Management System (BMS2) Coding Manual;*
- *Department Pub 281, Waste Site Evaluation Procedures Handbook;*
- *Department Pub 611, Waste Management Guidance Manual;* and
- *Attachment 1, Project Standards* of these Technical Provisions.

5.8.2.4 Lead Based Paint

The Development Entity shall identify, inspect, notify, amend notifications as necessary, pay notification fees, and abate lead-based paint found on any structure to be utilized during performance of the Work, in accordance with Environmental Law and manuals, policies, and regulations, as outlined in *Attachment 1, Project Standards* of these Technical Provisions. If structural members are scrapped/recycled/sold, the Development Entity shall follow Environmental Law and manuals, policies, and regulations, as outlined in *Department Pub 611, Waste Management Guidance Manual for Project Delivery*, and *Attachment 1, Project Standards* of these Technical Provisions for the handling processes.

5.8.2.5 Environmental and Waste Response Plan

The Development Entity shall develop an Environmental and Waste Response Plan (EWRP) as part of the CEPP as required by OSHA Parts 1910 and 1926.

The EWRP shall include:

- identification of potential environmental accidents and Emergencies associated with the Project-specific activities;
- response procedures to Project environmental accidents and Emergencies and for the preventions and mitigation of the environmental impacts that may be associated with them; and
- annual reviews and revisions of the EWRP, in particular after the occurrence of an environmental accident and Emergency.

The Development Entity shall develop a PPC Plan within the EWRP, which shall be submitted as part of the CEPP. The PPC Plan shall identify an Emergency response program, material and waste inventory, spill and leak prevention and response, inspection program, housekeeping program, and security and external factors, all of which the Development Entity shall develop and implement prior to Construction Work to control potential discharges of pollutants other than sediment into waters of the Commonwealth and/or Waters of the United States (WOTUS).

The Development Entity shall ensure that Development Entity-Related Entities that either cause, discover, witness, or otherwise have knowledge of a spill or release of a Hazardous Material shall provide proper spill notification and response procedures as outlined in the PPC Plan. Guidelines for the development of the PPC Plan are provided within the *Department Pub 783, Environmental Permitting Handbook*.

5.8.3 Well Impacts and Requirements

As part of CEPP, the Development Entity shall address wells (such as municipal, domestic, irrigation, or monitoring and observation wells) that may be impacted by the Work during the Term. This component of the CEPP includes:

- a process for training personnel on recognition of wells;
- procedures for avoiding or protecting wells in place during the Work;
- procedures for closeout of wells removed in the course of the Work;
- procedures for preventing contamination and for addressing contamination (including temporary measures and permanent measures to restore the well to its original state) of a well resulting from the Work; and
- procedures to notify the Department and the appropriate Governmental Entities in case of contamination.

5.8.4 National Flood Insurance Program Compliance

The Development Entity shall avoid and minimize additional impacts to floodplains other than the impacts included within the Provided Environmental Approvals. If modifications to the Project Limits and/or Temporary Interests require unavoidable impacts to floodplains, the Development Entity shall prepare and submit the documents required to obtain necessary approvals from the respective Governmental Entities for regulated activities within floodplains. The Development Entity shall obtain the Pennsylvania Department of Community & Economic Development's Pennsylvania flood maps, the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) (<https://dced.pa.gov/local-government/pennsylvania-flood-maps/>), the effective flood insurance studies for the applicable county, and

the effective FIRM covering the Work associated with the revisions to the Project Limits and/or Temporary Interests. The Development Entity shall also determine the extent to which the proposed activities encroach into a Special Flood Hazard Area, floodway (for streams studied with detailed methods), or a Non-Encroachment Area (for streams studied with limited detailed methods).

If an activity associated within temporary and/or permanent works modifies the Project Limits and/or Temporary Interests within a floodway or Non-Encroachment Area as defined by the Pennsylvania flood map, the Development Entity shall determine if the proposed activity will result in an increase in the base flood elevation as defined by the Pennsylvania flood map. If a base flood elevation increase will occur to the extent that a Conditional Letter of Map Revision (CLOMR) will be required, the Development Entity shall prepare and submit the necessary documentation to the respective Governmental Entities to obtain a CLOMR prior to construction of the regulated activities. Within 60 Business Days prior to Substantial Completion, the Development Entity shall prepare and submit to the Department the Record Drawings for Work within the regulated areas necessary to obtain a Letter of Map Revision (LOMR). The Development Entity shall provide fees associated with obtaining CLOMRs and LOMRs when an activity is proposed within a Special Flood Hazard Area and shall obtain the necessary local floodplain development permits, as required, from the applicable county administrators for modifications to the Project Limits and/or Temporary Interests that are outside of a floodway or Non-Encroachment Area.

The Development Entity shall prepare documents including notification letters to the affected municipality(ies) and county(ies) necessary for the approval as required in 25 Pa Code Chapter 106, Floodplain Management requirements for the Department's acceptance prior to sending the notification letters. Terms in the required Chapter 106 coordination shall have the meaning as defined by FEMA for the National Flood Insurance Program, 44 C.F.R., Part 60 (Criteria for Land Management and Use) through Part 65 (Identification and Mapping of Special Hazard Areas). Permitting requirements for the floodplain and floodway impacts are further discussed in *Section 13.6.5, Hydraulic Analysis* of these Technical Provisions.

The Development Entity shall coordinate with the Department regarding FEMA buyout properties associated with proposed modifications to the NEPA Basic Configuration, Provided Environmental Approvals, and/or Development Entity-Led Environmental Approvals. Wherein the event FEMA buyout properties are required, due to unavoidable modifications to the Work, the Development Entity shall prepare revisions to the right of way plans as identified in *Section 8, Right of Way* of these Technical Provisions for the additional Project Limits and/or Temporary Interests. The Development Entity shall conduct additional investigations required to support the preparation of supporting modifications to the Provided Environmental Approvals and/or Development Entity-Led Environmental Approvals and prepare and submit associated documentation to the Department for coordination of the FEMA buyout properties.

Upon the conclusion of the Term, the Development Entity shall transfer the obtained CLOMR, LOMR, and applicable Section 106 authorizations to the Department.

5.8.5 Environmental Protection Training Plan

The Development Entity shall prepare and offer an Environmental Protection Training Plan (EPTP) in English and Spanish languages for personnel working on the Project, including the Development Entity, Development Entity-Related Entities, and the Department personnel. The purpose of this training is to ensure personnel are educated on environmental compliance requirements and environmental sensitivities.

The Development Entity shall conduct the training before personnel are permitted to enter the Project Limits and/or Temporary Interests established for the Work, and no Development Entity, Development Entity-Related Entities, and/or the Department personnel performing Work shall be allowed to enter the Project Limits and/or Temporary Interests established for the Work until they have completed the EPTP. The EPTP shall be presented by the ECM, as supported by the necessary Required Personnel identified in *Section 5.6, Personnel* of these Technical Provisions and cover necessary topics to remain in compliance including, at a minimum:

- Erosion, Sedimentation, and Pollution Control Plan (ESPCP) – as described in *Section 13.6, Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control Design Requirements* of these Technical Provisions;
- maintaining the Project Limits and/or Temporary Interests;
- tree and shrub protection;
- wetland and waterway protection;
- wildlife habitat protection;
- recognizing the consequences for departure from approved operating procedures;
- pumping and dewatering operations;
- accidental discovery of archaeological material or human remains;
- access and mobility;
- temporary stabilization;
- Incident communication and reporting;
- time of year stream work restrictions;
- Hazardous Materials;
- no work zones; and
- historic properties.

The outline of the EPTP aspects and procedures shall be included in the CEPP. The Development Entity shall be required to track the attendance of the program, and documentation of attendance for environmental training shall be provided to the Department. The submission process is further described in *Section 3.3.5, Document and Data Management Plan* of these Technical Provisions.

5.8.6 Avoidance and Minimization

The Development Entity shall focus Work efforts on avoiding and minimizing impacts to sensitive environmental resources in areas of the Work. The design shall continue to emphasize avoidance and minimization of impacts.

5.8.7 Environmental Authorizations and Revisions

The Development Entity shall coordinate with the Department as necessary to take assignment of all Provided Environmental Approvals based on the NEPA Basic Configuration and take assignment of such Provided Environmental Approvals as a condition precedent to NTP3.

The Department will provide the Development Entity with access to ECMTS, which will include the environmental commitments contained within the Provided Environmental Approvals. The Development Entity shall implement and complete environmental commitments throughout the Term, including all associated costs, and update ECMTS with changes and/or additional requirements.

The Development Entity shall undertake necessary efforts to obtain Development Entity-Led Environmental Approvals and modifications to the Provided Environmental Approvals subject to Department's reasonable cooperation with Development Entity, including execution and delivery of appropriate applications and other documentation.

The Development Entity shall obtain all Provided Environmental Approvals modifications and Development Entity-Led Environmental Approvals for the Work. The Provided Environmental Approvals are identified within *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions, as part of one or more Projects as negotiated with the Department as described in *Section 2.3, Bridge-Specific Requirements* of these Technical Provisions.

The Work as it relates to the Provided Environmental Approvals and Development Entity-Led Environmental Approvals shall require coordination with the relevant Governmental Entities and other key stakeholders within and outside the Commonwealth, including but not be limited to:

- FHWA, through coordination with the Department;
- USACE;
- USEPA;
- United States Fish and Wildlife Service (USFWS);
- United States Coast Guard (USCG);
- United States Forest Service;
- federally recognized tribes;
- National Park Service;
- Pennsylvania Department of Conservation and Natural Resources (DCNR);
- DEP;
- State Historic Preservation Office (SHPO);¹

¹ The FHWA and Advisory Council on Historic Preservation has delegated to the Department certain responsibilities under Section 106 and 110(d) of the National Historic Preservation Act, as amended, through a Programmatic Agreement for minor transportation projects of the Federal Aid Highway Program, which are classified as

- PFBC;
- Pennsylvania Game Commission (PGC); and
- County Conservation Districts (CCDs), as applicable.

The Development Entity shall provide copies of any correspondence, including at a minimum, initial correspondence forms, reports, permit applications, mitigation plans, and approvals with the above-referenced agencies to the Department.

The Development Entity shall complete the following tasks for any modifications to the Provided Environmental Approvals and/or Development Entity-Led Environmental Approvals:

- notifying the Department of changes requiring a NEPA re-evaluation and providing design support information required for re-evaluation;
- coordinating with the relevant Governmental Entities, the public, interested parties, stakeholders and the Department for modifications or changes to the environmental commitments; and
- modifications to the Provided Environmental Approvals that are required to complete the Construction Work and Maintenance Work.

For processes where coordination with federal agencies (e.g., FHWA, USACE, USEPA, USFWS, USCG, U.S. Forest Service) will be required, the Development Entity shall coordinate with the Department for any federal agency consultations.

For other Development Entity-Led Environmental Approvals (e.g., DEP Chapters 102/105/106, USACE Section 404, etc.), the Development Entity shall secure the necessary Environmental Approvals NOT ALREADY RECEIVED that are required for such modifications or changes to the Project. The Development Entity shall update ECMTS to document such modifications or changes to the environmental commitments.

The Development Entity shall use processes and procedures established by relevant Governmental Entities to request modifications and/or amendments to such permits. The Development Entity is not precluded from requesting pre-application meetings or other similar meetings with relevant Governmental Entities in an effort to expedite permit processes. The Development Entity shall not be exempt from permit application and/or review fees required for amendment and/or modification requests. The Development Entity shall provide the Department with copies of the amendment and/or modification requests, supporting documents, and the final permit decision.

The Development Entity shall comply with the terms and conditions of the Provided Environmental Approvals, Development Entity-Led Environmental Approvals, and environmental commitments, as well as any resulting compliance action and/or litigation.

The Development Entity shall, within one Business Day of receiving a written Notice of Violation (NOV), warning of NOV, enforcement action, or similar notification from federal, state, or local Governmental

“categorical exclusions” under 23 CFR 771. This agreement establishes the basis for the Department internal review of individual minor projects and establishes the roles of involved parties throughout the process.

Entities, including at a minimum USACE, USFWS, DEP, CCD, contact the Department. The Development Entity shall provide correspondence and details of the resolution of these warnings and/or violations for the Department's records.

In addition to the reporting obligation to the Department, the Development Entity shall hold the Department harmless and shall resolve NOVs, compliance/enforcement actions, and/or violations noted in inspection reports issued by local, state, or federal agencies, including at a minimum: corrective action to resolve the action, required plan and permit modifications, payment of fines and penalties, and coordination with the affected parties and agencies.

Upon completion of construction, the Development Entity shall coordinate with the USACE, DEP, and the respective CCD, if necessary, to complete the necessary forms and obtain acknowledgement and/or authorizations for the permits including, at a minimum:

- Notice of Construction Completion (USACE Clean Water Act Section 404);
- Notice of Termination (DEP Chapter 102 Erosion and Sediment Control);
- Permit Compliance Self-Certification Form (USACE Clean Water Act Section 404); and
- Water Obstruction and Encroachment Permit Completion Report (DEP Chapter 105 Dam safety and Waterway Management).

The completed Permit Compliance Self-Certification Form must be returned to the Department's Permit Coordinator in the pertinent District office.

Upon the conclusion of the Term, the Development Entity shall transfer the remaining, open Provided Environmental Approvals and Development Entity-Led Environmental Approvals that authorize ongoing operation and maintenance from the Development Entity name back to the Department. The Provided Environmental Approvals and Development Entity-Led Environmental Approvals shall not be transferred to the Department until the Development Entity can document that the applicable agencies have acknowledged and approved the completion of construction and mitigation under the permit, and NOV or enforcement actions have been resolved. In the event that transfer fees are required, the Department will pay the associated transfer fees and will either pay for these directly or the Development Entity shall pay the transfer fees and the Department will reimburse the Development Entity for the actual cost.

5.8.7.1 National Environmental Policy Act Re-evaluations

NEPA re-evaluations shall be subject to the terms set forth in Project Agreement Section 6.2.12. Should a NEPA re-evaluation be required due to modification of the NEPA Basic Configuration, modification of the Provided Environmental Approvals, and/or modification of the Work covered under Development Entity-Led Environmental Approvals, the Development Entity shall develop the NEPA re-evaluation, complete the associated analyses, and submit such analyses to the Department. The Development Entity shall coordinate with the Department and appropriate Governmental Entities on potential public lands impacts to facilitate avoidance or mitigation, in the event that the Development Entity, through a NEPA re-evaluation, Project modification, or other re-assessment, must revise the NEPA Basic Configuration. Through the NEPA re-evaluation process, the Development Entity shall coordinate with the Department on revisions associated with federal authorizations and coordination necessitated by or in connection with the

subject NEPA re-evaluation, including at a minimum, and any revisions to any federal approvals associated with:

- Section 404 Clean Water Act (*Section 5.8.7.3, Water Obstruction and Encroachment and Floodplain Management Permits* of these Technical Provisions);
- Section 7 Endangered Species Act (*Section 5.8.7.4, Threatened and Endangered Species* of these Technical Provisions);
- state-owned lands (*Section 5.8.7.5, State Forests, Parks, and Game Lands; Section 5.8.7.6, Section 4(f); and Section 5.8.7.7, Section 6(f)* of these Technical Provisions);
- Section 106 (*Section 5.8.7.8, Cultural Resources* of these Technical Provisions);
- Environmental Justice (*Section 5.8.7.10, Environmental Justice* of these Technical Provisions);
- air quality (*Section 5.8.7.11, Air Quality* of these Technical Provisions); and
- noise impacts (*Section 5.8.7.12, Highway Traffic Noise* of these Technical Provisions).

For avoidance of doubt, the requirements of this *Section 5.8.7.1* shall in no manner limit or supersede the requirements of PA Section 6.2.12 (Provided Environmental Approval Re-evaluations, Amendment, or Supplements).

5.8.7.2 National Pollutant Discharge Elimination System

Upon identification of the need for a modification to the existing National Pollutant Discharge Elimination System (NPDES) authorization(s) contained within the Provided Environmental Approvals or the identification of need for a separate NPDES authorization as a Development Entity-Led Environmental Approval, the Development Entity shall prepare and submit a complete NPDES application to the DEP and/or respective CCD. The Development Entity shall prepare the NPDES application in accordance with permit requirements outlined in 25 Pa Code Chapter 102 Erosion and Sediment Control and USEPA Clean Water Act Section 404.

The Development Entity shall develop and submit to the DEP and/or CCD the respective NPDES Notice of Intent as the applicant, as well as develop, implement, and monitor a Bridge Site specific ESPCP and a PCSM plan in compliance with Environmental Law and guidance in the following:

- Chapters 12 and 13 of *Department Pub 584, Drainage Manual*;
- Chapters 13 and 14 of *Department Pub 13M: Design Manual Part 2, Highway Design*;
- Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design*; and
- *Section 13.6.10, Post-Construction Stormwater Management* of these Technical Provisions.

The Development Entity shall submit the required administrative and technical review fees to the DEP and/or respective CCD.

The Development Entity shall inspect, maintain, implement remedial actions, and obtain approval for permit modifications of PCSM facilities constructed or modified for the Project. The Development Entity shall perform inspections and maintenance (including long term operation and maintenance) in accordance with the current Department policy on PCSM facilities inspections and the *Department Pub 888, Stormwater Control Measure Maintenance Manual*. If the Department policy on PCSM facilities inspections is not available, the Development Entity shall perform inspections on PCSM facilities in accordance with the PCSM Plan and inspection results must be reported to the Department and DEP.

For PCSM facilities, the long-term inspection and maintenance schedule developed by the Development Entity shall comply with applicable Department policies and shall be transferred to the Department at the conclusion of the Term. The Development Entity shall report maintenance, remedial action or permit modifications of PCSM facilities constructed for the Project to the Department.

Routine maintenance consists of preventative measures that are essential to the ongoing care and upkeep of a Best Management Practices (BMPs). These measures are performed regularly to ensure proper function. Additionally, it helps prevent potential nuisances including, at a minimum, odors, mosquitoes, weeds, reduces the need for corrective maintenance, and reduces the chance of polluting stormwater runoff by identifying and repairing problems before they further deteriorate. Upon being identified during an inspection, the Development Entity shall conduct routine maintenance within six months of the inspection. Examples of routine maintenance include, at a minimum:

- removal of any accumulated sediment from the forebays;
- replacement of plants called for in the approved plans that have died or are diseased;
- repair of the stormwater structures for erosion or undercutting;
- repair of any erosion in the PCSM facility, including sloughing, animal burrows, and slopes;
- repair of any deterioration at the outfall of the PCSM facility, including the riprap outlet protection;
- removal of blockages from all trash racks, inlets, and outlets;
- maintenance of adequate access to the PCSM facility and removal of woody vegetation as needed;
- removal of trees from embankments;
- exercise of valves to prevent them from locking up where applicable; and/or
- removal of all trash, debris, and buoyant items periodically from the facility.

Corrective maintenance is any maintenance that should be addressed for the PCSM facility to properly function in accordance with the accepted PCSM plans. These items require more intensive repair efforts and should be addressed as a higher priority than routine maintenance. If there are structural deficiencies, or issues that raise the water level in the facility beyond the design intentions, the Development Entity shall perform corrective maintenance as soon as possible to prevent downstream damage to properties and/or the environment. Upon being identified during an inspection, the Development Entity shall perform corrective maintenance within one year of the inspection contingent on complexity. Reasonable progress steps should at least be taken. Examples of corrective maintenance include:

- repair of any deterioration or issues with the principal spillway and riser, including, at a minimum, evidence of spalling, joint failure, leakage, and/or corrosion;
- extensive sediment removal when inspections indicate that 50 percent of the forebay sediment storage capacity has been filled;
- control or removal of invasive species and plant growth if there are impacts to the storage volume; and/or
- removal of woody vegetation from the embankment, if present, to prevent structural damage.

The Development Entity shall coordinate any modifications that alter the PCSM facility design included within the PCSM as approved with the NPDES acknowledgement with the DEP and respective CCD prior to conducting the modifications to the PCSM facility. The Development Entity shall prepare and submit the required NPDES modification package including the revised PCSM plans and supporting calculations to the DEP and respective CCD for their review and approval. The Development Entity shall submit the required administrative and technical review fees to the DEP and/or respective CCD. The Development Entity shall comply with applicable Department policies and Environmental Law for the long-term maintenance and inspection schedule for PCSM facilities and shall transfer the schedule to the Department upon conclusion of the Term.

5.8.7.3 Water Obstruction and Encroachment and Floodplain Management Permits

Should the Work proposed include water obstructions that may affect regulated waterbodies such as wetlands, streams, floodplains, and other jurisdictional features, the Development Entity shall verify whether the Department has the authorization from the DEP and the USACE under 25 Pa Code Chapter 105 and Chapter 106 and USACE Clean Water Act Section 401/404 within the Provided Environmental Approvals. For Development Entity-Led Environmental Approvals, the Development Entity shall utilize the *Department Pub 783, Environmental Permitting Handbook*, which outlines the permit requirements set forth within 25 Pa Code Chapter 105 Dam Safety and Waterway Management for a structure or an activity changing, expanding, or diminishing the course, current or cross section of a watercourse, floodway, body of water, or wetland that is not included within the Provided Environmental Approvals.

Under 25 Pa Code Chapter 106 Floodplain Management, a permit will be required when an existing or new Highway obstruction that is located within a floodplain will be proposed for construction, modification, removal, destruction, or Abandonment. Chapter 106 permits, which are required for the floodplain and floodway impacts are further discussed in *Section 13.6.5, Hydraulic Analysis* of these Technical Provisions, are included as part of the Chapter 105 Dam Safety and Waterway Management permit application and approval. The Chapter 105 Dam Safety and Waterway Management permit also includes time of year restrictions to protect threatened and endangered species as per the *Department Pub 546, Endangered Species Desk Reference, Revision #5* and the PFBC in-stream construction restriction dates. The fee required for Work authorized under this permit if obtained as part of the Development Entity-Led Environmental Approvals shall be consistent with 25 Pa Code Section 105.13 and the Development Entity shall not be exempt from such fees.

In the event that the Development Entity proposes Project changes outside of the NEPA Basic Configuration resulting in wetland impacts that exceed the compensatory mitigation provided by the Department within the Provided Environmental Approvals, the Development Entity shall mitigate those

additional wetland impacts in accordance with applicable Environmental Law and as negotiated with the USACE and DEP.

The Development Entity shall acquire any Submerged Lands Licensing Agreements (SLLA) required for the Project.

The Development Entity shall submit to the Department a copy of the authorized Chapter 105/Section 404 application a report of the wetlands and stream impacts, and any required mitigation developed and approved as part of the conditions of the Chapter 105/106 and Section 404 permits prior to submitting the permit application to the agencies so the Department can ensure the impacts and mitigation reported in the NEPA document are accounted for in the permit process.

As part of the Chapter 105 process, the Development Entity shall develop, implement, and monitor an ESPCP in compliance with Environmental Law and guidance in the following:

- Chapters 12 and 13 of *Department Pub 584, Drainage Manual*;
- Chapters 13 and 14 of *Department Pub 13M: Design Manual Part 2, Highway Design*; and
- *Section 13, Hydrology and Hydraulics, Drainage/Stormwater Management, and Erosion and Sediment Control* of these Technical Provisions.

Upon the conclusion of the Term, the Development Entity shall transfer the remaining, open Chapter 105 authorizations that permit ongoing operation and maintenance from the Development Entity to the Department.

5.8.7.4 Threatened and Endangered Species

The Development Entity shall comply with the federal Endangered Species Act, including consultations; *Department Pub 546, Threatened and Endangered Species Desk Reference*; 17 Pa Code Section 45.1 through 45.91 Conservation of Pennsylvania Native Wild Plants; Pennsylvania Game and Wildlife Code (34 Pa.C.S. Sections 102, 925, 2164 through 2167, and 2924); and Pennsylvania Fish and Boat Code (30 Pa.C.S. Sections 102, 2502, 2504, and 2506). The Development Entity shall conduct a screening for Threatened or Endangered Species (T&E)/habitat or rare natural communities in the vicinity of the Project, the Development Entity shall coordinate with the Governmental Entities for their review of jurisdiction over potential impacts. In some instances, surveys may be necessary to determine if the Work will impact a species or its habitat. The Development Entity shall coordinate with the Department to determine whether Work may proceed and what measures can be implemented to avoid or minimize the impacts of the Work to T&E species and rare natural communities. Candidate species shall be treated as listed species if reasonable assurance of listing by the time of construction. The Development Entity shall consult with the Governmental Entities with jurisdiction of respective T&E species on the installation and maintenance of BMPs during construction to deter T&E species from settling into construction areas and on structures.

The Department shall conduct all consultations required for federally listed T&E Species for the Project to facilitate FHWA consultation with USFWS. The Development Entity shall provide to the Department copies of all T&E coordination, as well as mitigation documentation.

5.8.7.5 State Forests, Parks, and Game Lands

The Department will obtain interagency land use agreements between Governmental Entities for forest and tree clearing associated with the NEPA Basic Configuration of the Project. Mitigation of forested impacts on DCNR or PGC lands require a letter of agreement to use the property and mitigation as stipulated within the aforementioned, location-specific agreement. DCNR regulates forested impacts to Pennsylvania state forests and state parks, while the PGC regulates forested impacts to game lands. The Development Entity shall comply with Environmental Law, regulations, and Department commitments for tree and forest impacts in the Commonwealth.

The Development Entity shall coordinate with the Department and appropriate Governmental Entities on potential public lands impacts to facilitate avoidance or mitigation, in the event that the Development Entity, through a NEPA re-evaluation, Project modification, or other re-assessment, must reconsider public lands. Public lands may include parks, trails, state or national forests, state game lands, state parks and other recreational type lands that could potentially be classified as Section 4(f) or where federal or state grants were used to purchase said lands such as Section 6(f), Project 70, Project 500, and other Commonwealth grant programs. Mitigation requiring purchase of real properties and property purchase shall be in accordance with *Section 8, Right of Way* of these Technical Provisions.

The Development Entity shall obtain interagency land use agreements or other approvals to use state forests, parks, and game lands that are not included within the Provided Environmental Approvals. If the use of the land will require tree removal, then the Development Entity shall provide the compensatory fees required by DCNR or PGC to mitigate the loss of trees.

The Development Entity shall comply with applicable rules and regulations of the authority having jurisdiction when performing the Work within or adjacent to public use lands including, at a minimum: national or state forests, state game lands, wildlife or waterfowl refuges, recreation areas, parklands, and historic sites. See *Section 5.8.7.6, Section 4(f)* of the United States Department of Transportation Act of 1966 and *Section 5.8.7.7, Section 6(f) of the Land and Water Conservation Fund Act* of these Technical Provisions for documentation requirements related to Section 4(f) and Section 6(f).

The Development Entity shall cooperate with the national or state forest officer or supervisor and authorized subordinates in observing sanitary laws and in exercising every reasonable precaution to prevent and suppress forest fires and vandalism.

The Development Entity shall prevent and suppress forest fires and notify a forest supervisor, as soon as possible, of the location and extent of observed fire. Before starting indicated Work affecting stream channels, verify the Department has the approval of the DEP, DCNR, PFBC, and/or the USACE.

5.8.7.6 Section 4(f) of the United States Department of Transportation Act of 1966

Should the Development Entity identify the need for modification to the NEPA Basic Configuration of the Project which involves a temporary occupancy or a take from a Section 4(f) of the United States Department of Transportation Act of 1966 resource, including, at a minimum, historic properties, publicly owned parks, recreation areas, or wildlife refuges, the Development Entity shall comply with Section 4(f), its regulations (23 C.F.R. Part 774), de minimis determinations, the programmatic section 4(f) evaluations, 71 PS 512(a)(15) (the state equivalent), and *Department Pub 349, Section 4(f) Handbook*.

A Section 4(f) re-evaluation would be required by completing a Section 4(f) form if one of the approved Programmatic Section 4(f) Evaluations, or a de minimis determination, are applicable or an individual Section 4(f) evaluation would be required consistent with *Department Pub 349, Section 4(f) Handbook*. The Development Entity shall coordinate with the Department regarding the need to revise the Section 4(f) approval for the Project and the scope of documentation required. The Department and/or FHWA will review and approve the Section 4(f) form and the Individual Section 4(f) Evaluations. The Development Entity shall obtain Department approval for the non-applicability and temporary use and occupancy forms. The Development Entity shall obtain FHWA and Department approval for other forms and Individual Section 4(f) Evaluations. The Department will coordinate with FHWA. Approval of forms involving only the Department are normally completed in 30 Business Days, approvals of forms involving the Department and FHWA are normally completed in 60 Business Days, and approvals of Individual Section 4(f) Evaluations are normally completed in 30 to 120 Business Days.

5.8.7.7 Section 6(f) of the Land and Water Conservation Fund Act

Should the Development Entity identify the need for modification to the NEPA Basic Configuration of the Project which involves a temporary occupancy or a take from a Section 6(f) of the Land and Water Conservation Fund Act (Section 6(f)) resource, including, at a minimum, public municipal and state parks, state forests, state game lands, PFBC lands, properties under the jurisdiction of SHPO and certain lands acquired by land trusts or other public recreational facilities, the Development Entity shall comply with Section 6(f), its regulations (16 U.S.C. §460l-8(f)(3)), and Project 70, Project 500, and other Commonwealth grant programs.

A Section 6(f) re-evaluation would be required consistent with *Department Pub 745, Section 6(f), Project 70, Project 500, and Other Recreation Grant Guidance*. The Development Entity shall coordinate with the Department regarding the need to revise the Section 6(f) re-evaluation documentation. The Department and/or FHWA will review and approve the Individual Section 6(f) Evaluation(s).

5.8.7.8 Cultural Resources

If the Development Entity identifies modifications that alter the NEPA Basic Configuration, consultation with the SHPO will be required as part of the NEPA re-evaluation process, revisions to the Provided Environmental Approvals, and/or Development Entity-Led Environmental Approvals. The Development Entity shall comply with Section 106 of the National Historic Preservation Act and the Pennsylvania State History Code through the use of existing Department tools, specifically the Statewide PA (Amended Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the Pennsylvania State Historic Preservation Officer and the Pennsylvania Department of Transportation Regarding Implementation of the Federal Aid Highway Program in Pennsylvania, December, 2017), the corresponding Pennsylvania State History Code Memorandum of Understanding (MOU), *Department Pub 689, Cultural Resources Handbook*, Pennsylvania Transportation and Heritage (PATH), and the letter of agreement developed by the Department in coordination with SHPO and FHWA stipulating the use of the Statewide PA for this Project. The Development Entity shall provide copies of all correspondence with the SHPO, including, at a minimum, initial correspondence, forms, reports, and Section 106 mitigation workplans, conditions, and stipulations to the Department. If artifacts are identified and collected during subsequent investigations as part of the consultation process with the SHPO, the Development Entity shall provide a copy of the deed of gift for artifacts to the Department.

As part of the Section 106 process, cultural resource consultations include coordination with federally recognized tribes. The Development Entity shall provide copies of the initial consultation and project consultation forms associated with correspondence with federally recognized tribes to the Department.

5.8.7.8.1 Aesthetic Bridge Design in Historic Districts

This Section pertains only to Bridges located within historic districts. Aesthetics for other Bridges are considered under *Section 16, Context Sensitive Design, Aesthetics, and Landscaping* of these Technical Provisions. There are no Bridges within historic districts in Package 1.

Consistent with Stipulation V of the Statewide PA, there are two approaches for the consideration of aesthetic bridge design for contributing bridges in historic districts, depending on whether consulting parties other than the Department and SHPO are present. For the resolution of adverse effect(s), SHPO will have the opportunity to review and Comment on Project-specific plans. In the event that a Bridge contributes to a historic district, the standards developed in *Section 16, Context Sensitive Design, Aesthetics and Landscaping* of these Technical Provisions shall apply. The Development Entity shall develop plans for any Bridge contributing to an historic district and shall consult with the Department, FHWA, and SHPO. The Development Entity shall submit the finalized plans to SHPO for concurrence as a standard treatment (Section 106 PA, Appendix E, Part B). If SHPO concurs, the Development Entity shall execute the design. If SHPO does not concur, the Department's District Cultural Resource Professional (CRP), as an employee of the Commonwealth of Pennsylvania who meets the Secretary of the Interior's Professional Qualifications Standards in the fields of archaeology or architectural history, shall consult with SHPO, FHWA, and the Department to resolve the disagreement, following Stipulation XI of the Statewide PA. If a Bridge does not contribute to the historic district but could result in an adverse effect to the historic district, the Development Entity shall continue to minimize effects to the historic district throughout the design development.

In the event that there are consulting parties for a Bridge in addition to FHWA, SHPO, and the Department, the Development Entity shall present the design plans to the consulting parties for the purposes of consultation. The Development Entity shall follow the Statewide PA and Cultural Resource Handbook in completing the Section 106 process.

The Development Entity shall apply treatments beyond what is required in *Section 16, Context Sensitive Design, Aesthetics and Landscaping* of these Technical Provisions to address adverse effects to the historic district as an environmental mitigation action.

The Department, FHWA, and/or SHPO may request meetings during construction to review implementation of the agreed upon bridge designs and/or treatments. The Development Entity shall provide Project access and timely notification of the installation of the Work to avoid or minimize adverse effects during construction to accommodate the meetings.

5.8.7.8.2 Human Remains

Following the Stipulation VI of the Statewide PA, if human remains, graves, or grave-associated artifacts are encountered during performance of the Work, the Development Entity shall immediately cease Work in the area of the encounter and notify the Department in accordance with the policies and coordination procedures established in *Department Pub 689, Cultural Resources Handbook: Chapters V.C.3 and XIII.E*.

(May 2021) and *Department Pub 2, Project Office Manual* (April 2020 Edition, Effective April 1, 2021). The Department and/or FHWA will implement the remaining provision of Stipulation VI.

The Development Entity shall obtain the required court orders for the relocation of identified human remains prior to conducting any relocation efforts. The Development Entity shall limit delays to the overall Project as a result of the coordination and relocation processes for human remains, graves, and grave-associated artifacts within the Project.

5.8.7.8.3 Oversight

The Development Entity shall coordinate with the Department's District CRPs to manage the Section 106 process and the use of a transparent process through PATH. In addition to these steps:

- The Development Entity shall develop and implement an internal communication protocol for the purposes of ensuring cultural resources decisions made by the Department's District CRPs are transmitted to the design team, and design decisions affecting historic properties are transmitted to the Department's District CRP in a timely manner.
- For Disputes raised under Stipulation XI of the Statewide PA, the Development Entity shall cooperate with FHWA, SHPO, and the Department to provide files, notes, memos, e-mails, etc., to assist in discovering the basis for the Dispute, the best means to resolve the Dispute, and best practices developed to prevent similar Disputes from arising in the future.
- For each mitigation commitment to avoid or resolve an adverse effect, the Development Entity shall develop and implement a mitigation work plan identifying the committed action and associated deliverable, who shall complete the action, the deadline for completing the action, and additional coordination for completing the action. Mitigation Work plans must be submitted to and accepted by the Department's Cultural Resources Unit Head prior to implementation. For each completed action, the Development Entity shall notify the Department and provide documentation of its completion. The Development Entity shall utilize PATH to monitor mitigation commitments. To the degree the ECMTS can be used to complete these requirements, the Development Entity shall use ECMTS.
- The Development Entity shall coordinate any modifications to the NEPA Basic Configuration that propose impacts to cultural or historic resources with the Department prior to coordination with the SHPO. If the Development Entity identifies modifications that alter the NEPA Basic Configuration, consultation with the SHPO will be required as part of the NEPA and Section 106 re-evaluation process including revisions to the Environmental Approvals. The Development Entity will provide timely information to the Department District CRPs so that they can consult with the SHPO as necessary. The Department District CRPs will consult with the Development Entity regarding any recommendations made by the Department to minimize or mitigate effects to cultural resources that arise from modifications.

5.8.7.9 Invasive Species Control

The Development Entity shall comply with the best management practices identified in the current version of *Department Pub 756, Invasive Species Best Management Practices* and the Pennsylvania Department of Agriculture's *Order of Quarantine and Treatment: Spotted Lanternfly (SPL)*.

5.8.7.10 Environmental Justice

Environmental Justice (EJ) refers to the implementation of Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” which directs procedures to be put in place to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income population groups.

The Project has undergone a detailed EJ analysis. In the event that the Development Entity proposes changes to the Work, the Department will determine if changes to the Work are exempt from an EJ analysis and if so, the Development Entity shall document this determination by supplying the Department with PDF copies of the associated information. For Bridges with Environmental Assessments, the Development Entity will coordinate with the Department on the review and update of the Environmental Assessment. For Work that is not exempt, the Development Entity shall conduct an EJ analysis as outlined in *Department Pub 746, Project Level Environmental Justice Guidance*. This analysis shall address changes to the NEPA Basic Configuration or where an analysis is warranted, and the Department has not conducted such analysis.

For exempt Work, the deliverable is the accurate completion of the EJ information in PDF copies of the Environmental Assessments as provided by the Department. The Development Entity shall keep the technical file with documentation of the analysis for review by the Department or FHWA as requested.

For those Bridges with Environmental Assessments, the Development Entity shall coordinate with the Department on the review and update of the Environmental Assessment documentation. The Development Entity shall submit the mitigation strategy to the Department for approval. The Development Entity shall implement mitigation measures outlined in the mitigation strategy.

5.8.7.11 Air Quality

Project level air quality analyses occur as part of the Environmental Approval process and address requirements in the Clean Air Act and Amendments and PA Act 120. Projects with potential air quality impacts must be considered for the incorporation of appropriate avoidance and/or relief strategies.

If required by a major design change to the NEPA Basic Configuration, the Development Entity shall complete air quality analysis as required by *Department Pub 321, Project Level Air Quality Handbook*.

For Work requiring a qualitative analysis, per *Department Pub 321, Project Level Air Quality Handbook*, the Development Entity shall complete the analysis and accurately document and provide PDF copies of the results to the Department. For Work requiring a quantitative analysis, the Development Entity shall complete the analysis and accurately document and provide PDF copies of the results to the Department. For those Bridges with Environmental Assessments, the Development Entity shall coordinate with the Department on the review and update of the Environmental Assessment documentation. Additionally, the quantitative analysis shall be submitted to the Department for acceptance. The Department will coordinate the review of the analysis with the Pennsylvania Air Quality Interagency Consultation Group.

The Development Entity shall not conduct burning operations within the Bridge Sites.

5.8.7.12 Highway Traffic Noise

As part of the PMP, the Development Entity shall prepare and obtain Department approval of a Noise Study Work Plan (NSWP), as described in *Section 6.6.1, Noise Study Work Plan* (NSWP) of these Technical Provisions to expand upon information the Development Entity submitted with the Project Proposal.

The Department has assessed the potential noise impacts of the Project and, where appropriate, considered noise impact mitigation measures. The Development Entity shall prepare Highway traffic noise analyses for the final design as required under 23 C.F.R. 772 and the *Department Pub 24, Project Level Highway Traffic Noise Handbook*.

No FHWA or Department review is needed for qualitative analysis projects. When the Development Entity determines the Project is a Type I Project per FHWA and the Department criteria, a quantitative analysis shall be required. Development Entity shall conduct the quantitative analysis in accordance with *Department Pub 24, Project Level Highway Traffic Noise Handbook*. The Development Entity shall be required to submit Type I Projects with quantitative analysis to the Department for review and approval. If mitigation is required, public involvement will be necessary as part of the determination of the selected treatment option. If FHWA approval is required, assume 30 Business Days for review by FHWA.

Highway traffic noise is addressed further in *Section 6, Noise Analysis and Mitigation* of these Technical Provisions.

5.8.7.13 Agricultural Resources

The agricultural resources evaluation process for the NEPA Basic Configuration was developed in conformance with and to assure compliance with the following Environmental Law and policies:

- 7 U.S.C. Section 4201, Farmland Protection Policy Act of 1981;
- 4 Pa Code Chapter 7, Section 7.301 *et seq.*, Agricultural Land Preservation Policy, Executive Order No. 2003-2, March 20, 2003;
- PA Act 1979-100, The Administrative Code of 1929; and
- PA Act 1981-43 Agricultural Area Security Law.

For any modifications to the NEPA Basic Configuration that propose additional agricultural impacts, the Development Entity shall coordinate agricultural resource activities associated with the Project in accordance with *Department Pub 324, Agricultural Resources Evaluation Handbook*. The Projects are not anticipated to result in significant impacts to agricultural resources, therefore, only requiring the NEPA document to address the Farmland Protection Policy Act and Agricultural Land Preservation Policy. Additionally, the Department review and the involvement of the Office of Chief Counsel is required when PA Act 1979-100 or PA Act 1981-43, related to the condemnation of productive agricultural land and/or condemnation/conversion of lands enrolled under the Agricultural Area Security Law including the filing of a declaration of taking are applicable to the Work in accordance with *Section 8.8, Agricultural Lands Condemnation Approval Board* of these Technical Provisions.

5.8.7.14 Waste, Borrow, and Staging Areas

The Development Entity shall locate proposed areas for obtaining borrow material and/or areas for disposal of waste material, when required, and ensure compliance with Environmental Law and regulations. Locate waste, borrow, or staging areas inside or outside of the ROW in upland areas not affecting WOTUS, including jurisdictional wetlands, unless already authorized by the USACE and DEP; remove topsoil and stockpile it for replacement when removal of borrow material has been completed.

Waste and borrow areas affecting WOTUS are prohibited unless already permitted, as agreed to with the USACE. The Development Entity shall obtain waterway and/or other required permits as applicable, prepare and submit Erosion, Sedimentation, and Pollution Control Plans (ESPCPs) to the DEP and/or applicable CCD for approval and negotiate with the owner(s) of property to be obtained by using the Department's standard borrow and/or waste agreement, available from the Department. This standard agreement may be modified to cover unusual or special conditions, provided such conditions are acceptable to the Department. Submit one copy of each executed agreement to the Department.

The Development Entity shall also submit one copy of applicable permits and the authorized ESPCP to the Department before starting Work; have the agreement provide for cleaning and leaving the premises and area in a well-drained and, if required, smoothly graded condition, blending into the existing topography; and scarify, lime, fertilize, seed, and mulch disturbed areas with material, and formulae, at rates typical for the Project. The Development Entity shall remove and dispose of surplus material and perform the clean fill determination for borrow materials entering the Project Limits and/or Temporary Interests by completing and submitting the Environmental Due Diligence Forms, (Form EDD-VI), and, if necessary, Form EDD-VII to the Department for acceptance, and the DEPs Management of Fill Policy Form FP-001, as well as complying with applicable Environmental Law.

5.8.7.15 Construction Impacts and Monitoring

The Development Entity shall submit to the Department inspection documentation of the Project and applicable areas in the vicinity thereof as required pursuant to *Section 3.3.9.2, Construction Quality Management Plan* of these Technical Provisions. Development Entity shall evaluate potential construction noise as defined in *Section 6, Noise Analysis and Mitigation* of these Technical Provisions, and dust and traffic impacts and develop and implement necessary impact mitigation measures. Haul routes shall use designated state routes, avoiding residential and other sensitive communities, such as Environmental Justice communities.

The CEPP discussed in *Section 5.8, Comprehensive Environmental Protection Plan (CEPP)* shall identify times, locations, and other conditions where monitoring of construction activities will be performed to maintain and cause compliance with Environmental Law, Provided Environmental Approvals, and/or Development Entity-Led Environmental Approvals, and the Contract Documents. The Development Entity shall make environmental monitoring reports available for review by the Department at the Department's request. Should Nonconforming Work or violation be observed representing an imminent danger to human health or the Environment, the CEPP shall include procedures to cause immediate notification to the Department.

In addition to the CEPP, prior to NTP2, the Development Entity shall inspect existing facilities, structures, and environmentally sensitive areas in the vicinity of the Project but not included as part of the Work. The

inspection shall document the pre-construction condition of vegetation, streets, sidewalks, landscaping, residential and commercial property, creeks, storm drainage and infrastructure. The purpose of the inspection is to provide a point of reference from which the Department can determine if a facility, structure, and environmentally sensitive area damaged during the Work is restored to its pre-construction condition. Development Entity shall document the inspection with a report including photographs, sketches, maps, and narratives clearly depicting the pre-construction Project condition.

Photographs shall be archival quality and shall be accompanied by a caption describing the date, time of day, location, and direction in which the photograph was taken. If the photograph shows existing damage, the damage must be clearly shown and noted in the caption. Sketches and maps must be no larger than 11" x 17". Photographs must be 4" x 6".

5.8.7.16 Property Access

The Development Entity shall minimize the inconvenience to vehicles, bicycles, and pedestrians during the Term to fulfill the obligations set out in the Governmental Approvals obtained by the Department to maintain current access during and after completion of the Work. The Development Entity shall maintain access to adjacent properties during the Construction Period and ensure visibility of businesses is maintained.

5.8.7.17 Dust Control

The Development Entity shall institute dust control measures to minimize air quality impacts as required under 25 Pa Code Section 123.1, Prohibition of Fugitive Emissions (see 25 Pa. 123.1 (c)), Environmental Law, and manuals, policies, and regulations, as outlined in *Attachment 1, Project Standards* of these Technical Provisions. The Development Entity shall also comply with county, city, and township fugitive dust control regulations applicable to the project location. The measures shall be adjusted as necessary based on construction traffic, forecasted wind speeds, and persistent dry weather conditions.

5.8.7.18 Documentation

The Development Entity shall retain environmental related manifests, analytical laboratory results, property studies, documents prepared for containment, management, mitigation and/or remediation records, asbestos records, and other relevant documents and shall provide such documentation to the Department as a condition of each Bridge Completion.

5.9 Department Actions and Responsibilities

The following sections outline the responsibilities of the Department in support of the Development Entity for each Project.

5.9.1 Department Review and Approval of Development Entity Submissions

The Department will review, Comment on, and, as applicable, require revisions to documentation submitted for environmental commitments or Development Entity-Led Environmental Approvals as related to the NEPA re-evaluation process associated within changes to the NEPA Basic Configuration as required. The Department reserves the right to review, Comment on, and require revisions to documentation submitted for state and federal permit applications. Documentation shall conform to current Department submission standards and the requirements of applicable Governmental Entities and Environmental Law. If the

Department reviews documentation, when applicable, the Department will return approved documentation to the Development Entity for Submittal to the appropriate Governmental Entity in cases where the Development Entity performs coordination. The Department, acting reasonably, shall approve those submissions for which the Department signature or other approval will be required. Documentation not meeting current submission standards or requirements of Governmental Entities will be returned to the Development Entity and shall be revised by Development Entity to meet standards or requirements. The Department will also compare the impacts caused by the Development Entity against the approved NEPA documents for conformance.

5.9.2 Permits and Approvals

The Development Entity shall conduct environmental studies and re-evaluations caused by actions not identified in the Provided Environmental Approvals, actions not covered specifically by existing resource agency coordination, changes to the disclosed information, or incorporation of additional properties into the Project. The Development Entity shall coordinate environmental studies with appropriate Governmental Entities.

For the Work, the Department has obtained or based on current information, anticipates obtaining Provided Environmental Approvals, as summarized in Table 5-1.

Table 5-1. Major Bridge Project Environmental Process

Major Bridge Project Name ¹	Type of Provided Environmental Process
I-78 Lenhartsville	Categorical Exclusion
I-79 Bridgeville	Environmental Assessment
I-80 Canoe Creek	Categorical Exclusion
I-80 Lehigh River	Categorical Exclusion
I-80 Nescopeck	Categorical Exclusion
I-80 North Fork	Categorical Exclusion
I-81 Susquehanna	Categorical Exclusion
I-83 South Bridge	Environmental Assessment
I-95 Girard Point	Environmental Assessment

¹ Only those Bridges identified within the Project will be included.

The Development Entity shall perform the Work in accordance with these Technical Provisions and is specifically directed to *Attachments 2 through 10, Bridge-Specific Requirements* that are part of the Package Proposal, as part of one or more Projects as negotiated with the Department as described in *Section 2.3, Bridge-Specific Requirements* of these Technical Provisions.

In the event that changes to the Provided Environmental Approvals are required or should the Provided Environmental Approvals require additional coordination or Submittals based on the Development Entity's Final Design Documents, the Development Entity shall use the requirements identified within *Section 5.5, Environmental Approvals* of these Technical Provisions as guidance for preparing required applications or performing coordination necessary for the Work.

5.10 Section 5, Environmental Submittal Requirements

Whenever a Submittal identified in the following Table 5-2 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 5-2 information. The Department will conduct reviews and provide Department Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 5-2 and Project Agreement Section 6.3.

Table 5-2. Section 5, Environmental Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Comprehensive Environmental Protection Plan (CEPP)	2	10	NTP2	—	—
2	Environmental Protection Training Plan (EPTP)	2	10	NTP2	—	—
3	Waste Management Plan (WMP)	2	10	NTP3	—	—
4	Environmental Commitments and Mitigation Measures	2	15	Construction Work commencement for Submittal related Work	—	—
5	NEPA re-evaluations and supporting documentation	3	30	NTP3	—	—
6	Summary of Permit Status for all Projects	2	10	NTP3	—	—
7	Permit Applications and Permits Received	1	10	Construction Work commencement for Submittal related Work	—	—
8	Section 4(f) Documentation	3	30 to 120	NTP3	—	—
9	Section 6(f) documentation	3	15	NTP3	—	—
10	Initial and Project Tribal Consultation Forms	3	10	NTP3	—	—
11	Section 106 Mitigation Conditions and Stipulations	3	10	NTP3	—	—
12	Section 106 Mitigation Workplan	3	10	NTP3	—	—

5. Environmental

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
13	State and Federal T&E Coordination and Mitigation Documentation	1	10	Construction Work commencement for Submittal related Work	—	—
14	Environmental Mitigation or Commitment Modifications	2	15	NTP3	—	—
15	Environmental Site Assessments	2	15	Construction Work commencement for Submittal related Work	—	—
16	Notices of Violations (NOVs)	1	10	—	Term	—
17	Quarterly Spreadsheet Detailing the Status of all Environmental Approvals and Permits	1	10	—	Design and Construction Period	—
18	Report of Maintenance, Remedial Action, of Modifications of Post-Construction Stormwater Management (PCSM) Facilities	1	15	—	Maintenance Period	—
19	PCSM Inspection Reports	1	10	—	Term	—
20	Deed of Gift for Artifacts	1	10	—	Design and Construction Period	—
21	Transfer of Chapter 105/106 Permits to Department	3	15	handback	—	—
22	Quantitative Air Analysis	2	15		Design and Construction Period	

6 Noise Analysis and Mitigation

6.1 General Requirements

In the event that a noise analysis and mitigation become necessary, the Development Entity shall prepare a Highway traffic noise analysis, noise mitigation and a Final Design Highway Traffic Noise Report for the final Design Work as required under 23 C.F.R. 772 and *Department Pub 24, Project Level Highway Traffic Noise Handbook*.

The Development Entity shall perform and/or coordinate as described, the requirements set forth within this section inclusive of applicable referenced material. The Development Entity shall provide a detailed Highway traffic noise assessment based on the level of required National Environmental Policy Act (NEPA) documentation. In Section 1.2.1 of the *Department Pub 24, Project Level Highway Traffic Noise Handbook*, the Development Entity shall determine, based on the Project potential to adversely affect the ambient noise environment at sensitive receptors, the necessary level of noise analysis. The Development Entity shall complete the *Section 5.8.7.12, Highway Traffic Noise* requirements of these Technical Provisions.

In the event the Highway traffic noise documentation is classified as a Type III project, the Development Entity shall adhere to Section 1.2.1.1 in *Department Pub 24, Project Level Highway Traffic Noise Handbook*. In the event the Highway traffic noise documentation is classified as a Type I project, two noise analyses are possible, a screening traffic noise analysis or a quantitative traffic noise analysis. In the event the Highway traffic noise documentation is classified as a Type I screening analysis project, the Development Entity shall adhere to Section 1.2.1.2 in *Department Pub 24, Project Level Highway Traffic Noise Handbook*. In the event the Highway traffic noise documentation is classified as a Type I quantitative traffic noise analysis project, the Development Entity shall adhere to Section 1.2.1.3 in *Department Pub 24, Project Level Highway Traffic Noise Handbook*. The Development Entity shall conduct the noise analysis per the U.S. Federal Highway Administration (FHWA) and the Department policy criteria and in accordance with *Department Pub 24, Project Level Highway Traffic Noise Handbook*.

6.2 Project Standards

In the event that a noise analysis and mitigation become necessary, the Development Entity shall conduct a noise analysis in accordance with applicable Project Standards identified within this document. *Attachment 1, Project Standards* of these Technical Provisions contains a list of manuals, policies, and regulations that the Development Entity shall utilize, at a minimum and comply with, in addition to Commonwealth and federal regulation policy.

6.3 Bridge-Specific Requirements

The Development Entity shall perform the Work in accordance with these Technical Provisions and is specifically directed to *Attachments 2 through 10, Bridge-Specific Requirements* included within these Technical Provisions.

6.4 [Reserved]

6.5 Design and Analysis Software

In the event that a noise analysis and mitigation become necessary, the Development Entity is to utilize the FHWA's Traffic Noise Model® (TNM) version 2.5 (or current version of the FHWA TNM, approved by

the Department) to create the computer models to predict the hourly equivalent traffic noise levels, $L_{eq}(h)$, in accordance with industry standard methods. Use of the FHWA TNM must be completed or supervised by qualified personnel described in Section I.4 of the *Department Pub 24, Project Level Highway Traffic Noise Handbook*. Roadway features input into the TNM model must be developed based on Design Documents (e.g., Bentley MicroStation files). In addition, GIS software may be used to acquire and process georeferenced data for use in the TNM. Ground elevation data used for noise modeling input should be based on the Project survey data developed for the specific Project corridor area or other reputable sources of topographical data (e.g., USGS National Elevation Dataset) for areas outside normal Project corridor coverage.

6.6 Noise Analysis

6.6.1 Noise Study Work Plan

As part of the Project Management Plan (PMP) and in the event a noise analysis and mitigation become necessary, the Development Entity shall prepare and obtain Department acceptance of a Noise Study Work Plan (NSWP) that establishes the procedures and processes to conduct a Noise Impact Assessment, where warranted. If warranted, the Development Entity shall follow the *Department Pub 24, Project Level Highway Traffic Noise Handbook* for guidance on the development of the NSWP.

The NSWP shall also include items described in *Section 6.6.1.1, Noise-Sensitive Land Uses* through *Section 6.6.1.5, Public Comment on proposed Noise Barriers* of these Technical Provisions.

6.6.1.1 Noise-Sensitive Land Uses

The Development Entity shall follow in accordance with 23 C.F.R. Part 772- Procedures for Abatement of Highway Traffic Noise and Construction Noise and *Department Pub 24, Project Level Highway Traffic Noise Handbook* guidelines specifying land use activities.

6.6.1.2 Noise Monitoring

The Development Entity shall perform necessary and/or required noise measurements in accordance with procedures described in the FHWA *Noise Measurement Handbook – Final Report* and *Department Pub 24, Project Level Highway Traffic Noise Handbook*. Such measurements must be recorded using a laboratory calibrated sound level meter. The measurements should be performed under acceptable weather and street surface conditions consistent with FHWA Section 3.4.1 of the *Noise Measurement Handbook – Final Report*.

6.6.1.3 Noise Model

The Development Entity shall use the current version of TNM to import roadway features based on the roadway Design Documents as described in *Section 6.5, Design and Analysis Software* of these Technical Provisions.

6.6.1.3.1 Model Validation

In developing a model validation program, the Development Entity shall adhere to the monitoring methodologies listed in the Department's policy guidelines, and the FHWA *Noise Measurement Handbook– Final Report*. In addition, the validation monitoring site locations must be presented to and accepted by the Department prior to site selection for monitoring.

The Development Entity shall ensure that existing noise levels measured in the field are compared with the TNM noise level predictions for the traffic conditions observed during the monitoring period, thereby verifying the accuracy of the computer model. The noise report must contain the monitored and modeled noise level for each noise monitoring location in table format, with reported changes in noise level between the measured and modeled values.

6.6.1.3.2 Modeling Receptor Sites

In the event the Development Entity changes the final Design Work on a Bridge-by-Bridge basis, a revised noise analysis and mitigation will be necessary. The Development Entity shall analyze the new noise study areas within the Project corridor including any new monitoring sites and additional receptor site locations. This selection shall include individual sites that are in close proximity to the Project alignment and could be potentially impacted by the Project. The location of monitored and modeled receptor sites shall be relatively consistent throughout the entire Project Limits. A minimum of one monitored receptor site should be placed at each Highway traffic noise study area. Receptor sites shall be placed inside the Highway ROW line at the outdoor areas of frequent human use. Modeled receptor sites shall be positioned in areas necessary to assist in identifying impacts, and to evaluate potential noise barrier locations. Modeled receptors shall also be placed at locations based on the transportation improvement Project. Placement of both monitored and modeled receptor sites shall comply with the FHWA *Noise Measurement Handbook-Final Report*. The Development Entity shall conduct the noise validation procedure in accordance with *Department Pub 24, Project Level Highway Traffic Noise Handbook*.

6.6.1.3.3 Evaluation of Land Uses

The Development Entity shall conduct a land use window and planning level desktop survey to establish and clarify the categories of land use along the proposed Projects for both developed and undeveloped lands. The Development Entity shall use this information to identify the land use Noise Abatement Criteria (NAC) following *Department Pub 24, Project Level Highway Traffic Noise Handbook*.

6.6.1.4 Noise Mitigation

The Development Entity shall perform the Work (and coordinate with the Department as may be necessary) in a manner sufficient to ensure demonstratable compliance with 23 C.F.R. 772.13(c).

6.6.1.5 Public Comment on Proposed Noise Barriers

In the event that the Bridges require the consideration of Highway traffic noise analysis and mitigation, the Development Entity shall conduct public involvement activities relating to Highway traffic noise and construction noise levels and impacts related to the Project as outlined in *Section 4.5, Public Information and Communications Plan (PICP)* of these Technical Provisions. Opportunities for such involvement should be provided as appropriate during both the environmental document preparation phase and the final Design Work phase.

For purposes of NEPA-related public involvement, the Development Entity shall carry out public involvement consistent with the requirements of *Department Pub 295, Project Level Public Involvement Handbook* and 23 C.F.R. 771.111(h) and *Department Pub 24, Project Level Highway Traffic Noise Handbook*.

6.6.2 Construction Requirements

In the event that a noise analysis and mitigation become necessary, the Development Entity shall ensure that construction noise is addressed as part of the Work in accordance with Section 5.0 of the *Department Pub 24, Project Level Highway Traffic Noise Handbook*.

6.6.2.1 Construction Noise

In the event that a noise analysis and mitigation become necessary, the Development Entity shall evaluate potential construction noise and develop and implement necessary noise control mitigation measures in coordination with Section 5.0 of the *Department Pub 24, Project Level Highway Traffic Noise Handbook*.

The Development Entity shall evaluate construction related noise impacts on a Bridge-by-Bridge basis considering land uses/activities identified, construction measures being used, and public concern.

The Development Entity shall document the effects of construction noise in the Final Design Highway Traffic Noise Report. The Development Entity shall identify noise control measures to minimize or eliminate construction phase noise impacts in accordance with *Department Pub 24, Project Level Highway Traffic Noise Handbook*.

6.7 Section 6, Noise Analysis and Mitigation Submittal Requirements

Whenever a Submittal identified in the following Table 6-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 6-1 information. The Department will conduct reviews and provide Department Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 6-1 and Project Agreement Section 6.3.

Table 6-1. Section 6, Noise Analysis and Mitigation Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Noise Study Work Plan (NSWP)	2	10	NTP2	—	—
2	Final Design Highway Traffic Noise Report Addendum	3	15	Construction Work commencement for Submittal related Work	—	—

7 Utilities

7.1 Utility Clearances

The Development Entity shall be responsible for preparing (and updating as may be necessary) utility clearances for all Utility Adjustments and conducting activities required for the Department to review such Utility Clearance and issue the applicable Utility Clearance certifications (UCC). Development Entity shall not perform any Utility Adjustment Work unless the Department has issued the UCC for the applicable Utility Adjustment and shall perform Utility Adjustment Work in accordance with and solely as permissible under the subject UCC(s).

7.2 Project Standards

Project Standards applicable to the Work are included within *Attachment 1, Project Standards* of these Technical Provisions.

7.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included within *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

7.4 [Reserved]

7.5 Utility Contacts

The Development Entity shall refer to the Utility contacts included within *Attachment 25, Utility Contacts* of these Technical Provisions. Such Utility contacts are provided for reference purposes and are subject to change following the Effective Date. Department makes no representation as to the accuracy thereof and no inaccuracy or subsequent change to such Utility contacts shall be the basis for any recourse against the Department or Development Entity compensation or relief under the Contract Documents.

7.6 Utility Relocation Management System

The Development Entity shall utilize the Department's Utility Relocation Management System (URMS) as the primary means to communicate with the Utility Owners and to provide, coordinate, manage, and document Utility Adjustment Work in accordance with the Utility Relocation Management System User Guide, unless directed otherwise by the Department. The Development Entity shall be responsible, at a minimum, for submittal of the following to the Department in accordance with Table 7-1:

- Subsurface Utility Engineering (SUE) impact evaluations;
- roadway construction plans with Utility Adjustments indicated;
- Utility conflicts and Utility conflict resolutions;
- cost sharing requests;
- incorporated work requests;
- Real property interest documents;
- Utility Adjustment permits;
- Utility estimate package; and
- Utility Clearance (D419).

The Development Entity shall utilize the Department's URMS to track ongoing issues, identify actions required or those already performed to complete the Utility Adjustment Work.

7.7 Coordination

The Development Entity shall coordinate with Utility Owners for Utility Adjustment Work, Utility Enhancements, Utility Incorporated Work, undisclosed Utility Incorporated Work and Protection in Place requirements.

The Development Entity shall coordinate with Utility Owners and facilitate Utility Bridge Occupancy Permits (BOPs) that may become necessary for the Work and shall ensure Bridge Occupancy Licenses (BOLs) are submitted to the Department in accordance with *Section 14, Structures* of these Technical Provisions.

7.7.1 Verify Utility Locations

For any required UCC not obtained by NTP1, and/or for the Utility Adjustments described in Section 7.1, the Development Entity shall issue the relevant plans and a notification letter to the Utility Owners per *Department Pub 16: Design Manual Part 5, Utility Relocation* and *Section 7.6, Utility Relocation Management System* of these Technical Provisions. The Plans shall show the type, size, and location of known existing Utilities. The Development Entity shall request in writing that the Utility Owners verify the type, size and location of existing Utilities as shown on the Plans provided by the Development Entity and whether Unidentified Utility Facilities exist.

The Development Entity may utilize the response from the Utility Owner to help determine Utility impacts and identify Utility Adjustments.

7.7.2 Subsurface Utility Engineering

In performing the Utility Coordination and Investigation Work, the Development Entity shall utilize the best practice concerning SUE to determine or confirm the existence and position of underground Utilities. The Development Entity shall determine the level of SUE required for the additional Utility Adjustments and complete the SUE impact evaluation in URMS and in accordance with Chapter 6 (Subsurface Utility Engineering) of *Department Pub 16: Design Manual Part 5, Utility Relocation*. The Development Entity shall upload SUE into URMS.

The Development Entity shall obtain test hole permits for Quality Level A SUE, as described in Chapter 6 (Subsurface Utility Engineering) of *Department Pub 16: Design Manual Part 5, Utility Relocation*, prior to excavation in the Right of Way (ROW).

7.7.3 Utility Conflicts

If found, the Development Entity shall identify to the Department any Unidentified Utility Facilities that are located within the Project Limits that require Protection in Place, Utility Adjustment, Utility accommodation, and/or Utility Enhancements. The Development Entity shall identify such Utility conflicts for each Bridge and enter such conflicts into a Utility Impact Analysis (UIA) and/or if directed by the Department and not already completed, the Development Entity shall enter such Utility conflicts into URMS. The Development Entity shall recommend actions to resolve such conflicts. The Development

Entity shall prepare the UIA as described in *Section 7.10.2, Utility Impact Analysis* of these Technical Provisions.

7.7.4 Utility Agreements

As part of the Utility Coordination and Investigation Work, and in the event that the Development Entity identifies additional necessary Utility Adjustment Work and/or Utility Enhancements, and/or Utility accommodations, the Development Entity shall prepare information to process additional Utility agreements and/or relocations in coordination with the Department.

In the event the Development Entity elects to amend a previously executed Utility agreement, the Development Entity shall coordinate processing the amendments with the Utility Owners and the Department. The amendment shall be subject to the review and acceptance by the Utility Owner and the Department, who will execute the amendment.

The Development Entity or Utility Owner shall perform Utility Adjustment Work in conformance with any applicable Utility agreement and subsequent revisions thereto made in accordance with the Contract Documents.

7.8 [Reserved]

7.9 Utility Property Interest

In the event a Utility Owner claims it is entitled to compensation in connection with Utility Adjustment, the Development Entity shall obtain the applicable real property interest documentation from the Utility Owner. The Development Entity shall provide on the ROW Acquisition Plan references to the portion of the Utility facilities which each real property interest document applies. The Development Entity shall then submit the real property interest documents to the Department in accordance with Table 7-1.

The Development Entity shall forward requests from a Utility Owner for substitute ROW provided it complies with Section 412 of the State Highway Law and Chapter 7 (Right-of-Way Procedures) of *Department Pub 16: Design Manual Part 5, Utility Relocation* and shall support the Department with the evaluation and acquisition process.

The ROW Acquisition Plan shall be prepared in accordance with *Section 8, Right of Way* of these Technical Provisions.

7.10 Utility Work Plan

As part of the Project Management Plan (PMP), as described in *Section 3.3, Project Management Plan* of these Technical Provisions, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Utility Work Plan (UWP) expanding upon the relevant information in the Package Proposal. The Development Entity shall implement, manage, and update the accepted UWP in accordance with the PMP. The UWP shall include, at a minimum:

- the Preliminary Utility Status Report (PUSR);
- Utility Adjustment Work communication procedures and processes;

- processes to identify, designate, and locate existing Utilities within the Project Limits;
- Utility Coordination and Investigation Work activities that specifically address processes to address Unidentified Utility Facilities;
- plan to address Utility Enhancements requested by Utility Owners; and
- Utility Owner coordination plan.

The Development Entity shall coordinate a meeting minutes resolution meeting between the Department and the Development Entity, if warranted in Development Entity's judgement or requested by the Department. No less than 5 Business Days prior to the meeting minutes resolution meeting, the Development Entity shall provide written responses to the Department provided Comments. No later than 3 Business Days following the meeting, the Development Entity shall revise the written meeting minutes as may be needed and provide the Department with a record of the meeting minutes resolution.

The Development Entity shall address Department provided Comments identified during Department reviews of such Submittals.

The UWP shall also include items described in *Section 7.10.1, Emergency Response Utility Plan* through *Section 7.10.3, Preliminary Utility Status Report* of these Technical Provisions.

7.10.1 Emergency Response Utility Plan

The Development Entity shall prepare and submit to the Department an Emergency Utility Response Utility Plan (ERUP).

The ERUP shall, at a minimum:

- provide a Utility Owner list, include contact information, for Utilities located within the Project Limits;
- provide copies of easements, plans, or other supporting documents that substantiates Utility Owner property interests, if any;
- identify nearby medical facilities;
- discuss Emergency procedures;
- establish Emergency Utility communication protocols;
- identify safe meeting locations for Emergencies relating to Utilities; and
- prescribe evacuation routes for Emergencies relating to Utilities.

7.10.2 Utility Impact Analysis

The Development Entity shall prepare and submit to the Department a UIA. The Development Entity shall, if applicable, revise and resubmit the UIA as Utility conflicts or previously unidentified Utilities become known.

The UIA shall, for each Utility conflict, at a minimum, include:

- Utility Owner;
- Utility location;
- description of impact;
- estimated cost of Utility Adjustment; and
- estimated implications to Baseline Project Schedule.

7.10.3 Preliminary Utility Status Report

The Development Entity shall prepare and submit to the Department a PUSR for undisclosed Utility Incorporated Work and unforeseeable Utilities.

The PUSR shall, at a minimum:

- provide a Utility Owner list with contact information for Utilities located within the Project Limits;
- present each Utility Owner's property interests, if any; and
- provide copies of easements, plans, or other supporting documents that substantiates Utility Owner property interests.

7.11 Authorizations and Notices

Authorizations and notices for Utility Adjustments shall be as described in *Section 7.11.1, Authorization to Start Engineering* through *Section 7.11.3, Notice to Start Work* of these Technical Provisions.

7.11.1 Authorization to Start Engineering

The Development Entity shall issue the Utility Owners authorization to start preliminary Utility engineering in accordance with *Department Pub 16: Design Manual Part 5, Utility Relocation*.

7.11.2 Authorization to Proceed with Work

The Development Entity shall issue the authorization to Utility Owners to start Utility Adjustments in accordance with *Department Pub 16: Design Manual Part 5, Utility Relocation*.

7.11.3 Notice to Start Work

The Development Entity shall notify affected Utility Owners a minimum of 15 Days, or such shorter period stipulated in the applicable UCC, before starting Construction Work affecting such Utility.

The Development Entity shall mark the dimensions of the proposed excavation area within the Bridge Sites in white before contacting Pennsylvania One Call. The Development Entity shall call Pennsylvania One Call in accordance with PA Act 287 of 1974, Act 50 Underground Utility Line Protection Law before starting excavation operations.

7.12 Construction Requirements**7.12.1 Care During Construction**

In the event a Utility is damaged, the Development Entity shall promptly notify the Department and the affected Utility Owner. The Development Entity shall complete or cause to be completed an alleged violation report in accordance with Pennsylvania One Call.

7.12.2 Access to Utilities

The Development Entity shall allow access to Utilities by Utility Owners to install, inspect, repair, maintain, or adjust their Utilities. The Development Entity shall reasonably accommodate and cooperate with Utility Owner's efforts to avoid delays with access by Utility Owners or hindering the performance of Utility Owner's activities.

7.12.3 Inspection

The Independent Quality Firm (IQF) shall perform inspections of Utility Adjustment Work performed by the Development Entity within 10 Business Days of specific Utility Adjustment completion.

The Development Entity shall verify location and adequacy of work for Utility Adjustment Work performed by the Department or a Utility Owner performing under a Utility agreement with the Department within 10 Business Days of specific Utility Adjustment completion.

The Development Entity shall inform the Department, the Utility Owner, and the IQF of Utility Adjustment Work to be backfilled and covered in sufficient time to allow a full and adequate opportunity to inspect and test such part of the Utility Adjustment Work.

The IQF shall provide necessary Independent Quality Assurance and Acceptance activities and obtain necessary material clearances for all Utility Adjustments constructed by the Development Entity. Such inspections and material clearances shall be agreed upon by the Development Entity, the Department, and the Utility Owner and shall be compiled into a Utility Adjustment inspection report for the Utility Adjustment Work performed by the Development Entity.

The IQF shall inspect Utility Adjustments and materials for conformity with the Design Documents. The Development Entity shall provide necessary equipment needed, such as walkways, railings, ladders, and platforms to ensure safety and access during these inspections.

The Development Entity shall not be relieved of performing the Work, due to the inspections, in accordance with the Contract Documents.

The Development Entity shall perform corrective measures, when necessary, within 10 Business Days of substandard work determination by the Construction Quality Manager (CQM).

7.12.4 Survey Control

The Development Entity shall provide survey control for Utility Adjustment Work performed by the Development Entity. As part of the Utility Coordination and Investigation Work, the Development Entity shall coordinate with any Utility Owner performing Utility Adjustments to identify the necessity of and provide necessary survey control for the applicable Utility Adjustment.

7.12.5 Permits

The Development Entity shall obtain the necessary Utility Adjustment permits and approvals from Governmental Entities, as may be required, for the Utility Adjustment Work performed by the Development Entity and shall verify that the Utility Adjustment Work performed by the Development Entity complies with the requirements of permits and approvals.

7.13 Meetings and Documentation

The Development Entity shall be available to meet when requested by the Utility Owners to discuss and resolve matters relating to the Utility Adjustment Work. The Development Entity shall notify the Department of such meetings no less than 5 Business Days prior to the meeting and the Department, in its sole discretion, will determine which meetings to attend (if any). The Development Entity shall produce meeting minutes with Utility Owners and/or the Department and shall distribute copies of the minutes to the Utility Owner, the Department (whether or not the Department attended the subject meeting), URMS, and attendees no later than 3 Days after each meeting date.

The Development Entity shall upload correspondence between the Development Entity and Utility Owners in URMS no later than 5 Days after receipt or sending.

7.14 Section 7, Utilities Submittal Requirements

Whenever a Submittal identified in the following Table 7-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 7-1 information. The Department will conduct reviews and provide Department Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 7-1 and Project Agreement Section 6.3.

Table 7-1. Section 7, Utilities Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Utility Work Plan (UWP)	2	10	NTP2	—	—
2	Emergency Response Utility Plan (ERUP)	2	10	NTP3	—	—
3	Preliminary Utility Status Report (PUSR)	2	10	NTP2	—	—
4	Utility Adjustment Inspection Reports	2	10	Each Bridge Completion	—	—
5	Revised Utility Adjustment Permits for Completed Utility Adjustments	2	10	Each Bridge Completion	—	—

7. Utilities

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
6	Utility Clearances	3	10	Construction Work commencement for Submittal related Work	—	—
7	Bridge Occupancy Permit (BOP)	2	10	Construction Work commencement for Submittal related Work	—	—
8	Bridge Occupancy License (BOL)	3	10	Each Bridge Completion	—	—
9	Utility Information	2	15	Design Work commencement for Submittal related Work	—	—
10	Utility Impact Analysis	2	10	Design Work commencement for Submittal related Work	—	—
11	SUE Submission	1	10	Design Work commencement for Submittal related Work	—	—
12	Cost Sharing Request	2	10	Design Work commencement for Submittal related Work	—	—
13	Incorporated Work Request	2	10	Design Work commencement for Submittal related Work	—	—
14	Real Property Interest Documents	2	10	Design Work commencement for Submittal related Work	—	—
15	Utility Adjustment Permits	2	10	Design Work commencement for Submittal related Work	—	—
16	Roadway Construction Plans with Utility Adjustments	2	15	Construction Work commencement for Submittal related Work	—	—
17	Utility Estimate Package	2	10	Construction Work commencement for Submittal related Work	—	—

8 Right of Way

8.1 General Requirements

The Development Entity shall only propose acquisition of additional Right of Way (ROW) that is necessary to construct, operate, and maintain the Project.

In the event the Department accepts the Development Entity's proposal for acquisition of additional ROW (such acceptance being in the Department's sole discretion), the Development Entity shall provide engineering support to the Department's acquisition of the subject ROW, including non-destructive staking out of required ROW and easements (if requested by the Department) after issuance of a Notice of Intent to Enter Letters (NOITE Form RW-983), providing more detailed design, if required, and undertaking required actions described within this section. The Development Entity shall coordinate with the Department as necessary to obtain the ROW Clearance Certification prior to NTP3.

The Development Entity shall ensure all commitments and agreements made through the ROW acquisition process to the adjacent private property owners that have been disclosed to the Development Entity are incorporated into the Baseline Project Schedule and designs.

The Development Entity shall inspect all buildings prior to their demolition.

8.2 Project Standards

Project Standards applicable to the Work are included in *Attachment 1, Project Standards* of these Technical Provisions.

8.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

8.4 Notice

The Development Entity shall provide and deliver Notice of Intent to Enter Letters (NOITE Form RW-983) to affected property owners upon Department review and acceptance to conduct appropriate Design Work, stake-outs, NEPA re-evaluations, and other investigations. In the event that NEPA re-evaluations become necessary in accordance with the terms of Project Agreement Section 6.2.12.4, the Department cannot begin ROW acquisition in any affected area of the Project until the NEPA re-evaluations are approved.

8.5 Right of Way Acquisition Plans

In the event that additional ROW is required to complete the Work, the Development Entity shall conduct appropriate Design Work and investigations and prepare and submit the applicable ROW Acquisition Plans to the Department for review and acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3).

8.5.1 Preliminary Right of Way Acquisition Plans

The Development Entity shall prepare, submit, and revise as needed, the Preliminary ROW Acquisition Plans and supporting data for the Department's review and Comment in accordance with applicable Project

Standards included in *Attachment 1, Project Standards* of these Technical Provisions. The Preliminary ROW Acquisition Plans shall consist of the following:

- ROW matrix map and property deeds;
- ROW Matrix with parcel numbers and owner names; and
- preliminary ROW Acquisition Plans;

8.5.2 Final Right of Way Acquisition Plans

The Development Entity shall revise, as needed, the preliminary ROW Acquisition Plans to address the Department review Comments and to prepare the final ROW Acquisition Plans for authorization of acquisition in accordance with applicable Project Standards. The final ROW Acquisition Plan title sheet will be prepared on mylar for Department signatures.

The Development Entity shall submit title information and supporting documents, inclusive of and at a minimum, current deed(s), mortgage(s), deed(s) of easement (including Utility easements), will(s), estate information, adverse(s), lot or subdivision plan(s), judgment(s), lien(s), tax assessment information, tax and lien certification(s), tax map(s), current taxes including paid, unpaid, or delinquent status, bankruptcy verification, unity of use analysis and other related documents with the Final ROW Acquisition Plans. The Development Entity shall also complete and provide the ROW Acquisition Plan review checklist in accordance with

- Chapter 3 (Right-of-Way Plans) of *Department Pub 14M: Design Manual Part 3, Plans Presentation*;
- Chapter 13 (Section 13.7, Plan Review Checklist) of *Department Pub 14M: Design Manual Part 3, Plans Presentation*; and
- Chapter 4 (Section 4.7, Right-of-Way Coordination) of *Department Pub 10C: Design Manual 1C, Transportation Engineering Procedures*.

8.6 Condemnation Support

In the event a condemnee files a petition for the appointment of a board of viewers, preliminary objections to a declaration of taking or other real property litigation against the Department, or the Department needs to file for a writ of possession, the Development Entity shall submit the “Board of View Plans” (as described in the Project Standards) in accordance with applicable Project Standards to the Department for review and acceptance, provide necessary expert of fact witnesses for the afore-mentioned legal proceeding(s), and any other necessary litigation support.

8.7 Railroad Property Acquisitions

Development Entity shall provide information and support as needed to the Department in connection with any acquisition of Railroad ROW as required under *Department Pub 371, PennDOT Railroad Grade Crossing Manual* and *Department Pub 378, The Right of Way Manual*.

8.8 Utility Property Acquisitions

Development Entity shall coordinate with the Utility Owners and the Department if Utilities request the acquisition of substitute ROW from the Department. Substitute ROW must be shown on the ROW Acquisition Plans as depicted in *Department Pub 14M: Design Manual Part 3, Plans Presentation*.

8.9 Agricultural Lands Condemnation Approval Board

The Development Entity shall identify in the ROW Acquisition Plan (or earlier, if feasible) if condemnation approval would be required from the Agricultural Lands Condemnation Approval Board (ALCAB).

8.10 Final Right of Way Clearance Certificate

The Development Entity shall provide the Right of Way Acquisition Plans described in *Section 8.5, Right of Way Acquisition Plans* of these Technical Provisions to the Department, in order for the Department to issue the final Right of Way Clearance certificate. The Development Entity shall not begin Work until a Right of Way Clearance Certificate has been issued by the Department.

8.11 Right of Way Acquisition Report

As part of the Project Management Plan (PMP), as described in *Section 3.3, Project Management Plan, Work Management and Administration* of these Technical Provisions, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Right of Way Acquisition Report (ROWAR) that establishes the procedures and processes to administer ROW acquisitions. The Development Entity shall submit to the Department for review and comment an initial version of the ROWAR at NTP 2 and submit revised versions of the ROWAR to the Department, as revisions become warranted, until the Department has issued Approval of the ROWAR.

The Development Entity's ROWAR shall, at a minimum:

- quantify and describe ROW acquisitions, the number of total acquisitions, the number of partial acquisitions and the anticipated number of relocations;
- identify Properties the Department has or is in the process of acquiring as well as additional ROW approved by the Department;
- provide an organizational chart identifying Development Entity's ROW roles, responsibilities, authorities, and lines of reporting;
- detail the ROW Acquisition or Report schedule and reporting methodology; and
- provide a ROW cost estimate.

8.12 Section 8, Right of Way Submittal Requirements

Whenever a Submittal identified in the following Table 8-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 8-1 information. The Department will conduct reviews and provide Department Comments in accordance with

8. Right of Way

Section 3.5, *Submittal Review and Oversight* of these Technical Provisions and Table 8-1 and Project Agreement Section 6.3.

Table 8-1. Section 8, Right of Way Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Right of Way Acquisition Report (ROWAR)	2	10	NTP3	—	—
2	Notice of Intent to Enter Letters (NOITE Form RW-983)	2	5	Design Work commencement for Submittal related Work	—	—
3	Preliminary Right of Way Acquisition Plans	1	10	Construction Work commencement for Submittal related Work	—	—
4	Final Right of Way Acquisition Plans	3	10	Construction Work commencement for Submittal related Work	—	—
5	ROW Clearance Certification	3	10	NTP3	—	—

9 Geotechnical and Pavement

9.1 General Requirements

The Development Entity shall perform geotechnical investigations, analyses, design, construction, maintenance, monitoring and reporting in accordance with this *Section 9* and other relevant provisions of the Contract Documents. Approval or acceptance (as applicable) shall be required from the Department or its representative for Submittals from the Development Entity prior to start of associated Work, as specified in this *Section 9*.

9.2 Project Standards

Project Standards applicable to the Work are included in *Attachment 1, Project Standards* of these Technical Provisions.

9.3 Bridge-Specific Requirements

The Development Entity shall perform the Work in accordance with these Technical Provisions and is specifically directed to *Attachments 2 through 10, Bridge-Specific Requirements* within these Technical Provisions.

9.4 [Reserved]

9.5 Existing Data

Existing geotechnical information for each structure have been provided to the Development Entity as part of the Reference Information Documents.

9.6 Design and Analysis Software

The Development Entity shall utilize software included in the Department's most current list of accepted commercially available or consultant developed software, as of the Technical Setting Date, for the respective listed geotechnical design and analysis, or as referenced in *Department Pub 293, Geotechnical Engineering Manual* or *Department Pub 15M: Design Manual Part 4, Structures*.

Where the Department's accepted list does not provide software options for a given analysis type, the Development Entity shall submit a list of proposed geotechnical software to be used with supporting information regarding the operational and technical details of the software, including hand calculations if deemed necessary by the Department, in accordance with Section 1.4 (Computer Programs) of *Department Pub 15M: Design Manual Part 4, Structures*.

In the event the Department's accepted list does provide software options for a given analysis type and the Development Entity wants to use different software, the Development Entity shall submit sufficient justification to prove to the Department's satisfaction that the proposed software is an approved equal to the software accepted by the Department in accordance with Section 1.4 (Computer Programs) of *Department Pub 15M: Design Manual Part 4, Structures*. The proposed software shall be equivalent in methodology and results.

9.7 Geotechnical Investigations, Testing, and Reporting

In the event the Development Entity identifies the need for supplemental geotechnical subsurface exploration programs to meet the requirements of these Technical Provisions, the Development Entity shall

perform supplemental geotechnical subsurface exploration programs, data collection, testing, research (including of existing published sources, geotechnical/geological references and maps, existing records of previous subsurface exploration programs), to determine and recommend representative soil and rock design parameters to facilitate geotechnical design and analyses of each Bridge.

9.7.1 Supplemental Subsurface Exploration Planning Submission and Laboratory Testing Plan

The subsurface exploration may include but is not limited to, soil borings (standard penetration tests) and rock coring, Piezocone Penetrometer Tests (CPTu), test pits, field and laboratory testing for soil, rock, and groundwater, and pavement coring. The Development Entity may also employ air track drilling, additional field testing, instrumentation and/or geophysical methods of investigation, as it deems appropriate and necessary, to define subsurface conditions and develop design parameters. The Development Entity shall determine the specific locations, depths, frequency, and scope of subsurface geotechnical explorations, testing, research, and analysis that the Development Entity considers necessary for the Work in accordance with the Contract Documents.

The Development Entity shall employ field exploration measures to avoid groundwater contamination as prescribed in Publication 222 – Geotechnical Investigations Manual. The Development Entity shall perform restoration of geotechnical exploration sites as prescribed in Publication 222 – Geotechnical Investigations Manual.

To the extent the Development Entity determines it necessary to perform supplemental geotechnical explorations or tests for design of the Project, the Development Entity shall perform such investigations or tests in accordance with the following requirements where determined to be necessary for design of the Project:

- subsurface borings providing standard penetration tests and rock core drilling, material description and classification following the requirements of *Department Pub 222, Geotechnical Investigation Manual* and *Department Pub 293, Geotechnical Engineering Manual*. Borings shall be of sufficient depth below foundation as outlined in Table 3.2.4-2 (Depth of Test Borings) of *Department Pub 293, Geotechnical Engineering Manual*;
- sieve analysis with gradation curves in accordance with *AASHTO T-88, Standard Method of Test for Particle Size Analysis of Soils*, Atterberg Limits in accordance with *AASHTO T 89, Standard Method of Test for Determining the Liquid Limit of Soils* and *AASHTO T-90, Standard Method of Test for Determining the Plastic Limit and Plasticity Index of Soils*, Hydrometer analysis in accordance with *AASHTO T-88, AASHTO and Unified Soil Classifications*, adequate to represent soil layers imparting lateral loads and soil layers resisting foundation loads;
- Development Entity shall perform California Bearing Ratio (CBR) testing on pavement subgrade materials in accordance with *AASHTO T-193, Standard Method of Test for The California Bearing Ratio*. The Development Entity shall collect samples for CBR testing in accordance with Section 3.7.10 (Pavement Design Borings) of *Department Pub 293, Geotechnical Engineering Manual*;
- Development Entity may consider resilient modulus testing on pavement subgrade materials in accordance with *AASHTO T-307, Standard Method of Test for Determining the Resilient Modulus of Soils and Aggregate Materials* to obtain a direct laboratory determination of the subgrade resilient modulus;

- Development Entity may consider Dynamic Cone Penetrometer (DCP) or Falling Weight Deflectometer (FWD) for estimating resilient modulus of the subgrade soil, if reliable correlations are available, calculations supporting the correlation are provided and approved by the Department's Central Office Pavement Design and Central Office's Geotechnical Sections, per *Department Pub 293, Geotechnical Engineering Manual*;
- unconfined compressive strength tests of intact rock core samples or point load tests representing rock layers subject to foundation loads to assure materials have adequate strength to resist long-term foundation loads determined according to *ASTM D7012, Standard Method of Test for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures*, Method C or *ASTM D5731, Standard Test Method for Determination of the Point Load Strength Index of Rock and Application to Rock Strength Classifications*; and
- point load strength test of rock core samples representing rock layers subject to foundation load to assure materials have adequate strength determined according to *ASTM D5731* shall only be used when inadequate samples exist for unconfined compressive testing following *ASTM D7012*.

In the event the Development Entity identifies the need for an additional supplemental subsurface exploration program during final design to meet applicable Contract Document requirements, the Development Entity shall submit a supplemental Subsurface Exploration Planning Submission (SEPS) to the Department for review and acceptance and perform necessary supplemental subsurface exploration program.

In the event the Development Entity identifies the need for an additional supplemental laboratory testing program during final design to meet applicable Contract Document requirements, the Development Entity shall submit a supplemental laboratory testing request to the Department for review and acceptance and perform necessary supplemental laboratory testing. Laboratory testing requests shall include the laboratory test assignments by sample, supporting boring logs and core box photographs indicating the rock specimen(s) to be tested.

The Development Entity shall utilize prequalified drillers and certified boring inspectors approved and certified by the Department, in accordance with *Department Pub 222, Geotechnical Investigation Manual*. Prequalified drillers shall be approved as Class A by the Department. For in-water borings, the Development Entity shall use a prequalified driller approved by the Department as Class S for the Off-shore Drilling (OSD) specialized borings sampling and testing (BST). For other proposed drilling methods listed in Table 1 (Criteria for Drilling Contractor Prequalification), Note 17 of *Department Pub 222, Geotechnical Investigation Manual*, the prequalified driller shall be approved by the Department as Class S for the respective specialized BST.

The Development Entity shall use laboratory testing methods published by ASTM or AASHTO and in accordance with the Project Standards for determining non-presumptive geotechnical design parameters. Laboratory testing shall be performed by an accredited AASHTO materials reference laboratory on representative soil and rock samples to determine shear strength parameters and consolidation parameters with laboratory testing assignments determined based on encountered soil and rock conditions. In addition to the laboratory testing requirements in *Department Pub 293, Geotechnical Engineering Manual*, the Development Entity shall include the following in its laboratory testing program as a set of guidelines but not minimum requirements:

- shear strength parameters of soils for slope stability analyses – *AASHTO T 236*, Standard Method of Test for Direct Shear Test of Soils under Consolidated Drained Conditions;
- shear strength parameters of cohesive soils – *AASHTO T 297*, Standard Method of Test for Consolidated, Undrained Triaxial Compression Test on Cohesive Soils;
- consolidation design parameters of soils – *AASHTO T 216*, Standard Method of Test for One-Dimensional Consolidation Properties of Soils;
- unconfined compressive strength of intact rock – *ASTM D7012*, Standard Method of Test for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures, Method C; and
- point load strength – Standard Test Method for Determination of the Point Load Strength Index of Rock and Application to Rock Strength Classifications – *ASTM D5731* is to be used only when inadequate samples exist for unconfined compressive testing following *ASTM D7012*.

As a general guideline but not minimum requirement, one consolidation test and two triaxial compression tests shall be required for each distinct predominantly fine-grained (silt to clay) soil layer at each bridge location. Each consolidation test shall include at least one unload-reload cycle.

For foundations bearing on rock, three unconfined compressive strength of intact rock (*ASTM D7012*) may be performed (but not minimum requirement) for each distinct rock bearing stratum at each bridge location.

The minimum number of tests may be reduced with approval of the Department at pier locations with shallow foundations resting directly on competent bedrock.

The Development Entity may determine (but not minimum requirement) the D50 value for scour evaluation at each Bridge in accordance with *ASTM D422*. For hydraulic analysis requirements, see *Section 13, Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control* of these Technical Provisions.

One soil corrosion series per pier and abutment location may be required (but not minimum requirement) at each bridge and two water corrosion series at each bridge. The Development Entity shall assess the potential for corrosive soil, water, and ground water; shall evaluate foundations for corrosive conditions; and shall mitigate for identified corrosive conditions in the design in accordance with *Department Pub 293, Geotechnical Engineering Manual*.

Each soil corrosion series shall consist of the following tests and methods:

- one resistivity of soil test (*AASHTO T 288*);
- one pH of soil test (*AASHTO T 289*);
- one sulfate ion in soil test (*AASHTO T 290*); and
- one chloride ion in soil test (*AASHTO T 291*).

Each water corrosion series shall consist of the following tests and methods:

- one conductivity/resistivity of water test (ASTM D1125);
- one pH of water test (ASTM D1293);
- one sulfate ion in water test (ASTM D516); and
- one chloride ion in water test (ASTM D512).

In the event the Development Entity elects to conduct field testing using an electric cone penetrometer with a pore pressure measuring device (piezocone penetration test or CPTu) to supplement laboratory consolidation testing to determine the horizontal rate of consolidation, the Development Entity shall include performance of field testing in the Subsurface Exploration Planning Submission. Drillers performing CPTu shall be prequalified and accepted by the Department as Class S for CPT specialized BST prior to start of drilling in accordance with *Department Pub 222, Geotechnical Investigation Manual*.

If the Development Entity identifies the need for an additional supplemental subsurface exploration after submitting a Subsurface Exploration Planning Submission, the Development Entity shall submit an updated Subsurface Exploration Planning Submission.

Subsurface information must be entered and reported using gINT software, as produced by Bentley Corporation, for subsurface data management and reporting. The Department's gINT library and data template will be provided to the Development Entity. The Development Entity shall log any newly collected subsurface information and, as appropriate, complete the gINT file.

9.7.2 Foundation Design Parameters Assumptions and Model Assumptions Report

The Foundation Design Parameters Assumptions and Model Assumptions Report will not be required for any structures on the project. The Final Structure Foundation Report for each structure will contain all of the supporting information, rationale for parameter selection, and documentation (of sources and any notable limitations for geotechnical parameters or other items), classification and test results, summaries of test results, and statistical analysis of test results used for geotechnical parameters selection including any modifications or elimination of data in the statistical analysis. The Final Structure Foundation Report will also contain a description of any modeling used for design/analysis of the proposed foundations and include rationale for use of modeling technique or limitation.

9.7.3 Geotechnical Analysis and Design

The Development Entity shall perform geotechnical analyses and foundation design in accordance with *Department Pub 293, Geotechnical Engineering Manual* and *Department Pub 15M: Design Manual Part 4, Structures* and as specified herein, whichever is more stringent.

The Development Entity shall conduct slope stability analyses using, at a minimum, the simplified Bishop method, modified Bishop method, the simplified Janbu method, or force-moment-equilibrium methods, to consider both circular and possibly block failure modes. The type of analysis used above will be determined by the Development Entity based on which method is appropriate for the stability case being evaluated.

In performing geotechnical analyses, the Development Entity shall determine the long-term (drained) soil shear strength design parameters in accordance with *Department Pub 293, Geotechnical Engineering Manual* and *Department Pub 15M: Design Manual Part 4, Structures*. Undrained soil shear strength

parameters will not be required if not warranted for the project design case as determined by the Development Entity. The Development Entity shall provide rationale for using only the drained soil parameters.

The Development Entity shall calculate both elastic and primary and secondary consolidation settlement of soils in accordance with the Contract Documents.

The Development Entity shall perform excavation of pyritic soils and rocks, such as sulfate soils and acid bearing rock, in accordance with *Department Pub 293, Geotechnical Engineering Manual* and with DEP requirements to mitigate or prevent acidic runoff. The Development Entity shall adhere to the acid bearing rock requirements in *Department Pub 293, Geotechnical Engineering Manual* Chapter 10 with respect to pyritic soils or rocks to be stockpiled and/or reused as fill on the Bridge. Addressing Acid Producing Rock in accordance with Department Pub 293, Chapter 10 guidelines, including site drilling and sampling requirements, may be modified/reduced based on guidance received from the Department and/or DEP.

The Development Entity shall calculate bearing resistance of soil and rock for spread footings in accordance with *Department Pub 293, Geotechnical Engineering Manual* and *Department Pub 15M: Design Manual Part 4, Structures*.

The Development Entity shall design and construct Bridge foundations to meet or exceed the requirements for and performance of foundation types, testing requirements, pile dynamic analysis and other requirements listed in *Department Pub 293, Geotechnical Engineering Manual* and *Department Pub 15M: Design Manual Part 4, Structures*, as well as the requirements in these Technical Provisions.

The Development Entity shall limit the grout-to-ground bond strength of micropiles to no higher than the upper limit provided in Table 9-1 of these Technical Provisions. The Development Entity shall verify grout-to-ground strength via field testing in accordance with Section 10.9.3.5.4 in *Department Pub 15M: Design Manual Part 4, Structures*.

Table 9-1. Limiting Values for Grout-to-Ground Strength for Preliminary Design

Type	Limiting Values for Preliminary Design
Ultimate Grout to Ground Bond Strength for Micropiles	See Table C10.9.3.5.2-1 of Design Manual Part, Table
Ultimate Values of Grout to Ground Bond Stress for Anchors in Rock	See Sec 5.3.6, Table 7 of FHWA, GEC 4, Table

The following types of geotechnical conditions shall not be included in the Project design as means of contributing to the support of a structure: bearing on coal, bearing on slaking rock, bearing on claystone, spread footing on soil or rock underlain by karst geology, timber piles, timber mats, or other conditions considered unacceptable in *Department Pub 293, Geotechnical Engineering Manual* and *Department Pub 15M: Design Manual Part 4, Structures*. Additionally, the Design Documents shall clearly identify any other potentially hazardous geotechnical conditions, including but not limited to sinkholes, abandoned mines, solution cavities and/or voids, karst geology, and saprolite, and provide for appropriate mitigation in the geotechnical design and selection of construction methods.

Tip elevation for drilled foundations shall not reside in saprolite. Intermediate geomaterials shall only contribute to the side resistance of a pile or drilled shaft foundation. The Development Entity shall not consider tip resistance for piles and drilled shaft foundations within intermediate geomaterials (e.g., residual soil).

9.7.4 Final Geotechnical Engineering Report

If necessary, the Development Entity shall update the Geotechnical Engineering Report from the PDA Phase and submit a Final Geotechnical Engineering Report (GER) for the non-structural portions of the Bridge (e.g. roadway embankment) in accordance with Section 1.5.5 of *Department Pub 293, Geotechnical Engineering Manual* and with the requirements of these Technical Provisions. The GER shall meet the minimum requirements listed in *Department Pub 293, Geotechnical Engineering Manual* for the Final Geotechnical Engineering Report and shall also include recommended soil and rock parameters for representative roadway and/or embankment segments requiring geotechnical analysis.

The Development Entity shall confirm final design rock parameters via laboratory testing as applicable for the project design. The Development Entity shall select final soil and rock design parameters in accordance with *Department Pub 293, Geotechnical Engineering Manual*.

The Development Entity shall prepare as necessary its GER documenting the assumptions, conditions, and results of the geotechnical investigations and analyses, and rationale for the report, including the following:

- the geology of the Project, including soil and/or rock types, and drainage characteristics,
- field investigations and field and laboratory test results used to characterize conditions:
 - In documentation of field investigations, the Development Entity shall include descriptions of methods of investigation and testing, descriptions of soil and rock strata including soil and rock recoveries, blow counts, N_{60} values, field classification, and rock quality designation values, drilling and field observations, and the results of any field/in-situ testing conducted as part of the investigations.
- laboratory testing and test borings including activities necessary for development of design parameters:
 - In documentation of laboratory testing, the Development Entity shall include test results, recording of measurements and observations conducted as part of the testing, and calculations, charts and graphs made in analysis and determination of the test results. The Development Entity shall conduct laboratory testing in accordance with required Department, AASHTO and ASTM testing standards by a lab certified in accordance with *Section 4.8 of Department Pub 293, Geotechnical Engineering Manual*.
- a discussion of conditions and results with reference to specific locations at the Project;
- design and construction parameters resulting from the geotechnical investigation, testing and analysis, including parameters for the design of (as applicable) pavements, pipes, slopes, reinforced soil slopes, and embankments or other geotechnical designs in accordance with *Department Pub 293, Geotechnical Engineering Manual*;
- documentation of field testing and results of testing;

- slope stability analyses for (as applicable) embankment and excavation, including roadway sections, and retaining wall slopes including both short-term (undrained) and long-term (drained) conditions, and discussion of design measures undertaken to ensure stability and safety of slopes, including temporary construction conditions;
- Development Entity shall include groundwater seepage considerations in design of soil cut slopes and slope stability analyses;
- Development Entity's analysis shall consider the potential for long-term surficial slide failures common to high plasticity clays in Pennsylvania, and specific recommendations shall be provided to minimize their occurrence.
- The Development Entity shall not design slopes to be steeper than 2H:1V unless slopes are in rock or a reinforced soil slope; unless approved by PennDOT.
- an analysis of the expected settlement of the embankment, roadway, pipes, slopes, or other geotechnical features per *Department Pub 293, Geotechnical Engineering Manual*, including both short-term and long-term effects, and the proposed method of addressing settlement to limit differential settlement and total settlement to within allowable tolerances per the Contract Documents. The Development Entity shall include considerations for both elastic settlement and consolidation settlement during construction; and potential consolidation settlement post-construction. Where applicable, the Development Entity shall include analyses for surcharge and preloading, wick drains, or other means of settlement mitigation to keep differential settlement and total settlement to within the allowable tolerances per the Contract Documents. The Development Entity shall limit post-construction settlement of new embankments to less than 1 inch; unless approved by PennDOT.
- a boring locations plan showing the plan view locations of field sampling;
- boring logs and other field testing data;
- summary of laboratory testing results; and
- pertinent calculations, general notes, and analyses supporting design decisions.

Coal seams encountered within the Project Limits will be addressed in general accordance with Publication 293, Chapter 10 to ensure that the coal seam does not cause slope or embankment stability issues nor cause seepage into nearby waterways. If determined applicable for the overall project design, the Development Entity shall remove and waste coal to a DEP-approved landfill, permitted coal refuse facility, or other suitable permitted and approved waste area to the satisfaction of the Department and DEP.

9.7.5 Final Structure Foundation Report with Foundation Submission Letter

The Development Entity shall update the Structure Foundation Report from the PDA Phase and submit to the Department for acceptance a Final Structure Foundation Report (SFR), including a Foundation Submission Letter, for each Structure in accordance with Section 1.5.7 of *Department Pub 293, Geotechnical Engineering Manual* and meeting the requirements of these Technical Provisions.

For bridges constructed adjacent or near to an existing structure, the Development Entity shall include analyses for design of temporary support of excavation and cofferdams, and design new foundations to be

compatible with existing foundations. The Development Entity shall design new foundations to not adversely affect existing foundations via induced settlement, lateral loading, increased scour, potentially damaging vibrations, or other means. The Development Entity shall provide rationale and/or analysis to demonstrate adequacy of existing foundations subject to additional loading by proposed structures or roadway.

The Development Entity shall prepare and amend, as necessary, its SFRs documenting the assumptions, conditions, and results of the geotechnical investigations and analyses, and rationale for amending the report, including the following:

- the geology of each Bridge, including soil and/or rock types, and drainage characteristics;
- field investigations and field and laboratory test results used to characterize conditions:
 - In documentation of field investigations, the Development Entity shall include descriptions of methods of investigation and testing, descriptions of soil and rock strata including soil and rock recoveries, blow counts, N_{60} values, field classification, and rock quality designation values, drilling and field observations, and the results of any field/in-situ testing conducted as part of the investigations.
- laboratory and field testing including activities necessary for development of design parameters, testing necessary to establish construction control requirements and performance standards (e.g., moisture-density/Proctor testing), and testing conducted in monitoring of construction performance and compliance with construction specifications (e.g. nuclear density gauge testing):
 - In documentation of laboratory testing, the Development Entity shall include test results, recording of measurements and observations conducted as part of the testing, and calculations, charts and graphs made in analysis and determination of the test results. The Development Entity shall conduct testing in accordance with required Department, AASHTO and ASTM testing standards by a laboratory certified in accordance with Section 4.8 of *Department Pub 293, Geotechnical Engineering Manual*.
- a discussion of conditions and results with reference to specific locations on each Bridge;
- design and construction parameters resulting from the geotechnical investigation, testing and analysis, including parameters for the design of foundations and structures;
- documentation of field testing and results of testing;
- analysis of the expected settlement of the structure, both short-term and long-term effects, and the proposed method of addressing settlement to limit differential settlement and total settlement to within allowable tolerances per the Contract Documents. The Development Entity shall include considerations for both elastic settlement and consolidation settlement including potential differential settlement; total settlement; downdrag; and means of settlement mitigation or ground improvement to limit differential settlement and total settlement to within allowable tolerances per the Contract Documents. The Development Entity shall design deep foundations to limit maximum total settlement to less than 1 inch. If loads from the proposed structure are applied to adjacent existing structures, the Development Entity shall include an analysis documenting adequacy of the existing structure with the additional load;

- a boring location plan showing the plan view locations of field sampling;
- boring logs and other field data;
- summary of laboratory test results; and
- pertinent calculations, general notes, and analyses supporting design decisions.

In addition to the information required in *Department Pub 293, Geotechnical Engineering Manual* and *Department Pub 15M: Design Manual Part 4, Structures*, each SFR shall include the following as applicable for the project design:

- design and construction parameters derived from geotechnical investigations for the design of structure foundations, pipes, pavements, slopes, embankments, and earth retaining structures; and
- assessment of the corrosion potential of the soil and rock materials and groundwater conditions encountered per the Project Standards based on laboratory testing performed in accordance with *Section 9.7.1, Supplemental Subsurface Exploration Planning Submission and Laboratory Testing Plan* of these Technical Provisions, and the impacts to planned surface and subsurface facilities.

As part of the SFR, the Development Entity shall detail the Development Entity's plan for demolition of the existing foundations and removal of piles. The Development Entity shall consider and develop a plan to prevent the formation of void space and ground subsidence and to maintain stability of adjacent structures, utilities, and embankments.

Each SFR, upon completion and including any later supplements or amendments, shall be submitted to the Department for review, Comment, and acceptance in accordance with *Section 9.11, Section 9, Geotechnical and Pavement Submittal Requirements* of these Technical Provisions.

9.8 Impacts to Adjacent Properties and Infrastructure

9.8.1 Blasting and Vibration Monitoring Plan

If determined to be applicable for the Project, the Development Entity shall develop and implement a Blasting and Vibration Monitoring Plan meeting the requirements of *Department Pub 408, Highway Construction Specifications*. If determined to be applicable for the Project, the Development Entity shall include additional vibration monitoring sensors beyond those required in *Department Pub 408, Highway Construction Specifications* where critical structures exist within 300 feet of the blasting site. This vibration monitoring limit shall be extended to 1,000 feet from the blasting site if the blast is designed for a peak particle velocity exceeding 0.5 inches per second.

The Development Entity shall submit the Blasting and Vibration Monitoring Plan to the Department for review and acceptance in accordance with *Section 9.11, Geotechnical and Pavement Submittal Requirements* of these Technical Provisions prior to commencing the specified blasting. The Development Entity shall submit the Blasting and Vibration Monitoring Plan no fewer than 30 Days prior to any blasting activities.

9.8.2 Vibration and Movement Monitoring Plan

If determined to be applicable for the Project, the Development Entity shall develop and implement a Vibration and Movement Monitoring Plan to monitor vibration levels and existing structure movement and the control of means and methods of construction during installation of sheet piles, foundation casing, temporary sheeting, or any other vibration-causing construction activities not including blasting.

The Development Entity shall provide a Vibration and Movement Monitoring Specialist meeting the requirements listed in *Section 3.3.4.2.18, Vibration and Movement Monitoring Specialist* of these Technical Provisions.

The following qualifications shall be provided in the Vibration and Movement Monitoring Plan:

- name of firm engaged to perform vibration monitoring, inspections, and report work;
- qualifications of such firm including list of similar project experience of previous 3 years; and
- qualifications/resumes for Required Personnel performing work, including the Professional Engineer in responsible charge of the preparation and implementation of the vibration and movement monitoring plan.

The Development Entity shall develop and implement a Vibration and Movement Monitoring Plan for each Bridge. The Development Entity shall include the following information in the Vibration and Movement Monitoring Plan as general guidelines as applicable for the specific Project case:

- proposed list of vibration monitoring equipment to be used on the Bridge including at least two seismographs, two optical survey points, and one tiltmeter for each existing structure. Seismographs must be capable of measuring and recording the peak particle velocities and three components of ground vibration. Seismograph information shall include a certificate of calibration, dated within the previous 12 months of its anticipated use on the Bridge. The certificate of calibration shall be directly traceable to the United States Bureau of Standards. The seismographs shall have both a visual and paper (or electronic) readout;
- procedures for protection and maintenance of instrumentation throughout the duration of the applicable Construction Work, or until directed otherwise by the Department;
- list of structures and Utilities to be inspected and monitored;
- pre-construction and post-construction inspections including report preparation of structures within 300 feet of proposed sheet pile driving or other vibration-causing construction activities. This includes, at a minimum, commercial businesses, private residences, Utilities, bridges, and dam structures;
- procedures and schedule for the inspections for structures with anticipated submission dates for the pre-construction inspection report, vibration and optical survey point monitoring and construction control report, and post-construction inspection report;
- proposed list of equipment to be used on the Bridge for installation of sheet piles or any other vibration-causing construction activities;

- Development Entity shall provide the expected effect of vibrations caused by each piece of equipment on structures, private residences, private property, and utilities within the respective vibration monitoring range attributed to each activity for which that piece of equipment shall be utilized;
- development and implementation of a program to limit the construction vibrations to preclude damage to any existing structures, pavement, or Utilities;
- development and implementation of a program to monitor the ambient and construction vibrations at the structures within 300 feet of the proposed vibration-causing construction activities;
- a lower threshold value and a higher limiting value for the measured peak particle velocities, with the proposed vibration levels accounting for the inspected conditions of the structures;
- a lower threshold value and a higher limiting value for settlement, lateral movement, and rotation of the monitored existing structures, pavement, Utilities, and constructed portions of new structures; and
- plans of action for when the threshold value and limiting value are reached.

The Development Entity shall establish the threshold and limiting values in accordance with *United States Bureau of Mines RI-8507, Structure Response and Damage Produced by Ground Vibration from Surface Mine Blasting*. The threshold value shall correspond to a 95 percent probability that structural damage will not occur regardless of wave frequency.

The Development Entity shall submit the Vibration and Movement Monitoring Plan to the Department for review and acceptance in accordance with *Section 9.11, Geotechnical and Pavement Submittal Requirements* of these Technical Provisions prior to commencing the specified blasting. The Development Entity shall submit the Vibration and Movement Monitoring Plan no fewer than 30 days prior to the start of vibration-causing construction activities.

9.8.3 Instrumentation Plan

If determined to be applicable for the Project, the Development Entity shall develop and implement an instrumentation program to monitor settlement and lateral stability of embankments and structures to control the means and methods of construction in accordance with *Section 9.10.3, Instrumentation* of these Technical Provisions and Section 1.6.1.2 of *Department Pub 293, Geotechnical Engineering Manual*.

Where applicable based on encountered ground conditions, the Development Entity shall include the following in its instrumentation program, as applicable for the Project case:

- settlement platforms to monitor ground settlement;
- probe extensometers to monitor consolidation of new fill and differentiate from underlying ground settlement; and
- inclinometers to monitor lateral movement of subsurface soil strata.

As applicable for the proposed monitoring, the Development Entity shall include and locate deep benchmarks to provide a stable reference point for surveying settlement platforms and to support movement monitoring in *Section 9.8.2, Vibration and Movement Monitoring Plan* of these Technical Provisions.

The Development Entity shall develop the instrumentation plan to:

- provide reliable information to assess the embankment stability relative to embankment construction and to assess ground movements resulting from fill placement;
- permit timely implementation of proper remedial measures when and as required to prevent slope stability failures and damage to structures and utilities. Remedial measures may include modification of construction procedures or suspension of earthwork operations;
- document ground movements and embankment performance; and
- determine vertical displacements occurring during and after fill and, if applicable, surcharge placement.

The Instrumentation Plan shall provide sufficient information to demonstrate compliance with *Section 9.10.3, Instrumentation* of these Technical Provisions.

The Development Entity shall include a proposed schedule and procedures for instrumentation installation and performance of initial readings for the instrumentation. For inclinometers, probe extensometers, and deep benchmarks, the Development Entity shall provide detailed step-by-step procedures for installation, together with a sample installation record sheet, bound and indexed. The Development Entity shall include the following, as applicable for the Project case, in the installation procedures:

- the method to be used for cleaning the inside of casing;
- drill casing type and size;
- depth increments for backfilling boreholes with sand and bentonite pellets;
- method for overcoming buoyancy of instrumentation components during grouting;
- method for sealing of joints in pipes and inclinometer casing to prevent ingress of grout;
- method and equipment for mixing and placing the grout; and
- method and equipment for drilling boreholes.

The Development Entity shall establish installation procedures for instruments in boreholes (if applicable) such that the steps in the procedure can be quality assured.

The Development Entity shall define the time intervals for readings of installed instrumentation.

The Development Entity shall also include the following, as applicable for the Project case, in the Instrumentation Plan:

- survey control layout including locations of deep benchmarks, survey benchmarks, and baselines;

- instrumentation locations and base plate, casing, and magnet elevations as applicable for each instrument with supporting soil information;
- product data: Manufacturer's catalog cuts, shop drawings, material specifications, installation and maintenance instructions, and other data pertinent to each instrumentation type;
- material specifications and mix design for grout required for inclinometer and deep benchmark installations, including specifications for proposed grout mixes with commercial names, proportions of admixtures and water, mixing sequence, mixing methods and duration, pumping methods and tremie pipe type, size, and quantity;
- manufacturer's certifications that products, materials, and equipment furnished meet the specified requirements;
- sample installation record sheet meeting the requirements of *Section 9.10.3, Instrumentation* of these Technical Provisions; and
- criteria to define completion of the instrumentation program.

The Development Entity shall include its methods and procedures for evaluating the instrumentation data and for addressing readings which indicate potentially damaging ground displacements, such as modifying the construction rate and sequence or taking other action to reduce further ground displacements.

As applicable for the proposed monitoring, the Development Entity shall also include the following information for each instrument type:

- a description of the purpose of the instrument;
- make and model of each instrument;
- theory of operation;
- step-by-step procedures for pre-installation acceptance test when instruments are received on Bridge Sites, to ensure the instruments are functioning correctly before installation;
- calibration of readout units;
- a list of calibration equipment required, and recommended frequency of calibration;
- step-by-step instrument installation procedure including materials, tools, spare parts and any borehole requirements, and post-installation acceptance tests;
- maintenance procedure;
- step-by-step data collection procedure; and
- data reduction, processing, and plotting procedures.

9.8.3.1 Qualifications

The Development Entity shall include documentation that supervisory personnel and technicians performing the instrumentation work are qualified:

- technicians with at least four years of previous experience in the installation of the instruments included in the Instrumentation Plan;
- geotechnical engineer, licensed in the Commonwealth of Pennsylvania, with at least four years of direct field experience in the installation and monitoring of the types of instruments included in the Instrumentation Plan to supervise and be responsible for instrumentation installation; and
- drillers with at least four years of direct field experience in drilling boreholes for the types of instrumentation included in the Instrumentation Plan.

The qualified geotechnical engineer shall, as general guidelines depending on the specific Project case:

- prepare detailed step-by-step procedures and installation schedule for instrumentation included in the Instrumentation Plan;
- review and sign data submittals;
- be on the Bridge Site and supervise the installation of each inclinometer; and
- conduct at least the first two activities of each of the following tasks for each instrument specified herein jointly with the IQF: pre-installation acceptance tests, post-installation acceptance tests, field calibration, initial reading and data collection, reduction, processing, plotting, and reporting.

If drilling is required, the driller responsible for drilling instrumentation boreholes shall be on-site, full-time during the drilling program. The driller shall provide a drill rig capable of accessing the instrumentation locations under the conditions existing at time of drilling. The driller shall not perform earthwork to secure drill rig access to instrument locations without Department acceptance.

9.9 Pavement Design

The Development Entity shall base pavement designs for the Project on the most current version of *Department Pub 242, Pavement Policy Manual*, and as supplemented by the requirements contained within this document as identified in this section. The pavement limits defined by the Development Entity and accepted by the Department in the Development Entity's Package Proposal, shall be full-depth pavement replacement, unless otherwise agreed to in writing by the Department.

Where a Pavement Design Submittal is required for the Project design, the Development Entity shall prepare a Pavement Design Submittal following the procedures of *Department Pub 242, Pavement Policy Manual*. When a pavement design involves more than 30,000 square yards of mainline and shoulder replacement, the Pavement Design Submittal shall include a Life Cycle Cost Analysis (LCCA) using the current version of the Department's LCCA Excel spreadsheet as posted on ECMS under "References," "File Cabinet". Pavement Type determination shall follow Chapter 3 of *Department Pub 242, Pavement Policy Manual* unless provided by the Department as per *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

For all full-depth pavement replacement areas, the proposed pavement shall follow the design process and meet or exceed the minimum thickness requirements per Tables 8.3 and 9.4 of *Department Pub 242, Pavement Policy Manual*. The Development Entity shall design pavement structures to ensure shoulder sections follow the same pavement structure as the travel lane sections. For areas outside of the Bridge full-

depth pavement limits, the Development Entity shall show proposed milling areas and pavement overlay thicknesses and materials on the Form D-4332 as part of the Pavement Design Submittal.

Where pavement analysis is required according to Pub. 242 guidelines, the Development Entity shall perform pavement analysis using Pavement Design, Analysis and Rehabilitation for Windows (DARWin v3.01) as produced by AASHTO. The Development Entity shall submit pavement design calculations to the Department for review and acceptance as part of the Pavement Design Submittals, and pavement design recommendations shall be based on the results of the AASHTO method using DARWin v3.01 software. The Department will grant access to DARWin and the user's guide to individual users through limited access to the Department's virtual private network.

The Development Entity shall use the data on U.S. Federal Highway Administration's (FHWA) 13 vehicle traffic classification data available on the Department's Traffic Information Repository (TIRE) website (<https://gis.penndot.gov/TIRE>) as may be updated from time to time. If roadway classification data is not available identifying FHWA's 13 vehicle classifications, the Development Entity shall collect traffic classification data as per Appendix B of *Department Pub 242, Pavement Policy Manual* to determine proper pavement design and shall coordinate with the Department on the number of days of the classification counts.

The Development Entity shall prepare separate Pavement Design Submittals and submit to the Department, as and when required per *Department Pub 242, Pavement Policy Manual*. The reports shall include results of the field explorations and testing of pavement sections as well as recommended pavement rehabilitation methods and designs for new pavements. Each Pavement Design Submittal shall include a completed Form D-4332. Pavement designs for Interstates shall be submitted to FHWA per *Department Pub 242, Pavement Policy Manual*.

If required for the Project design, the Development Entity shall submit a California Bearing Ratio (CBR) Recommendation Letter for Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) based on either CBR values obtained from previous exploration programs and/or from laboratory testing results obtained as part of the subsurface exploration as detailed in *Section 9.7, Geotechnical Investigations, Testing, and Reporting* of these Technical Provisions. The Development Entity shall include a Department-signed CBR Recommendation Letter within the Pavement Design Submittal.

9.9.1 Pavement Materials

Unless otherwise specified herein, pavement material requirements are defined in the most current version of *Department Pub 408, Highway Construction Specifications*. The Development Entity shall use proposed pavement designs as construction items provided on the Department's ECMS items list. The Development Entity shall use the version as of the Technical Setting Date identified in the Materials Test Procedures, AASHTO or ASTM standards or equivalent guidance as approved or provided by the Department for test procedures identified therein.

The Development Entity shall not use open graded subbase (OGS). The Development Entity shall not reuse existing concrete exhibiting Alkali-Silica Reactivity (ASR). The Development Entity shall assess ASR via concrete petrographic laboratory testing of concrete pavement cores in accordance with *ASTM C856, Standard Practice for Petrographic Examination of Hardened Concrete*.

9.9.2 Pavement Widening

For widened sections, the Development Entity shall provide a uniform surface of the same material type across adjacent lanes at the interface between the new widened pavement and the existing pavement. In areas where an existing asphalt surface is in place and widening is required, the Development Entity shall construct a new surface course for existing and constructed pavement.

9.9.3 Preservation and Rehabilitation

Where the Development Entity bears responsibility during the Construction Period and during the Maintenance Period according to *Attachment 31, Maintenance Responsibilities* of these Technical Provisions, the Development Entity shall perform treatments to maintain and extend the pavement life as provided in *Section 22, Maintenance* of these Technical Provisions. Pavement preservation shall be performed as described in Chapter 12 of *Department Pub 242, Pavement Policy Manual* to avoid more costly rehabilitation required when not meeting the Performance Requirements of *Section 22, Maintenance* of these Technical Provisions. For items not included in *Section 22, Maintenance* of these Technical Provisions, the Development Entity shall follow the pavement maintenance cycles for the appropriate pavement type as shown in Chapter 11 of *Department Pub 242, Pavement Policy Manual* at a minimum.

9.9.4 Reinstatement of Open Cuts

As part of the Utility Adjustment Work and after installation of drainage structures, storm sewers, or any open cut beneath existing pavements carrying traffic during construction, the Development Entity shall restore and maintain the pavement structure and surface to a normal satisfactory structure and riding surface equal to or better than the existing structure and riding surface. The Development Entity shall ensure that any such planned relocations and installations are completed prior to final pavement surface construction.

9.10 Construction Requirements

The Development Entity shall construct the structures and pavement in accordance with Contract Documents. Within four weeks after completion of the Construction Work, the Development Entity shall complete the Pavement Data Form as posted on ECMS under “References”, “File Cabinet” to capture the pavement information from the Record Drawings.

The Development Entity shall design and construct necessary benching on slopes to prevent long term sloughing.

In the event that shallow bedrock, small pinnacles, or ledges of rock are encountered at the subbase elevation or bottom of shallow foundation elevation, the Development Entity shall undercut those areas sufficiently to provide a suitable level surface, free of hard points, for uniform placement of subbase or foundation.

9.10.1 Foundations

The Development Entity shall construct foundations and other geotechnical items in accordance with the Contract Documents.

The Development Entity must perform field testing of foundations, field testing of ground anchors and anchor systems, and field testing of soil nails. The Development Entity shall perform field testing of foundations in accordance with *Department Pub 15M: Design Manual Part 4, Structures*. The Development

Entity shall perform field testing of ground anchors and anchor systems and field testing of soil nails in accordance with FHWA GEC No. 4 and FHWA GEC No. 7, respectively. The Development Entity shall submit foundation installation and testing specifications, as well as installation and testing specifications for ground anchors, anchor systems, and soil nails for review and acceptance prior to the start of construction.

The Development Entity shall perform dynamic pile load testing, such as pile driving analyzer testing, on test pile foundations. The Development Entity shall perform pile driving analyzer testing on piles installed in karst geology, installed through claystone, and on piles developing capacity from side resistance. The Development Entity shall perform pile driving analyzer testing on piles for integral abutments unless predrilling to competent rock. Where predrilling to competent rock, the Development Entity shall perform pile driving analyzer testing on test piles at a minimum. Additional pile hammer submittal requirements are provided in *Department Pub 408, Highway Construction Specifications* and in *Section 14, Structures* of these Technical Provisions.

For drilled shaft foundations, the Development Entity shall conduct Thermal Integrity Profiling (TIP), Cross-hole Sonic Logging (CSL), Submersible Inspection Device (SID), and downhole camera on each drilled shaft foundation in accordance with *Department Pub 408, Highway Construction Specifications*. Battered drilled shafts are not permitted. The Development Entity shall follow *Department Pub 15M: Design Manual Part 4, Structures* for the design of drilled shaft foundations when load testing of drilled shafts is planned during construction and shall perform load testing in accordance with *Department Pub 408, Highway Construction Specifications*. The Development Entity shall limit testing of drilled shafts that will be incorporated into the final structure foundation to a maximum loading equal to the allowable axial resistance. The Development Entity shall locate sacrificial drilled shafts outside the limits of the final foundation footprint at a location that shall not interfere with the construction or performance of the final structure. The Development Entity may test sacrificial drilled shafts to failure. The Development Entity shall construct and test sacrificial drilled shafts prior to the start of construction of production drilled shafts.

The Development Entity shall verify the final foundation tip elevations based on the testing results and submit to the Department for acceptance in accordance with *Department Pub 408, Highway Construction Specifications*. The Development Entity shall provide access to the IQF and the Department, or its Authorized Representative, to inspect the foundation installation, integrity testing, and load testing throughout the Construction Period.

9.10.2 Pavement

The Development Entity shall construct pavement in accordance with *Department Pub 408, Highway Construction Specifications*.

Smoothness and skid resistance of the pavement constructed shall conform to the requirements of *Department Pub 408, Highway Construction Specifications* and *Department Pub 34, Approved Aggregate Producers*, Bulletin 14.

9.10.3 Instrumentation

For the type(s) of instrumentation proposed by the Development Entity, the Development Entity shall install and furnish instrumentation in accordance with the accepted Instrumentation Plan as noted in *Section 9.8.3, Instrumentation Plan* of these Technical Provisions and *Section 1.6.1.2 of Department Pub 293*,

Geotechnical Engineering Manual. The following provisions will only apply depending on the type and number of instrumentation and monitoring proposed by the Development Entity.

The Development Entity shall not install any instrumentation before review and acceptance of the Instrumentation Plan by the Department.

The Development Entity shall install the instrumentation, and shall have performed the initial readings, prior to any earthwork activity. The Development Entity shall not perform initial instrumentation readings without the IQF present.

The Development Entity shall prove initial readings by conducting at least three separate and complete sets of readings on each instrument and yielding consistent results.

The Development Entity shall conduct a factory calibration on instruments at the manufacturer's facility before shipment. The Development Entity shall repeat factory calibration on instruments as needed during the Work in accordance with the manufacturer's recommendations.

When instruments are received by the Development Entity, the Development Entity shall perform pre-installation acceptance tests to ensure that the instruments are functioning correctly before installation. The Development Entity shall include relevant items from the following list in the pre-installation acceptance tests at a minimum:

- by comparing with procurement document, check that the model, dimensions, materials, and other identifying features are correct;
- verify that components fit together in the correct configuration;
- check components for signs of damage in transit; and
- check that quantities received correspond to quantities ordered.

During pre-installation acceptance testing of each instrument or instrument component, the Development Entity shall complete a pre-installation acceptance test record form for inclusion in the Instrumentation Installation Report as per *Section 9.10.3.6, Instrumentation Installation Report* of these Technical Provisions.

The Development Entity shall protect and maintain instrumentation throughout the applicable Construction Work. The Development Entity shall protect survey reference and control points, instruments and appurtenant fixtures, instrument casings, and other components of the instrumentation systems from damage. The Development Entity shall repair an instrument or instrument component that fails the specified pre-installation acceptance test such that it passes a subsequent pre-installation acceptance test, or the Development Entity shall replace by an identical instrument.

The Development Entity shall maintain records of the installed instruments including the following information, at a minimum, for inclusion in the Instrumentation Installation Report:

- Bridge name;
- Contract name and number;

- instrument type and number;
- planned location in horizontal position and elevation;
- planned orientation;
- planned lengths and volumes of backfill;
- personnel responsible for installation;
- plant and equipment used to include diameter and depth of any drill casing or augers used;
- date and time of start and completion;
- spaces on record sheet for necessary measurements or readings required at check points and waiting intervals during installation to ensure that previous steps have been followed correctly including instrument readings made during installation;
- a log of subsurface data indicating the elevations of strata changes encountered in the borehole; Use soil strata nomenclature conforming to *ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)*;
- type of backfill used to fill instrumentation boreholes;
- as-built location in horizontal position, top elevation, and bottom elevation;
- as-built orientation;
- as-built lengths and volumes of various backfill materials placed in the instrumentation borehole;
- result of post-installation acceptance test;
- weather conditions at the time of installation; and
- notes of importance on the installation including problems encountered, delays, unusual features of the installation, and details of any events that may have a bearing on instrument behavior.

The Development Entity shall establish the initial coordinates of each instrument installation to the nearest 0.1 foot. The Development Entity shall establish the initial position of survey control stake points to the nearest 0.1 inch.

The Development Entity shall maintain the instrumentation throughout the applicable Construction Work, including, but not limited to, the raising and lowering of inclinometer casings as required to enable access to and measurement of monitoring instruments from the top of the final elevation at each instrument location. The Development Entity shall barricade and clearly mark with a color flag the locations where instrumentation protrudes through the fill or extends out beyond the toe of the fill. The Development Entity shall place the barricades at least 2 feet from the risers and tubes.

The Development Entity shall replace an instrument that fails the post-installation acceptance test by an identical instrument.

The Development Entity shall repair or replace damaged instrumentation within one week of identification of damage. The Development Entity shall replace damaged instrumentation when the Development Entity cannot demonstrate the ability to obtain readings from the repaired instrumentation that are consistent with

the pre-damaged instrumentation. Replaced instrumentation shall require a new set of initial readings and shall be treated as a new instrument.

Whenever withdrawing drill casing during instrument installation in a borehole, the Development Entity shall minimize the length of unsupported borehole and the rate of drill casing withdrawal. The Development Entity shall not allow collapse of the borehole to occur and shall not allow backfill material to build up inside the drill casing such that the instrument is lifted as the casing is withdrawn. The Development Entity shall withdraw the drill casing without rotation.

The Development Entity shall obtain specimens of grout from each batch of grout mix prepared for instrument installation for testing by a certified laboratory to verify that the 28-Day compressive strength of the batch is in accordance with the mix design accepted per *Section 9.8.3, Instrumentation Plan* of these Technical Provisions. The Development Entity shall collect specimens as either 2-inch cubes or cylindrical specimens with a diameter of 3 inches and a length of 6 inches unless approved otherwise as part of the Instrumentation Plan per *Section 9.8.3, Instrumentation Plan* of these Technical Provisions. The Development Entity shall take one specimen immediately before initial placement of each batch of grout in the ground (the “initial” specimen) and recover another specimen (the “final” specimen) after at least two-thirds of the batch has been placed or at the completion of grouting if less than two-thirds of the batch has been used. The Development Entity shall collect additional (“intermediate”) specimens following delays or stoppage of the work or at other times as deemed necessary by the Development Entity. The Development Entity shall submit the results of grout testing as part of the Instrumentation Installation Report noted in *Section 9.10.3.1, Inclinerometers* and *Section 9.10.3.6, Instrumentation Installation Report* of these Technical Provisions.

The Development Entity shall backfill boreholes in increments of small enough volume such that no bridging occurs and shall check the depth to the top of each increment after placement.

When removing the instrumentation at the completion of the instrumentation program, as defined and accepted in the Instrumentation Plan, the Development Entity shall remove and dispose of those portions of instruments, including terminal boxes and covers that are readily accessible. The Development Entity shall grout remaining open portions of the boreholes and inclinometer casings, backfill the area, patch surface, and restore surfaces affected by installation or removal of the instruments to the final planned condition.

9.10.3.1 Inclinerometers

If determined to be necessary for the Project, inclinometers shall consist of an inclinometer casing installed and grouted within vertical boreholes in the in-situ soil materials. A probe lowered within the casing is used to monitor horizontal soil displacements occurring during and after construction.

The Development Entity shall extend inclinometer casings as the fill is placed, if necessary.

The Development Entity shall install inclinometer casing as accepted in the Instrumentation Plan and according to the manufacturer's recommendations. The Development Entity shall install inclinometers before any earthwork is performed. The Development Entity shall install inclinometer casing to the depths accepted in the Instrumentation Plan in a minimum 6-inch-diameter borehole.

The Development Entity shall advance and clean the boring by rotary wash boring methods and shall stabilize the borehole with temporary drilling casing as the borehole is advanced. The Development Entity shall install the inclinometer casing within one degree of vertical for the entire length. The Development Entity shall install the inclinometer casing such that the casing groove spiral does not exceed one degree per 10 feet of length and the orientation of the grooves at the top of the casing is within 10 degrees of the planned orientation.

The Development Entity shall take three split spoon samples of the material assumed to provide base fixity, one at the bottom of the borehole, others at 5 feet and 10 feet above the bottom of the borehole and include the boring logs as part of the Instrumentation Installation Report.

The Development Entity shall place a protective cap on the bottom of the inclinometer casing and seal with acrylonitrile butadiene styrene (ABS) solvent cement to provide a waterproof seal.

The Development Entity shall assemble additional sections of inclinometer casing using appropriate couplings and lower them into the hole. The Development Entity shall fully extend telescoping casing sections and ensure that seals are watertight.

The Development Entity shall add clean water to the inside of the inclinometer casing to facilitate lowering of the inclinometer through water or drilling mud within the borehole.

The Development Entity shall position inclinometer casing so that the orthogonal grooves are parallel and perpendicular to the centerline of the adjacent embankment. The Development Entity shall maintain casing groove orientation throughout installation.

The Development Entity shall grout the annulus between the inclinometer casing and borehole with special grout mix to match the shear strength of the weakest soil layer. The Development Entity shall place grout with a detachable, flexible tremie pipe or grout pipe attached to the bottom of the inclinometer casing and shall ensure an intimate soil/grout contact. The Development Entity shall obtain grout specimens in accordance with *Section 9.8.3, Instrumentation Plan* of these Technical Provisions.

Immediately after grouting, the Development Entity shall jet and flush inclinometer casing with clean water.

After completion of installation but before the grout has set, the Development Entity shall perform a post-installation acceptance test to verify that no grout is in the inclinometer casing, that groove orientation is correct, and that the inclinometer probe tracks correctly in four orientations. After the grout has set, the Development Entity shall check again to verify that the inclinometer probe tracks correctly in four orientations. The Development Entity shall include the results of this post-installation acceptance testing in the Instrumentation Installation Report.

The Development Entity shall establish the initial elevation of inclinometers to 0.1 inch.

The Development Entity shall install a protective terminal box with locking cover over the top end of the inclinometer casing and shall lock cover. The Development Entity shall provide two copies of keys to the locks to the Department at the end of the Construction Period.

The Development Entity shall mark each inclinometer installation with a survey stake 3 feet long and tied with flags to clearly show its location and to warn equipment operators and others of its location. The Development Entity shall maintain the stakes and flags during the Construction Period of the Bridge and shall replace those that are missing or damaged.

The Development Entity shall maintain the inclinometers in working order during the Construction Period of the Bridge, including raising and lowering inclinometer casing during filling operations. The Development Entity shall add and remove sections as necessary to maintain the top of the inclinometer casing at least 1 foot but no more than 4 feet above the surface of the fill. As each additional inclinometer casing is added, the Development Entity shall immediately lower the “dummy” probe into the inclinometer casing down to the bottom in two directions to ensure that the four grooves are free of obstructions over their entire length.

9.10.3.2 Settlement Platforms

Where applicable, the Development Entity shall install settlement platforms placed on the prepared ground surface before placement of fill and consisting of a square steel plate to which vertical pipe risers are attached and marked to indicate distance above the plate, extending up through the fill.

The Development Entity shall extend the risers as the fill is placed. The Development Entity shall monitor settlement platforms by optical survey methods to determine vertical displacements occurring during and after fill placement.

Where applicable, the Development Entity shall construct and install settlement platforms as accepted in the Instrumentation Plan, placing the base plate on a level base of cohesionless material. The Development Entity shall tamp the cohesionless base to provide a firm, unyielding and level bearing surface for the base plate. The Development Entity shall strip the original ground surface of vegetation to provide a level base of cohesionless material for the settlement plate.

The vertical pipes shall have a maximum length of 4 feet for each section. The Development Entity shall provide spacers between the riser pipe and casing pipes at intervals of 4 feet maximum to ensure concentricity. The Development Entity shall place a container or protective casing with both ends open around the initial length of casing pipe. The Development Entity shall backfill this container with tamped clean sand or gravel to support the pipe in a vertical position during fill placement until the fill is carried above the platform.

As the height of fill above the settlement plate changes, the Development Entity shall increase or decrease the casing and settlement measuring pipes in a maximum of 4-foot increments to maintain the top of the pipe and casing above the embankment. As the Development Entity adds or removes each additional length of pipe, the Development Entity shall immediately transfer the pipe cap on the casing to the top section on the settlement plate to prevent fill material from entering the casing.

The Development Entity shall mark the casing pipe by flags to clearly show its location and to warn equipment operators and others of its location. The Development Entity shall maintain the flags during the applicable Construction Period and replace those that are missing.

Where applicable, the Development Entity shall survey the position and elevation of the settlement plate risers at time intervals in accordance with the accepted Instrumentation Plan.

The Development Entity shall not allow the settlement plate risers to rise above 4 feet over the surrounding ground surface elevation and shall add or remove sections as necessary during filling or removal of fill to maintain the tops of the pipes at least 1 foot above the surface of the fill.

Where applicable, the Development Entity shall survey the settlement plate risers immediately before and after additional extensions are added or removed.

The Development Entity shall notify the IQF at least two Business Days before extension or removal of the settlement plate risers.

9.10.3.3 Probe Extensometers

Where applicable, the Development Entity shall provide probe extensometers consisting of magnetic extensometer systems installed and grouted within vertical boreholes in the in-situ soil materials with a probe lowered within the extensometer to monitor vertical soil displacements occurring during and after fill placement. The Development Entity shall extend probe extensometers as the fill is placed. The Development Entity shall locate sensor magnets at 5-foot intervals along the length of the extensometer.

The Development Entity shall provide magnetic settlement targets consisting of pneumatically or mechanically actuated spider magnets, with six leaf springs, suitable for installation in a 4.5-inch- to 5.5-inch-diameter borehole. The Development Entity shall not place targets nearer than 18 inches above or below telescoping joints in the access tubes. The Development Entity shall provide leaf springs with stiffness such that a force of at least 5 pounds is required to move an 8-inch-long leaf spring from its extended position to the longitudinal axis of the target. The Development Entity shall provide leaf springs with an extended diameter of at least 9 inches. The Development Entity shall provide two datum ring magnets for each installation. The Development Entity shall provide tapered profiles of the spider magnet bodies and actuation devices such that there is no possibility of actuation devices hanging up on magnet bodies during retrieval. The Development Entity shall provide actuation devices designed such to provide a clear and reproducible signature to verify that the leaf springs have been released. The Development Entity shall ensure that, if pneumatically actuated cutters are used, the connection between the cutter and pneumatic tubing shall sustain a tensile force of not less than 45 pounds.

The Development Entity shall obtain factory calibrations of probe extensometers by verifying that an audible signal is emitted as the probes pass through each magnet. The Development Entity shall supply each magnet with a label or sticker confirming that it has been checked as specified. The Development Entity shall check the tape attached to the probe against a standard traceable to the National Institute of Standards and Technology, to an accuracy of plus or minus 0.5 inch.

Unless approved otherwise as part of the Instrumentation Plan, the Development Entity shall provide probe extensometers meeting the following requirements:

- Access tubes: flush coupled Polyvinyl Chloride (PVC), 1-inch nominal diameter;
- Couplings: Telescoping compression/extension tube joints shall be provided at connections in the access tube to allow for vertical compression;

- Settlement Probe, Cable Reel and Tape;
- Reed switch probe and reel with 30 meters of nylon-coated tape with integral conductors; and
- Tape graduated in feet, tenths, and hundredths of a foot.

The Development Entity shall provide a minimum of one probe, reel, and tape for the applicable Construction Period of the Bridge.

The Development Entity shall provide PVC rigid end caps to prevent dirt from entering the PVC pipe.

9.10.3.4 Piezometers

Where applicable, the Development Entity shall provide piezometers consisting of one pneumatic pore pressure transducer placed in a borehole at designated depths accepted as part of the Instrumentation Plan. The Development Entity shall monitor pore pressures within the compressible soils with the piezometers during and after fill placement in accordance with the accepted Instrumentation Plan. The Development Entity shall notify the IQF when monitoring shows that additional fill can be safely placed. The Development Entity shall extend the pneumatic tubing and conduit as the fill is placed.

The Development Entity shall obtain factory calibrations of piezometers made against a pressure gage traceable to the National Institute of Standards and Technology. The Development Entity shall use a pressure gauge with an accuracy not less than twice the specified accuracy of the piezometers. The Development Entity shall make calibrations to full scale in two complete cycles and shall record the reading in 10 equal increments during two loading and two unloading cycles.

Unless accepted otherwise as part of the Instrumentation Plan, the Development Entity shall provide leads consisting of pneumatic tubes with the following requirements:

- at least 3/16-inch outer diameter;
- made of color-coded, high-density polyethylene with a minimum tensile strength of 3,500 psi and a maximum water absorption index of 0.01 percent;
- tubes housed in an extruded polyvinyl chloride sheath that fills the space completely between the tubes; and
- tubes further encased in BX size flexible steel conduit.

The Development Entity shall provide leads that are permanently bonded to the sensor housing to prevent leakage of the gas out of, or external fluids into, the tubes or spaces within the armor encasement.

9.10.3.5 Deep Benchmarks

Where applicable, the Development Entity shall provide deep benchmarks consisting of an outer casing and an inner steel benchmark pipe installed and grouted into dense soil or rock to provide a stable benchmark for survey operations.

The Development Entity shall install deep benchmarks as accepted in the Instrumentation Plan. The Development Entity shall drill and permanently case with 3-inch inner-diameter casing, a hole from the ground surface to the minimum depth accepted in the Instrumentation Plan.

The Development Entity shall drill a minimum of 10 feet into the firm stratum below the bottom of the permanent casing and shall take three samples of the material assumed to provide base fixity, one at the bottom of the borehole, others at 5 feet and 10 feet above the bottom of the borehole and include the boring logs as part of the Instrumentation Installation Report.

The Development Entity shall clean the bottom of the hole of loose soil by flushing the hole until the return water runs clear. The Development Entity shall tremie cement grout into the bottom 10 feet of the borehole.

The Development Entity shall lower coupled 1.5-inch-diameter steel pipe into the casing down to the bottom of the cored hole. The Development Entity shall adjust the length of the 1.5-inch-diameter pipe as required so the final location of the round head reference screw fitted to the steel cap is approximately 4 inches below ground surface. The Development Entity shall provide a metal collar, sleeve, or other acceptable centralizer device to prevent lateral movement at the top of the 1.5-inch-diameter pipe as accepted in the Instrumentation Plan.

The Development Entity shall attach a steel pipe cap fitted with a stainless steel round head reference screw to the 1.5-inch-diameter pipe by welding. The Development Entity shall install the terminal box at the ground surface. The Development Entity shall fill the annulus between the permanent casing and the surface protection device with bentonite slurry or as accepted in the Instrumentation Plan.

The Development Entity shall prove the established elevations of benchmarks by obtaining consistent results on at least three separate and complete level circuits. If an inconsistent elevation results for any benchmark, the Development Entity shall resurvey the level circuit until correct and repeatable elevations are obtained. The Development Entity shall refer to *Section 10, Land Surveying* of these Technical Provisions for surveying requirements.

9.10.3.6 Instrumentation Installation Report

The Development Entity shall prepare an Instrumentation Installation Report for each Bridge. The Development Entity shall obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of the Instrumentation Installation Report prior to the start of earthwork on the respective Bridge. If earthwork and instrumentation installation will occur in phases, the Development Entity shall submit an updated Instrumentation Installation Report prior to start of earthwork in each phase.

The Development Entity shall include the following information, at a minimum, in the Instrumentation Installation Plan:

- pre-installation acceptance test results;
- installation records collected in accordance with *Section 9.8.3, Instrumentation* of these Technical Provisions;
- post-installation acceptance test results;

9. Geotechnical and Pavement

- boring logs from inclinometer installation in accordance with *Section 9.10.3.1, Inclinometers* of these Technical Provisions; and
- boring logs from deep benchmark installation in accordance with *Section 9.10.3.4, Piezometers* of these Technical Provisions.

9.10.3.7 Final Instrumentation Report

The Development Entity shall prepare a Final Instrumentation Report for each Bridge. The Development Entity shall include the following information, at a minimum, in the Final Instrumentation Report:

- a summary of instrumentation installed and monitored;
- a summary of the findings and results of the instrumentation monitoring program accepted in the Instrumentation Plan in *Section 9.8.3, Instrumentation* of these Technical Provisions and of the vibration and movement monitoring program accepted in *Section 9.8.2, Vibration and Movement Monitoring Plan* of these Technical Provisions; and
- recorded data for each installed instrument in both graphical and tabular formats.

9.11 Section 9, Geotechnical and Pavement Submittal Requirements

Whenever a Submittal identified in the following Table 9-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 9-2 information. The Department will conduct reviews and provide Department Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 9-2 and Project Agreement Section 6.3.

Table 9-2. Section 9, Geotechnical and Pavement Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	List of Proposed Geotechnical Software	2	10	Design Work commencement for Submittal related Work	—	—
2	Supplemental Subsurface Exploration Planning Submission (SEPS)	2	10	Design Work commencement for Submittal related Work	—	—
3	Supplemental Laboratory Testing Request	2	10	Design Work commencement for Submittal related Work	—	—
5	gINT Project File	1	10	Design Work commencement for Submittal related Work	—	—

9. Geotechnical and Pavement

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
6	CBR Recommendation Letter	3	10	Design Work commencement for Submittal related Work		
7	Final Geotechnical Engineering Report	2	10	Construction Work commencement for Submittal related Work	—	—
8	Final Structure Foundation Report with Foundation Submission Letter	3	10	Construction Work commencement for Submittal related Work	—	—
9	Pavement Design Submittal	3	10	Construction Work commencement for Submittal related Work	—	—
10	Pavement Data Form	3	10	Each Bridge Completion	—	—
11	Blasting and Vibration Monitoring Plan	2	10	Construction Work commencement for Submittal related Work	—	—
12	Vibration and Movement Monitoring Plan	2	10	Construction Work commencement for Submittal related Work	—	—
13	Instrumentation Plan	2	10	Construction Work commencement for Submittal related Work	—	—
14	Installation and testing specification for ground anchors, anchor systems, and soil nails.	2	10	Construction Work commencement for Submittal related Work		
15	Final gINT Project File	2	10	Each Bridge Completion	—	—
16	Instrumentation Installation Report	2	10	Construction Work commencement for Submittal related Work	—	—
17	Final Instrumentation Report	2	10	Each Bridge Completion	—	—

10 Land Surveying

10.1 General Requirements

The Development Entity shall ensure the final precision, accuracy, and comprehensiveness of survey and mapping.

10.2 Project Standards

Project Standards applicable to the Work are included within *Attachment 1, Project Standards* of these Technical Provisions.

10.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included within *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

10.4 Construction Surveying

The Development Entity shall provide construction surveying in accordance with Section 686 of *Department Pub 408, Highway Construction Specifications*.

10.5 Survey Control

The Development Entity shall establish surveys referenced to the Pennsylvania State Plane Coordinate System on the North American Datum of 1983 (current adjustment). The Development Entity shall maintain third order, Class I, survey control with a closure of 1:10,000 in accordance with *Department Pub 122M, Surveying and Mapping Manual*. When survey control is provided by the Department, the Development Entity shall base any additional horizontal and vertical survey control based on the information provided by the Department. The Development Entity shall replace existing survey monuments and control points disturbed or destroyed when discovered. New survey monumentation shall be set as deemed necessary by *Department Pub 122M, Surveying and Mapping Manual*. The Development Entity shall carefully remove any plaques and/or benchmarks from existing structures to be removed and deliver them to the Department.

10.5.1 Units

The Development Entity shall perform survey Work in the Pennsylvania State Plane Coordinate System using U.S. survey feet system of measurement. The Development Entity shall calculate the combined surface adjustments factors for each Bridge.

10.5.2 Horizontal Accuracy

The Development Entity shall perform measurements and meet accuracy requirements in accordance with *Department Pub 122M, Surveying and Mapping Manual*. Survey Work related to horizontal control networks shall be categorized as shown in Table 1.3.1 of *Department Pub 122M, Surveying and Mapping Manual*.

10.5.3 Vertical Accuracy

The Development Entity shall measure and express vertical distances to 0.01 foot (1 mm). Measurements shall meet the specific accuracy requirements as outlined in Table 1.3.1, Table 1.3.2, and Part A, Chapter 3 – Field Survey Classifications of *Department Pub 122M, Surveying and Mapping Manual*. The Department will not accept trigonometric leveling as a means of establishing elevations for control and the Development Entity shall be responsible for their accuracy.

10.6 Unmanned Aircraft Systems

The Development Entity shall comply with regulations as set forth in *Department Pub 220, Unmanned Aircraft System* policy regulations for certified remote pilots including commercial operators. The Development Entity shall notify the Department of the purpose, location, and time of UAS flights a minimum of two Business Days prior to the flight. The remote pilot in command shall be Federal Aviation Administration (FAA) Part 107 certified and shall comply with FAA regulations. The Development Entity shall submit a copy of the remote pilot in command Part 107 license and insurance and shall provide a list of the FAA UAS device registration numbers for pre-approval by the Department. UAS devices must be registered with the FAA, be free from damage, and in good operating condition.

All mission planning and risk assessment documentation must be maintained on the Bridge Site and be available to the FAA, the Department, or public officials upon request. Video and data obtained shall remain the property of the Department and cannot be shared or used without written approval by the Department. In the event of an Incident or accident involving injury or property damage, the remote pilot in command shall immediately report the Incident to the Department and provide a written report within 10 Business Days.

10.7 Survey Records and Reports

The Development Entity shall provide a horizontal and vertical control report including coordinate listing, maps showing control, the Department monument description and location description of primary and secondary survey control points installed, marked, and referenced along with a listing of the existing control used to create the installed control points. The Development Entity shall provide a survey control report within 90 Days of Department acceptance of the survey control values. Control from Related Transportation Facilities shall be located by the Development Entity and a comparison of the horizontal and vertical values shall be shown. The Development Entity shall provide survey records and reports to the Department upon request.

The Development Entity shall use an electronic field book to collect and store raw data. The Development Entity shall preserve original raw data and document changes, or corrections made to field data, such as station name, height of instrument, or target. The Development Entity shall also preserve raw and corrected field data in hardcopy output forms in a similar manner to conventional field book preservation.

In the event that field survey data and sketches cannot be efficiently recorded in the electronic field book, the Development Entity shall scan copies of manually recorded data and sketches and store in same location of the electronic data on e-Builder system. The Development Entity shall record field notes in a permanently bound book; loose leaf field notes shall not be permitted as means of satisfying the foregoing requirement. The Development Entity shall develop field survey books using a format and index consistent with Form D-428 of *Department Pub 122M, Surveying and Mapping Manual*.

The Development Entity shall provide a listing of primary and secondary control coordinate values, original computations, survey notes, copies of field notebooks, and other records, including GPS observations and analysis made by Development Entity in the form of the software and version thereof being used by the Department at the time the deliverable is developed and in accordance with Table 10-1 in *Section 10.8, Section 10, Land Surveying Submittal Requirements* of these Technical Provisions. The Development Entity shall submit the following “Survey Records and Reports” in accordance with Table 10-1 in *Section 10.8, Section 10, Land Surveying Submittal Requirements*:

- a listing of primary and secondary control coordinate values, original computations and other records including GPS observations and analysis made by Development Entity;
- copies of survey control network measurements, computations, unadjusted and adjusted coordinate and evaluation values;
- Digital Terrain Model (DTM) of existing conditions for each Bridge;
- field book and alignment files; and
- survey field book copies.

The Development Entity shall, as part of the Survey Records and Reports Submittal, provide reports documenting the location of the record alignments, profiles, structure locations, utilities, and survey control monuments. These reports shall include descriptive statements for the survey methods used to determine the record location of the feature being surveyed. The Development Entity’s record data shall include the coordinate types (x, y, and/or z) and feature codes in the same format in which the Department data was generated. The Development Entity record file formats shall comply with *Section 10.8, Section 10 Submittal Requirements*, Table 10-1.

Topographic mapping files of existing conditions created by the Development Entity shall be provided to the Department in accordance with *Department Pub 14M: Design Manual Part 3, Plans Presentation*.

10.7.1 Baseline Stakeout

The Development Entity shall perform Baseline Stakeout procedures in compliance with Section 686 of *Department Pub 408, Highway Construction Specifications*.

10.7.2 Right of Way Monumentation and Benchmarks

The Development Entity shall install ROW monumentation prior to each Bridge Completion to the Department in accordance with *Department Pub 122M, Surveying and Mapping Manual* and Section 686 of *Department Pub 408, Highway Construction Specifications* and in accordance with Table 10-1 in *Section 10.8, Section 10, Land Surveying Submittal Requirements*.

The Development Entity shall also adhere to benchmarking requirements in accordance with *Department Pub 122M, Surveying and Mapping Manual* and Section 686 of *Department Pub 408, Highway Construction Specifications* and in accordance with Table 10-1 in *Section 10.8, Section 10, Land Surveying Submittal Requirements*.

10.8 Section 10, Land Surveying Submittal Requirements

Whenever a Submittal identified in the following Table 10-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described within *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 10-1 information. The Department may conduct reviews and may provide Department Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 10-1.

Table 10-1. Section 10, Land Surveying Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Survey Records and Reports	1	15	Each Bridge Completion	—	—

11 Roadway and Grading

11.1 General Requirements

The roadways of the Project and their components shall be designed, constructed, and maintained in conformance with the requirements in the Contract Documents. Without limiting other requirement of the Contract Documents, including these Technical Provisions, the Development Entity shall design roadways to meet the following requirements:

- meet Department, AASHTO, and FHWA guidelines, policies and procedures, standards, and details;
- meet environmental commitments; and
- meet the required geometric improvements and traffic operations as identified in these Technical Provisions.

11.2 Project Standards

Project Standards applicable to the Work are included within *Attachment 1, Project Standards* of these Technical Provisions. Unless otherwise required in the Contract Documents, the Development Entity shall use such publications as requirements for the design and construction of the roadway.

11.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included within *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

11.4 Design and Analysis Software

The Development Entity shall prepare plans in accordance with *Department Pub 14M: Design Manual Part 3, Plans Presentation*. The Development Entity shall prepare at a minimum scale of 1 inch = 25 feet or larger, or scale accepted by the Department, if required to clearly show the design intent. The PS&E Roadway Construction Plans submittal shall include PDF and electronic CADD data. The Development Entity shall submit CADD data per Appendix B of *Department Pub 14M: Design Manual Part 3, Plans Presentation*.

11.5 Roadway Design Requirements

The Development Entity shall design roadways to integrate with streets and roadways adjacent or connecting to the Work.

Geometric design for each Bridge shall be in accordance with:

- *Department Pub 13M: Design Manual Part 2, Highway Design*;
- *Department Pub 13: Design Manual Part 2, Contextual Roadway Design*; and
- *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions, as applicable.

The geometric design of each Bridge shall not adversely affect the adjoining/adjacent roadway(s).

The Development Entity shall design transitions to and from each Bridge to existing facilities and roadways, accounting for necessary width transitions, roadway geometric changes, as well as roadway safety appurtenances in accordance with the requirements of this *Section 11*.

The Development Entity shall design roadways to incorporate roadway appurtenances, including ROW fences, guide rail, barriers, signing, Highway lighting, sidewalk, and hazard protection as required and as necessary to promote safety for the traveling public and adjacent properties.

The Development Entity shall obtain Department and FHWA approvals, as applicable, for modifications to an interchange configuration or ramp per Department procedures.

11.5.1 Design Criteria

Geometric design criteria tables listing the minimum requirements for the Project are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

11.5.2 Design Exceptions

Permitted Design Variances and Permitted Design Exceptions pertaining to this *Section 11* are included in *Attachment 21, Permit Design Variances and Exceptions* of these Technical Provisions.

If the controlling criteria listed in Appendix P (Design Exceptions) of *Department Pub 10X: Design Manual Part IX, Appendices to Design Manuals 1, 1A, 1B, and 1C* cannot be met within the Project Limits, the Development Entity shall follow the Design Exception and Design Variance request process, per *Section 2.7, Permitted Design Variances and Permitted Design Exceptions* and *Section 2.8, Design Variances and Design Exceptions* of these Technical Provisions. The Development Entity shall identify substandard design items and provide justification, as early as possible in the design process.

11.5.3 [Reserved]

11.5.4 Intersecting Roadways and Driveways

The Development Entity shall coordinate, design, and construct the improvements on intersecting roadways, including affected driveways or entrances connecting to roadways, in accordance with:

- *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions;
- *Department Pub 13M: Design Manual Part 2, Highway Design*; and
- *Department Pub 13: Design Manual Part 2, Contextual Roadway Design*.

At reconstructed intersections and driveways, the Development Entity shall include the following improvements:

- adjust or install utilities as necessary and in accordance with *Section 7, Utilities* of these Technical Provisions to accommodate the intersection reconstruction;
- construct roadway crossings including ADA curb ramps and crosswalks where pedestrian facilities exist or where specified in the Contract Documents and in accordance with *Section 12, Bicycle and Pedestrian Facilities* of these Technical Provisions;

- adjust or install driveways as necessary per *Department Pub 13M: Design Manual Part 2, Highway Design*, Chapter 7 (Interchanges) of *Department Pub 13: Design Manual Part 2, Contextual Roadway Design*, and any Highway Occupancy Permits; and
- maintain roadway access points per *Department Pub 13M: Design Manual Part 2, Highway Design*, Section 1.7 (Control of Access) of *Department Pub 13: Design Manual Part 2, Contextual Roadway Design*.

11.5.5 Roadside Appurtenances and Safety

The Development Entity shall provide clear zones free from vehicular hazards per:

- *Department Pub 13M: Design Manual Part 2, Highway Design*; and
- Chapter 12 (Guiderail, Median Barrier, and Roadside Safety Devices) of *Department Pub 13: Design Manual Part 2, Contextual Roadway Design*.

In locations where removal or relocation of hazards from the clear zone is not feasible, provide a MASH compliant roadside safety system in accordance with:

- *Department Pub 13M: Design Manual Part 2, Highway Design*
- Chapter 12 (Guiderail, Median Barrier, and Roadside Safety Devices) of *Department Pub 13: Design Manual Part 2, Contextual Roadway Design*; and
- the AASHTO Roadside Design Guide.

The Development Entity shall replace existing guide rail, barrier, or other roadside safety devices within the Project Limits. The Development Entity shall not reuse existing guide rail, barrier, or other roadside safety devices. If the existing guide rail extends beyond the Project Limits, the Development Entity shall replace such guide rail within the Project Limits and transition to the existing guide rail beyond the Project Limits.

11.5.6 Grading

The Development Entity shall provide new or modified slopes that are no steeper than 2H:1V, unless noted otherwise in *Section 9, Geotechnical and Pavement* of these Technical Provisions. Grading shall meet the requirements of:

- *Department Pub 13M: Design Manual Part 2, Highway Design*;
- Section 1.5 of *Department Pub 13: Design Manual Part 2, Contextual Roadway Design*;
- *Department Pub 72M, Roadway Construction Standards*; and
- the Geotechnical Engineering Report.

The Development Entity shall incorporate grading requirements for guide rail and impact attenuating devices per:

- *Department Pub 13M: Design Manual Part 2, Highway Design*
- Chapter 12 (Guiderail, Median Barrier, and Roadside Safety Devices) of *Department Pub 13: Design Manual Part 2, Contextual Roadway Design*; and
- *Department Pub 72M, Roadway Construction Standards*.

11.5.7 Access Control Fencing

The Development Entity shall provide access control fencing adjacent to limited access facilities, as indicated and per:

- *Department Pub 13M: Design Manual Part 2, Highway Design*;
- *Department Pub 13: Design Manual Part 2, Contextual Roadway Design*; and
- *Department Pub 72M, Roadway Construction Standards*.

The Development Entity shall replace any impacted, damaged, or missing fencing, access gates, or other fencing material within the Project Limits. The Development Entity shall not reuse existing fencing, access gates, or other fencing material. The Development Entity shall submit fencing locations and access points to the Department for acceptance.

11.5.8 Transitions to Adjoining Roadway

The transition work to adjoining existing roadways shall account for necessary roadway geometric changes including superelevation transitions, horizontal and vertical alignments, and applicable geometric transitions from the existing roadway as well as roadside safety appurtenances. *Department Pub 13M: Design Manual Part 2, Highway Design* geometric criteria for bridge projects is not applicable for Interstate, Freeway, and Expressway roadway geometrics. Transitions are considered to be roadway approach work. This work is the tie-in from the Bridge to the existing roadway inside of the Project Limits.

11.5.9 Approach Work to Bridges

Approach work to bridges on Interstates, Freeways, and Expressways shall not be considered “minimal roadway approach work” as presented in

- *Department Pub 13M: Design Manual Part 2, Highway Design*; and
- Section 1.9 of *Department Pub 13: Design Manual Part 2, Contextual Roadway Design*.

Where “minimal roadway approach work” is applied to other roadways the approaches are not to be adversely affected.

11.5.10 Disposal of Existing Highway Structures and Material within the Project

The Development Entity shall remove and dispose of all existing Highway structures and material which are not to remain in place or to be used in the Construction Work. The Development Entity shall not dispose of these structures and material within the Project Limits. Such structures on local roadways become the

11. Roadway and Grading

property of the local Governmental Entities. If the Governmental Entities do not want to retain any portion or portions of structures or material under their jurisdiction, then the Development Entity shall remove and dispose of them outside of the Project Limits.

11.6 Section 11, Roadway and Grading Submittal Requirements

Whenever a Submittal identified in the following Table 11-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described *Section 3.5.13.5.2, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 11-1 information. The Department will conduct reviews and may provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 11-1.

The Development Entity shall submit Roadway Construction Plans and PS&E Roadway Constructions per Chapter 4 (Final Design Plan Development) of *Department Pub 10C: Design Manual 1C, Transportation Engineering Procedures*. In the event it becomes necessary to provide preliminary engineering submissions, the Development Entity shall submit the applicable Line, Grade, and Typical Section Submission; Safety Review Submission; or Design Field View Submission per Chapter 3 (Preliminary Engineering Procedures) of *Department Pub 10C: Design Manual 1C, Transportation Engineering Procedures*.

Table 11-1. Section 11, Roadway and Grading Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
PRELIMINARY DESIGN DOCUMENTS						
1	Line, Grade, and Typical Section	2	15	Construction Work commencement for Submittal related Work	—	—
2	Safety Review	2	15	Construction Work commencement for Submittal related Work	—	—
3	Design Field View Submission	2	15	Construction Work commencement for Submittal related Work	—	—
4	Access Control Fence Locations	2	15	Construction Work commencement for Submittal related Work	—	—
FINAL DESIGN DOCUMENTS						
5	Roadway Construction Plans	2	20	Construction Work commencement for Submittal related Work	—	—
RELEASED FOR CONSTRUCTION DESIGN DOCUMENTS						
6	PS&E Roadway Construction Plans	3	15	Construction Work commencement for Submittal related Work	—	—

12 Bicycle and Pedestrian Facilities

12.1 General Requirements

In the event that bicycle and pedestrian facilities become necessary, the Development Entity shall plan, design, construct, and maintain bicycle and pedestrian facilities in accordance with Department, American Association of State Highway and Transportation Officials (AASHTO), and U.S. Federal Highway Administration (FHWA) guidelines, policies and procedures, standards, and details.

The Development Entity shall plan, design, construct, and maintain bicycle and pedestrian facilities consistent with the goals and strategies established by the Department, including those found in:

- Department Pub 787G, How-to Guide for Developing Active Transportation Plans;
- *Pennsylvania Active Transportation Plan*;
- *Pennsylvania 2045 Long-Range Transportation Plan*; and
- *Pennsylvania Strategic Highway Safety Plan*.

The Development Entity shall coordinate Bridge designs with existing and planned sidewalks, bicycle lanes, shared-use paths, trails, and other facilities for pedestrians and cyclists. The Development Entity shall coordinate with Governmental Entities and Third Parties on sidewalk agreements as per *Section 2.4, Coordination with Governmental Entities and Third Parties* within these Technical Provisions. The Development Entity shall also meet the maintenance responsibilities described in *Section 22, Maintenance Work* within these Technical Provisions.

12.2 Project Standards

Project Standards applicable to the Work are included in *Attachment 1, Project Standards, Table A1-1* of these Technical Provisions.

12.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included within *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

12.4 [Reserved]

12.5 Bicycle and Pedestrian Design Requirements

The Development Entity shall design bicycle and pedestrian facilities in accordance with the requirements applicable to accommodations, design, and construction of bicycle and pedestrian facilities referenced in this and other sections, including

- *Section 11, Roadway and Grading* of these Technical Provisions;
- *Section 14, Structures* of these Technical Provisions; and
- *Section 16, Context Sensitive Design, Aesthetics, and Landscaping* of these Technical Provisions.

12. Bicycle and Pedestrian Facilities

The Development Entity shall design bicycle and pedestrian facilities in accordance with the criteria presented in *Attachment 1, Project Standards* of these Technical Provisions, including:

- *AASHTO 2012, Guide for the Development of Bicycle Facilities*;
- *AASHTO 2021, Guide for the Planning, Design, and Operation of Pedestrian Facilities*;
- *AASHTO 2014, Roadway Design Guide*; and
- the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

The Development Entity shall also follow Department standards related to bicycle and pedestrian facilities including:

- *Department Pub 10: Design Manual 1, Transportation Program Development and Project Delivery Process*;
- *Department Pub 13: Design Manual Part 2, Contextual Roadway Design*;
- *Department Pub 13M: Design Manual Part 2, Highway Design*; and
- Appendix S (Bicycle and Pedestrian Checklist) of *Department Pub 10X: Design Manual Part IX, Appendices to Design Manuals 1, 1A, 1B, and 1C*. The “Bicycle and Pedestrian Checklist” consists of three distinct sections – Planning and Programming, Scoping, and Final Design – that are to be completed by the Development Entity at various times during the planning and design phases of the Project. The Development Entity shall submit the checklist sections to the Department as per the details outlined in *Section 12.7, Section 12 Submittal Requirements* of these Technical Provisions.

The Work shall incorporate existing and proposed bicycle paths and crossings, on-street bicycle facilities, sidewalks, crosswalks, and shared-use paths as shown on available municipal, county, regional, and state plans. The Development Entity shall coordinate with Governmental Entities to ensure consistency with existing and proposed bicycle and pedestrian plans.

The Work shall incorporate the following relating to bicycle and pedestrian facilities, as applicable, into the Design Documents and Construction Documents:

- alignment, profile, cross-section, and materials;
- points of connection to existing and proposed bicycle and pedestrian facilities;
- crosswalk and pedestrian ramp locations and details;
- signing, signalization, and pavement markings;
- separation between bicycle facilities and the nearest travel lane;
- methods of illumination indicating light fixture locations and types; and
- methods of separation, including barrier and/or fence type and height.

12. Bicycle and Pedestrian Facilities

The Development Entity shall meet ADA requirements when designing curb ramps within the Project Limits. If the ADA curb ramp requirements cannot be met, the Development Entity shall submit the “Technically Infeasible Form” found in Chapter 6 (Appendix A) of *Department Pub 13M: Design Manual Part 2, Highway Design* to the Department for acceptance.

The Development Entity shall install bicycle safe inlet grates for any inlets within the Project Limits that are located entirely within the paved surface, including shoulders and gutter areas. Bicycle safe inlet grates are not required in situations where the inlet is located outside of the paved surface, where the pavement flares at the edge of shoulder so that the inlet is not located in the potential path of a bicyclist, or on roadways where bicycling is prohibited.

12.6 Construction Requirements

The Development Entity shall conduct the Work in accordance with the requirements established in *Section 20.8.3, Pedestrian and Bicycle Access* of these Technical Provisions.

The Development Entity shall submit a Curb Ramp Inspection Form (CS-4401) to document the inspection of curb ramps within the Project Limits, including newly constructed curb ramps and existing curb ramps that are not reconstructed. Refer to Chapter 6 (Appendix A) of the *Department Pub 13M: Design Manual Part 2: Highway Design* for additional information on alterations.

12.7 Section 12, Bicycle and Pedestrian Facilities Submittal Requirements

Whenever a Submittal identified in the following Table 12-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 12-1 information. The Department will conduct reviews and provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 12-1.

Table 12-1. Section 12, Bicycle and Pedestrian Facilities Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Bicycle & Pedestrian Checklist (Planning & Programming)	1	15	Design Work commencement for Submittal related Work	—	—
2	Curb Ramp Inspection Form (CS-4401)	2	15	Each Bridge Completion	—	—
PRELIMINARY DESIGN DOCUMENTS						
3	Bicycle & Pedestrian Checklist (Scoping)	2	15	Construction Work commencement for Submittal related Work	—	—

12. Bicycle and Pedestrian Facilities

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
FINAL DESIGN DOCUMENTS						
4	Bicycle & Pedestrian Checklist (Final Design)	2	15	Construction Work commencement for Submittal related Work	—	—
5	Technically Infeasible Form	2	15	Construction Work commencement for Submittal related Work	—	—

13 Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

13.1 General Requirements

The Development Entity shall include Work for each Bridge which includes hydrology and hydraulic analyses, drainage and stormwater management, and erosion and sediment control. Hydrologic and hydraulic analyses will include development of design flows, modeling of river or stream hydraulics and floodplain impacts, scour computations and design of scour countermeasures. Drainage Systems include pipes, culverts, bridge drainage items, natural channels, man-made and post construction channels within the Project Limits. Each Bridge's Drainage System shall be designed to manage runoff associated with the Project, whether originating within or outside the Project Right of Way (ROW). The Development Entity's drainage design shall include assessments of pre- and post-construction conditions, as well as assessments of conditions during construction staging. The requirements of Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design*, and Chapter 7 (Drainage Structures, Scour and Culverts) of *Department Pub 15M: Design Manual Part 4, Structures*, shall govern the Work unless modified in this *Section 13*.

The Work in this *Section 13* shall build upon the H&H and scour analyses that were developed in the PDA. The Development Entity shall incorporate agreed upon resiliency Adaptations.

In the event that existing drainage patterns are altered by the Work, then the Development Entity shall endeavor to improve existing Drainage Systems, but in any case, shall design and construct a solution that is not worse than the existing conditions.

The Development Entity shall obtain permits associated with water, floodplains, drainage, stormwater, and erosion, sedimentation, and pollution control in accordance with the protocol established in *Section 5, Environmental* of these Technical Provisions.

13.2 Project Standards

Project Standards applicable to the Work are included within *Attachment 1, Project Standards* of these Technical Provisions.

13.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

13.4 [Reserved]

13.5 Design and Analysis Software

For interstate bridges, the Development Entity shall use 2D hydraulic modeling to perform the hydraulic analysis. The Development Entity shall use Sedimentation and River Hydraulics – Two-Dimensional Model (SRH-2D), the most current version of the Sedimentation and River Hydraulics – Two-Dimensional Model as of the Technical Setting Date. Modeling principles and techniques shall be presented using the latest version of the Surface Water Modeling System (SMS) as of the Technical Setting Date.

13. Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

The Development Entity shall develop a HEC-RAS (one dimensional) model for the permit submission for encroachments located within a detailed Federal Emergency Management Agency (FEMA) study area with a defined floodway. The Development Entity shall ensure the SRH-2D model is used to validate the HEC-RAS 1D model.

13.6 Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control Design Requirements

The Development Entity shall utilize an acceptable hydrologic method in accordance with the most current version of Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design*, for calculating flood discharges.

The Development Entity shall build upon work completed in the PDA and prepare a Hydrology and Hydraulics (H&H) Report that includes the detailed calculations, electronic and printed copies of the computer software input and output files, a description about the H&H analysis, and reasons for the design recommendations for each Structure. For 2D models, the Development Entity shall provide a reference list of input file names, dates, and sizes within the H&H Report. Electronic files of those files shall be provided to the Department. The H&H Report shall be developed in accordance with Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design*.

A Hydrologic and Hydraulic QAQC Checklist in Excel Format as found in Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design, Appendix D* is required for H&H Report submissions. The latest version of the spreadsheet can be found on the Department's website. The Development Entity shall prepare checklists as an attachment to the H&H Report for Department review.

13.6.1 Data Collection

The Development Entity shall build upon work completed in the PDA and establish a Drainage System to comply with the requirements of this *Section 13* and that accommodates the historical hydrologic flows through the Project Limits. The Development Entity shall collect and record necessary data to establish existing and proposed hydrologic and hydraulic conditions.

The Development Entity shall build upon data collected as part of the PDA and supplement with available data identifying water resource issues, including water quality requirements as imposed by state and federal government regulations; national wetland inventory and other wetland/protected waters inventories; Federal Emergency Management Agency (FEMA) maps of floodplains and floodways; and official documents concerning the Project. The Development Entity shall also identify watershed boundaries, protected waters, ditches, pipes, areas classified as wetlands, and floodplains.

The Development Entity shall build upon data collected as part of the PDA and conduct supplemental surveys necessary to perform the Work in accordance with the Contract Documents. Topographic surveys of the natural channel shall be required for development of hydraulic models in structures over waterways. Pennsylvania LiDAR (light detection and ranging) data may be used for the topography of the floodplains outside of the natural channel.

If documentation is not available for existing Drainage Systems within the Project Limits and the Drainage System is scheduled to remain in place, the Development Entity shall investigate the existing Drainage

13. Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

System by video inspection to determine condition, size, material, location, and other pertinent information prior to commencement of construction activities as established in *Section 14.3.10, Drainage Systems* of these Technical Provisions. The Development Entity shall provide the documentation of the Drainage System to the Department.

13.6.2 Coordination with Other Agencies

The Development Entity shall coordinate drainage issues with affected regulatory agencies having jurisdiction over the Work and in accordance with the protocol established in *Section 5.8.7, Environmental Authorizations and Revisions* of these Technical Provisions. The Development Entity is not precluded from requesting meetings with relevant Governmental Entities in an effort to expedite approval processes.

The Development Entity shall include the Department in formal correspondence with affected regulatory agencies. The Development Entity shall document the resolutions of hydrologic and hydraulic issues and include resolutions in the Department's e-Builder system design file.

The Development Entity shall submit the H&H Report to the appropriate agencies and address Comments or requests for revisions made by those agencies in accordance with *Section 3.3.10, Affected Third Parties Plan* within these Technical Provisions.

13.6.3 Design Criteria

The Development Entity shall design drainage facilities in accordance with the applicable design criteria, which shall include the following as applicable:

- Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design*;
- *Department Pub 584, Drainage Manual*; and
- Chapter 7 (Drainage Structures, Scour and Culverts) of *Department Pub 15M: Design Manual Part 4, Structures*.

The Development Entity shall use reasonable efforts to preserve existing drainage patterns.

Existing Drainage Systems within the Project Limits scheduled to remain in place must meet hydraulic capacity requirements in accordance with the following as applicable:

- Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design*;
- *Department Pub 584, Drainage Manual*; and
- Chapter 7 (Drainage Structures, Scour and Culverts) of *Department Pub 15M: Design Manual Part 4, Structures*.

If the existing Drainage Systems do not comply with these requirements, substandard items shall be replaced or supplemented by the Development Entity so that the items meet Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design* requirements. The Development Entity shall not establish roadway overtopping conditions worse than existing conditions.

13. Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

The Development Entity shall establish the appropriate hydraulic design performance criteria in accordance with Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design*. The Development Entity shall use a risk-based design process to select design frequencies in accordance with Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design* and *Department Pub 584, Drainage Manual*. The Development Entity shall evaluate structures for the regulatory hydraulic capacity as specified in 25 Pa Code Chapters 105 and 106 and the 1.0% exceedance probability. For bridges, the superflood (0.2% exceedance probability) shall be evaluated for the scour analysis and design of foundation scour countermeasures in accordance with Chapter 7 (Drainage Structures, Scour and Culverts) of *Department Pub 15M: Design Manual Part 4, Structures*.

13.6.4 Hydrologic Analysis

The Development Entity shall design for known changes in land use which may affect the magnitude of runoff and therefore the design capacity of structures. The Development Entity shall calculate flood discharges using an acceptable hydrologic method in accordance with Chapter 10 (Drainage Design and Related Procedures), Section 10.6.C4 of *Department Pub 13M: Design Manual Part 2, Highway Design*. For structures located within a FEMA FIS with peak flow information, the 100-year peak flow from the published FEMA FIS must be used to evaluate the 100-year backwater impacts. Other methods may be considered for the design flood if they are more applicable to current conditions and coordination and acceptance by the Department is granted. Such other method(s) must be justified and documented in the H&H Report.

13.6.5 Hydraulic Analysis

The Development Entity shall evaluate the structures hydraulics using an acceptable hydraulic method in accordance with Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design*. The Development Entity shall ensure the selected hydraulic method is appropriate for conditions within the Project Limits. The Development Entity shall use the most current version of the SRH-2D Modeling principles and techniques must be presented using the latest version of the Surface Water Modeling System (SMS), a graphical pre- and post-processor for several 2D modeling engines, including SRH-2D.

If required by permitting agencies or FEMA, the Development Entity shall also prepare a HEC-RAS 1D model to show floodplain and floodway impacts.

The Development Entity shall provide a scour analysis in accordance Chapter 7 (Drainage Structures, Scour and Culverts) of *Department Pub 15M: Design Manual Part 4, Structures*, for bridges over water. The Development Entity shall design abutment and pier foundations to account for contraction and pier scour and shall incorporate scour protection in accordance with Chapter 7 (Drainage Structures, Scour and Culverts) of *Department Pub 15M: Design Manual Part 4, Structures*. The Development Entity shall provide countermeasures for instability and scour problems, including lateral stream migration in accordance with Chapter 7 (Drainage Structures, Scour and Culverts) of *Department Pub 15M: Design Manual Part 4, Structures*, or U.S. Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 23 – Bridge and Scour and Stream Instability Countermeasures Experience Selection and Design Guidance. The Development Entity shall clearly indicate in each submittal which scour countermeasure method they propose to use, and under no circumstance will Chapter 7 (Drainage

13. Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

Structures, Scour and Culverts) of *Department Pub 15M: Design Manual Part 4, Structures*, or FHWA HEC 23 methods be mixed or used in combination during the Design Work. The 2D hydraulic model output will be used for the design methodology of scour countermeasures.

13.6.6 Bridge and Culvert Waterway Design

The Development Entity shall analyze existing structures with the proposed flows to determine if the backwater meets overtopping limitations as outlined in *Section 13.3, Bridge-Specific Requirements* of these Technical Provisions. If this condition is not met, the Development Entity shall evaluate replacement structures with sufficient capacity to pass the design frequency flows without causing adverse impacts.

For bridges located in the floodways of FEMA detailed study areas, the Development Entity shall ensure there is no increase in the 100-year water surface profile for during or post-construction conditions.

For bridges located in FEMA approximate study areas, FEMA detailed study areas with no floodway, or areas not regulated by FEMA, the proposed waterway design may allow a maximum increase of up to 1.0 feet in the 100-year water surface profile if the low chord is not lowered and there are no adverse impacts to structures (buildings) in the floodplain. If there is an increase in the proposed 100-year water surface profile, the Development Entity must submit to the Department for acceptance, proof the minor increase of 1.0 feet or less does not impact any structures and the increases do not extend beyond the hydraulic model study limits.

The Development Entity shall consider a bridge's ability to allow passage of ice and debris when setting Freeboard heights. A Freeboard of 2.0 feet is the desirable minimum for all types of superstructures. Freeboard shall be computed using the low chord elevation at the upstream face on the lowest end of the bridge for the design storm. The required minimum Freeboard shall be 1 foot for the design event. The calculated 100-year water surface elevation at a location that is approximately one bridge width upstream should be used to check Freeboard. If the existing bridge has less than 1 foot of Freeboard, then the low chord of the proposed bridge shall not be lowered unless the span length is increased to offset the loss of clearance and reduce backwater elevations.

Bridge waterway design shall maintain the existing low flow channel through the structure or provide a new low flow channel. Abutments on bridges must be located in the overbank area and aligned with the flow of the stream.

13.6.7 Bridge Deck Drainage

The Development Entity shall design bridge deck drainage to intercept stormwater flowing toward the bridge upstream from the approach slab. Scuppers shall be provided on the bridge in accordance with Chapter 7 (Drainage Structures, Scour and Culverts) of *Department Pub 15M: Design Manual Part 4, Structures*, where hydraulic computations show they are needed. The Development Entity shall meet the requirements of *Section 14.3.10, Drainage Systems* of these Technical Provisions.

For existing Drainage Systems, the Development Entity shall investigate/clean underground drainage items during the design phase in order to accurately determine the scope of repairs necessary as part of the Work. The Development Entity shall make necessary repairs to the bridge deck Drainage System to maintain compliance with Chapter 7 (Drainage Structures, Scour and Culverts) of *Department Pub 15M: Design Manual Part 4, Structures*.

13. Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control**13.6.8 Roadway Drainage**

The Development Entity shall design Highway drainage facilities. The design and criteria for Highway drainage facilities shall conform to the guidelines presented in Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design* and shall be constructed in accordance with the most current version of:

- *Department Pub 72M, Roadway Construction Standards;*
- *Department Pub 408, Highway Construction Specifications;*
- *Department Pub 584, Drainage Manual;* and
- other applicable Department directives.

The Development Entity shall remove any existing drainage pipes that will not be in use, post construction, in accordance with *Department Pub 16: Design Manual Part 5, Utility Relocation*. The stormwater and drainage network shall be added to the list of public and private utilities that are subject to the provisions of *Department Pub 16: Design Manual Part 5, Utility Relocation*. Where conditions prohibit removal by Development Entity due to safety or aesthetic concerns, the pipes shall be abandoned and filled with controlled low strength material concrete.

13.6.9 Inspection and Use of Drainage System

The Development Entity shall follow inspection and monitoring requirements in *Department Pub 888, Stormwater Control Maintenance Manual*. Any potential illicit discharges shall be documented according to procedures found in *Department Pub 23, Maintenance Manual*.

13.6.10 Post-Construction Stormwater Management

The Development Entity shall prepare the PCSM Plan to meet the regulations 25 Pa Code Chapter 102 regulations and Chapter 13 of *Department Pub 13M: Design Manual Part 2, Highway Design*. The Final Design Documents shall address and remediate impacts to existing stormwater management facilities caused by the Work.

Projects requiring a National Pollutant Discharge Elimination System (NPDES) Permit are regulated by 25 Pa Code Chapter 102 for Post-Construction Stormwater Management (PCSM). The Development Entity shall meet requirements for PCSM. The Development Entity shall follow long-term operation and maintenance requirements in *Department Pub 888, Stormwater Control Maintenance Manual*.

The Development Entity shall comply with Pennsylvania's Storm Water Management Act (Act No. 167 of 1978, P.L. 864, 32 P.S. Sections 680.1 – 680.17), including taking necessary action to ensure the Work is consistent with the standards of applicable Act 167 stormwater management watershed plans.

If an Act 167 stormwater management watershed plan is not approved by DEP for the watershed where a specific Bridge is located, the PCSM Plan must be designed to meet the peak rate, volume and water quality regulations contained in 25 Pa Code Chapter 102 (Erosion and Sediment Control).

As part of the required documentation in the PCSM plan, the Development Entity shall identify PCSM critical stages of construction. The PCSM critical stages of construction are defined as any stage of PCSM

13. Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

construction that cannot be visually observed from the surface without the need for further earth disturbance. This includes but is not limited to structurally engineered stormwater control measures (SCMs), underground treatment or storage SCMs, embankment construction, anti-seep collars underdrain systems, grading for infiltration basins, excavation for infiltration trenches. The PCSM Plan preparer must identify the construction steps and components of SCMs that are considered a PCSM Critical Stage; however, DEP or County Conservation Districts (CCD) can identify critical stages that may not have been identified by the PCSM Plan preparer.

The Development Entity shall provide a licensed Professional Engineer in the Commonwealth of Pennsylvania or their designee to be on the Bridge Site to verify proper installation. The licensed Professional Engineer or their designee shall be on the Bridge Site and be responsible for the entire critical stage, not just part of the critical stage. If the critical stage will span multiple days, the expectation is that the licensed Professional Engineer or their designee is observing the critical stage each day for the full duration of said stage. As part of the as-built conditions, the Development Entity shall provide signed and sealed documentation that the critical stages of each PCSM were constructed according to the design plans.

The Development Entity shall prepare PCSM plans and NPDES Module 2 (PCSM) for each design Submittal in accordance with *Department Pub 584, Drainage Manual* and Chapter 10 (Drainage Design and Related Procedures) of *Department Pub 13M: Design Manual Part 2, Highway Design*. The PCSM plans and module submittals shall include applicable information from the Roadway Drainage Report (RDR).

13.6.11 Erosion and Sediment Pollution Control

The Development Entity shall prepare the Erosion, Sedimentation, and Pollution Control Plan (ESPCP) to meet the regulations of the 25 Pa Code Chapter 102 (Erosion and Sediment Control).

The Development Entity shall develop an ESPCP to be submitted with the DEP 105/USACE 404 Permits and the National Pollutant Discharge Elimination System (NPDES) permit application to the County Conservation District and DEP for review and acceptance. The ESPCP shall be prepared consistent with regulations contained in 25 Pa Code Chapter 102 (Erosion and Sediment Control) and shall reflect the use of Best Management Practices (BMPs) and guidance presented in DEPs 'Erosion and Sediment Pollution Control Program Manual' Document Number 363-2134-008 (most current version). The Development Entity shall develop and implement processes to ensure that the accepted ESPCP is followed and the required inspections are conducted.

13.6.12 National Pollutant Discharge Elimination System Permit

The Development Entity shall prepare the National Pollutant Discharge Elimination System (NPDES) permit application for construction projects in accordance with 25 Pa Code Chapter 102 (Erosion and Sediment Control) to obtain a NPDES Permit for Stormwater Discharges Associated with Construction Activities. This permit is intended to address the quantity (volume and rate) and quality of stormwater run-off generated during and after the planned construction. The DEP administers the NPDES program in Pennsylvania. The Development Entity shall prepare the application and coordinate with applicable reviewing Governmental Entities.

The Development Entity shall develop the PCSM plan in accordance with *Section 13.6.10, Post-Construction Stormwater Management* of these Technical Provisions.

13. Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

The Department's 2018 Administrative Order for Compliance on Consent (AOCC) with the United States Environmental Protection Agency (USEPA) applies to Department projects that require an NPDES Permit for Stormwater Discharges Associated with Construction Activities. The Department's Compliance Management Program (CMP) is set forth in Attachment B of the AOCC. For Projects covered by an NPDES permit, the Development Entity shall:

- comply with Section 4 (Stormwater Inspection Training) of the CMP;
- comply with Section 6 (Compliance Response Policy) of the CMP as detailed in Section 4, Appendix A of *Department Pub 2, Project Office Manual*; and
- coordinate with the Department to determine work to be delegated to the Development Entity with regard to Section 5 (Stormwater Self-Audit Program) and Section 7 (Stormwater Compliance Data) of the CMP as described in *Section 2.4, Coordination with Governmental Entities and Third Parties* in these Technical Provisions.

The Development Entity shall submit a Preparedness, Prevention, and Contingency (PPC) Plan as required for NPDES application, and as defined in *Department Pub 783: Environmental Permitting Handbook*, for stormwater general permits or water management permits. A separate PPC Plan is needed for each Bridge.

13.6.13 Aids to Navigation

For navigable waters, the Development Entity shall prepare and submit all documents required for Aids to Navigation (ATON) in accordance with Chapter 10 (Drainage Design and Related Procedures) Section 10.5.C.6 of *Department Pub 13M: Design Manual Part 2, Highway Design*.

13.7 Construction Requirements

The Development Entity shall design drainage to accommodate construction staging. The design shall include temporary erosion and sediment controls needed to satisfy the water obstruction permitting process and other regulatory requirements.

13.8 Section 13, Hydrology and Hydraulics, Drainage/Stormwater Management, and Erosion and Sediment Control Submittal Requirements

Whenever a Submittal identified in the following Table 13-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.3.5.2, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 13-1 information within these Technical Provisions. The Department will conduct reviews and provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 13-1.

As a condition of each Bridge Completion, the Development Entity shall provide hydrologic, hydraulic, drainage and stormwater documentation and pertinent information on which the design and design decisions were based to the Department for record retention. Required documentation shall include:

- the documentation for filing the Joint Section 404/Water Obstruction and Encroachment applications;

13. Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

- the documentation for filing NPDES applications;
- the documentation for ESPCPs;
- the documentation for PPC Plans;
- the documentation for Post-Construction Stormwater Management (PCSM) Plans;
- the documentation for the determination of a significant encroachment as per Chapter 10 (Section 10.1.A.5) of *Department Pub 13M: Design Manual Part 2, Highway Design*;
- the location hydraulic studies (Preliminary Engineering Phase) as defined in Chapter 10 (Section 10.1.A.10) of *Department Pub 13M: Design Manual Part 2, Highway Design* is to be included as part of the environmental review documents noted below:
 - design hydraulic studies (Final Design Phase) as defined in Chapter 10 (Section 10.1.A.15 and Section 10.7) of *Department Pub 13M: Design Manual Part 2, Highway Design*;
 - environmental review documents pursuant to 23 C.F.R. 771 and Chapter 10 (Section 10.1.A.12(e)) of *Department Pub 13M: Design Manual Part 2, Highway Design*;
 - Conditional Letter of Map Revision (CLOMR) or Letter of Map Revision (LOMR) as per Chapter 10 (Section 10.7.C.9 and Appendix C) of *Department Pub 13M: Design Manual Part 2, Highway Design*; and
 - other supporting documentation such as drainage area and other maps, field survey information, source references, photographs, engineering calculations, analyses and computer files, plans, specifications, measured and other data and flood history including narratives from newspapers and individuals (e.g., Highway maintenance personnel and local residents who witnessed or had knowledge of an unusual event).
- the documentation for Roadway Drainage Report (RDR) as per Chapter 10 (Section 10.3.G) of *Department Pub 13M: Design Manual Part 2, Highway Design*. The requirements of this report should be included in the Final PCSM Report. The definition of the PCSM Report must include the RDR.

Table 13-1. Section 13, Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
PRELIMINARY DESIGN DOCUMENTS						
1	Preliminary Engineering (PE) – Full Hydrologic and Hydraulic (H&H) Report for each structure over water	2	15	Construction Work commencement for Submittal related Work	—	—
2	PE - H&H QAQC Checklist for each structure over water	2	15	Construction Work commencement for Submittal related Work	—	—

13. Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
3	PE - H&H Documentation Including Electronic Files for each structure over water	2	15	Construction Work commencement for Submittal related Work	—	—
4	PE – Erosion, Sedimentation, and Pollution Control Plan (ESPCP) and NPDES Module 1 (E&S)	2	15	Construction Work commencement for Submittal related Work	—	—
5	PE - Post-Construction Stormwater Management (PCSM) Plans and NPDES Module 2 (PCSM) to include applicable info from Roadway Drainage Report (RDR) as described in <i>Department Pub 584, PennDOT Drainage Manual</i>	2	15	Construction Work commencement for Submittal related Work	—	—
FINAL DESIGN DOCUMENTS						
6	Design Field View (DFV) Submission – Full Hydrologic and Hydraulic (H&H) Report for each structure over water	2	15	Construction Work commencement for Submittal related Work	—	—
7	DFV Submission - H&H QAQC Checklist for each structure over water	2	15	Construction Work commencement for Submittal related Work	—	—
8	Pre-Final Design - H&H Documentation Including Electronic Files for each structure over water	2	15	Construction Work commencement for Submittal related Work	—	—
9	Pre-Final Design - National Pollutant Discharge Elimination System (NPDES) Application	2	15	Construction Work commencement for Submittal related Work	—	—
10	Pre-Final Design – Erosion, Sedimentation, and Pollution Control Plan (ESPCP) and NPDES Module 1 (E&S)	2	15	Construction Work commencement for Submittal related Work	—	—

13. Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
11	Pre-Final Design - Post-Construction Stormwater Management (PCSM) Plans and NPDES Module 2 (PCSM) to include applicable info from Roadway Drainage Report (RDR)	2	15	Construction Work commencement for Submittal related Work	—	—
12	Pre-Final Design - Joint Section 404 and Water Obstruction and Encroachment Permit Application Package (Waterway Permit)	2	15	Construction Work commencement for Submittal related Work	—	—
RELEASED FOR CONSTRUCTION DESIGN DOCUMENTS						
13	Plans, Specifications and Estimates (PS&E) – Full Hydrologic and Hydraulic (H&H) Report for each structure over water	3	15	Construction Work commencement for Submittal related Work	—	—
14	PS&E - H&H QAQC Checklist for each structure over water	3	15	Construction Work commencement for Submittal related Work	—	—
15	PS&E - H&H Documentation Including Electronic Files for each structure over water	3	15	Construction Work commencement for Submittal related Work	—	—
16	PS&E - National Pollutant Discharge Elimination System (NPDES) Application and all completed modules	3	15	Construction Work commencement for Submittal related Work	—	—
17	PS&E – Erosion, Sedimentation, and Pollution Control Plan (ESPCP)	3	15	Construction Work commencement for Submittal related Work	—	—
18	PS&E - Post-Construction Stormwater Management (PCSM) Plans	3	15	Construction Work commencement for Submittal related Work	—	—
19	PS&E - Joint Section 404 and Water Obstruction and Encroachment Permit Application Package (Waterway Permit)	3	15	Construction Work commencement for Submittal related Work	—	—

13. Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
20	PS&E - Aids to Navigation (ATON) requirements	3	15	Construction Work commencement for Submittal related Work	—	—
21	Preparedness, Prevention, and Contingency (PPC) Plans.	3	15	Each Bridge Completion	—	—

14 Structures

14.1 General Requirements

The Development Entity shall design, construct, and maintain structures for the Project, inclusive of bridges, culverts, drainage structures, retaining walls, noise barriers, sign structures and lighting and traffic signal foundations. The Development Entity shall perform structural investigations, analyses, design, and reporting in accordance with this *Section 14* and other relevant provisions of the Contract Documents. The Development Entity shall address durability of bridges by using *Strategic Highway Research Programs (SHRP2) Project (R19A) Bridges for Service Life beyond 100 Years: Innovative Systems, Subsystems, and Components, Appendix F, Example Birth Certificate and Recommendations for Through-Life Management*.

Prior to advancing structural Design Work, the Development Entity shall confirm structural concepts, design assumptions and calculations, details and solutions, soil and other pertinent geotechnical parameters, hydraulics (including existing and proposed freeboard), environmental requirements, wetland impacts, safety, functional and geometric criteria, constructability, horizontal and vertical clearances, aesthetics requirements, and continuity as defined by the Development Entity and accepted by the Department in the Development Entity's Package Proposal.

14.2 Bridge-Specific Requirements

Bridge-Specific Requirements are included within *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

14.3 Bridges

The Development Entity shall provide bridge design life in accordance with the Departments' 100-year bridge life initiative. The Development Entity shall design and construct bridges in conformance with these Technical Provisions and shall:

- provide both vertical and horizontal (clear span) minimum required bridge clearances in accordance with the Project Standards, inclusive of Railroad requirements where applicable;
- provide reinforced concrete decks;
- utilize epoxy coated reinforcement bars in accordance with the Project Standards or as previously approved by the Department for the first Package Proposal;
- use class AA cement concrete, utilizing No. 8 coarse aggregate in raised sidewalk, alternate sidewalk, curbs, barriers, and divisors;
- utilize class AA cement concrete in Types 1, 2, and 4 approach slabs, concrete diaphragms, abutment backwalls, cheek walls, shear blocks, U-wings above bridge seat construction joint, flared safety wings, footings (when specified), sleeper slabs, and noise barriers;

The Development Entity shall not implement bridges that:

- utilize lightweight concrete;
- use precast panel forms for placing concrete deck slab in lieu of metal stay-in-place forms;
- use partial precast deck panels;

- utilize longitudinal stiffeners;
- utilize empirical design for bridge decks or deck systems;
- provide superstructures with both steel girders and concrete girders in any combination or configuration of simple or continuous spans;
- utilize permanent precast concrete barriers; or
- have uplift at supports.

The Development Entity shall not implement the following bridge and/or culvert types:

- non-composite superstructure inclusive of box beams with asphalt overlay;
- prestressed concrete hollow core slab with metallic prestressing strands;
- open steel grid decks;
- multi-cell culverts or multiple pipes (are permitted only on temporary situations);
- aluminum structures;
- timber structures; or
- metal pipe or culvert structures, including buried corrugated metal culverts, equal to or greater than eight foot in diameter or, in the case of a non-circular cross-section, have a hydraulic opening area greater than or equal to 50 square feet.

The Development Entity shall provide a design that at a minimum prevents bank erosion within 50 feet of the bridge.

The Development Entity shall make bridge superstructures, joints, and bearings accessible for long-term inspection and maintenance. The Development Entity shall make open-framed superstructures accessible by use of ladders, lift truck or an under-bridge inspection crane. Bridges shall either be accessible from below or from the bridge deck using an under-bridge inspection crane.

The Development Entity shall make steel and concrete box girders and box caps (substructure) with a minimum inside depth of 6-feet to facilitate interior inspection. The Development Entity shall include a minimum access opening of 3-foot diameter into cells and between cells of the girders to allow free flow of air during inspections. The outside access opening cover shall hinge to the inside of the box girder and caps (substructure). The Development Entity shall install water-tight, sealed, and locked entryways on hatches and points of access. Without limiting other requirements of the Project Standards, the Development Entity shall provide keys to the locked entryways to the Department.

The Development Entity shall provide bracing necessary for global stability during future re-decking with the Work for prestressed concrete and steel superstructures. This statement does not apply to segmental bridge construction

The Development Entity shall not weld reinforcement bars.

The Development Entity shall submit temporary bracing schemes to the Department for acceptance where bridge construction will be conducted over live traffic.

The Development Entity shall provide a design that addresses differential camber for the superstructure for bridges that are built using phased construction.

The Development Entity shall provide longitudinal and transverse precast arch segments joints that do not leak.

The Development Entity shall provide design calculations and Bridge Birth Certificates to the Department for review and acceptance. The Development Entity shall ensure that Bridge Birth Certificates collect and record as-built documentation of the achieved values inclusive of concrete cover thickness, chloride migration coefficients, and other durability-related parameters. The Development Entity shall adhere to the requirements of Appendix F (Example Birth Certificate and Recommendations for Through-Life Management) of *Strategic Highway Research Programs (SHRP2) Project (R19A) Bridges for Service Life beyond 100 Years: Innovative Systems, Subsystems, and Components*.

In the event that the Development Entity adjusts the design defined by the Development Entity and accepted by the Department in the Development Entity's Package Proposal, the Development Entity shall provide updated Preliminary Design Documents (TS&Ls) for bridges. Otherwise, the Development Entity shall provide Final and Released for Construction Design Documents for bridges.

14.3.1 Fracture Critical Members

The Development Entity shall not implement Fracture Critical Members without written authorization from the Department and FHWA. In the event that Fracture Critical Members are authorized by the Department, they shall be designed to allow full access for inspection and shall implement redundancy as described in FHWA memorandum "Clarification of Requirements for Fracture Critical Members" (dated June 20, 2012).

14.3.2 Design Loads and Load Ratings

The Development Entity shall calculate the bridge load ratings based on live load distribution factor equations in accordance with *Department Pub 15M: Design Manual Part 4, Structures*, at a minimum. Live load distribution based on refined analysis or 3-dimensional analysis shall be equal to or exceed the values from the *Department Pub 15M: Design Manual Part 4, Structures* distribution factor equations based on the limitations noted in *Design Manual Part 4, Structures*. The Development Entity shall prepare Load and Resistance Factor Ratings analysis files for bridges in accordance with applicable sections of *Department Pub 238, Bridge Safety Inspection Manual*. The Department will enter the data into APRAS. The final bridge load rating must include changes resulting for the as-built conditions.

The bridge load rating computations submitted to the Department for review and acceptance shall include applicable electronic input files (STLRFD, PSLRFD, etc.), and the native input files for STLRFD and PSLRFD used to design the bridge. Additionally, the submission of the native input files shall indicate which file is for the controlling girder for permit evaluation.

14.3.3 Foundations

The Development Entity shall follow Sections 10, 11 and 12 in *Department Pub 15M: Design Manual Part 4, Structures* and *Section 9, Geotechnical and Pavement* of these Technical Provisions. The Development Entity shall follow Section 11 and Appendix G in *Department Pub 15M: Design Manual Part 4, Structures* requirements for integral abutments and the integral abutment spreadsheet contained therein, where the superstructure is structurally framed into the abutment.

The Development Entity shall ensure that Mechanically Stabilized Earth (MSE) walls shall not serve as structural foundations for bridges and shall not be subjected to vertical loads from the bridges.

The Development Entity shall refer to Dynamic Pile Load testing per *Section 9, Geotechnical and Pavement* of the Technical Provisions for driven pile foundations.

14.3.4 Substructures

The Development Entity shall apply a protective coating to the substructures for surfaces that are exposed to salt spray from vehicles that are within 30 feet of the edge of traveled way. The protective coating shall be an epoxy resin coating and shall match the concrete finish color.

14.3.5 Tendons

The Development Entity may consider both internal and external tendons for bridge design. In the event that the Development Entity elects to utilize tendons, the Development Entity shall:

- provide both internal provisional ducts in accordance with Section 5.12.5.3.9b of *AASHTO LRFD Bridge Design Specifications* (8th Edition, 2017) and external ducts for future adjustment in accordance with Section 5.12.5.3.9c of *AASHTO LRFD Bridge Design Specifications* (8th Edition, 2017); and
- ensure that the external tendons are replaceable throughout the design life of the bridge.

14.3.6 Decks and Deck Systems

In the event that the Development Entity elects to utilize an alternate form system, the Development Entity shall submit material details and erection methods of the alternate form system to the Development Entity's Engineer of Record for review and acceptance and then to the Department for acceptance. For avoidance of doubt, acceptance of an alternate form system is in the Department's sole discretion.

In the event that expansion joints become necessary, the Development Entity shall place expansion joints off the bridges, where possible. The Development Entity shall design and construct bridge approach slabs in accordance with the *Department Pub 218M, Bridge Design Standards – BD-600M Series*. If an expansion joint is placed at a pier or an abutment, the pier cap or abutment shall be protected with a 2-inch minimum thickness Ultra High Performance Concrete (UHPC) layer.

For cast in place decks, the Development Entity shall provide a Latex Modified Concrete (LMC) overlay with a 1.25-inch minimum thickness or a Polyester Polymer Concrete (PPC) overlay with a 1-inch minimum thickness to the new deck prior to opening the bridge to traffic. The Development Entity shall remove the existing overlay and provide a new overlay two years prior to handback. The Development Entity shall confirm that mechanical texturing is provided for LMC and PPC overlays.

For precast decks or modular deck units with closure pours, the Development Entity shall provide a LMC overlay with a 1.25-inch minimum thickness or a PPC overlay with a 1-inch minimum thickness to the new deck prior to opening the bridge to traffic. The Development Entity shall remove the existing overlay and provide a new overlay two years prior to handback. The Development Entity shall provide a 0.25-inch over placement of UHPC and the beam deck modules, then scarify the entire deck before placing LMC or PPC. The Development Entity shall confirm that mechanical texturing is provided for LMC and PPC overlays.

For precast deck closure pours, the Development Entity shall use one of the following methods:

- ultra-high-performance concrete with mild reinforcement and exposed aggregate finish to precast concrete surfaces; or
- conventional grout with post tensioning.

For precast decks, at the longitudinal closure pour, the Development Entity shall cast the beam/girder haunch with UHPC and exposed aggregate finish to the precast concrete surfaces. The Development Entity shall cast the beam/girder haunch and shear pockets at other beams/girders with either UHPC or an epoxy grout.

The Development Entity shall place and cure the overlay prior to opening the bridge to traffic. The Development Entity shall not use temporary asphalt or other overlay substitute in lieu of the overlay to facilitate opening a bridge to traffic. The Development Entity shall not utilize accelerated LMC, unless accepted by the Department.

14.3.7 Railings and Barriers

The Development Entity shall provide MASH TL-5 barrier on bridges and MASH TL-3 barrier guiderail transitions to roadways and shall satisfy applicable railing and barrier safety requirements. The Development Entity shall not permanently attach and secure precast concrete barrier to the deck via dowel bars with grout and/or adhesive anchors. The Development Entity may utilize precast barriers with adhesive anchors for temporary conditions (under three years). The Development Entity may cast barriers monolithically with a precast concrete deck component in a fabrication shop. Barriers do not have to be replaced on bridges where the deck is not being replaced.

The Development Entity shall design pedestrian facilities to meet the criteria of *Section 12, Bicycle and Pedestrian Facilities* of these Technical Provisions and shall protect pedestrian facilities on bridges from vehicular impact using appropriate railings, barriers, protective fence, or offsets.

14.3.8 Utilities

The Development Entity shall coordinate with Utilities and facilitate applications for Utility Bridge Occupancy Permits (BOPs) that may become necessary for the Work. The Development shall obtain the utility attachment details from the Utility and include them in the bridge Design Documents, where utility attachment details are required. The Development Entity shall provide these same set of plans to the Utility for inclusion in the BOP application. The BOP application shall be submitted by the Utility through the Department's Electronic Permit System (EPS) for acceptance by the Department. The Development Entity shall review and accept the BOP application prior to the Utility submitting it to EPS.

The Development Entity shall coordinate with Utility Owners so that Bridge Occupancy Licenses (BOLs) Form M-906 A 187 BOL License are submitted by the applicable Utility Owner to the Department 90 Business days prior to commencement of Construction Work associated with the particular BOL.

The Development Entity shall provide a copy of the transmittal letter to the Department indicating that the Design Documents with the utility attachment details for the bridge were sent to the Utility Owner.

14.3.9 Intelligent Transportation System Conduit

The Development Entity shall provide ITS conduits on each new bridge within the Project Limits for potential future ITS work (refer to *Section 19, Intelligent Transportation System* of these Technical Provisions for the number and size of ITS conduit). ITS conduit shall be placed between the fascia beam and first interior beam of the superstructure in accordance with the Project Standards.

14.3.10 Drainage Systems

The Development Entity shall utilize galvanized ferrous materials for bridge drainage items.

The Development Entity shall design bridge downspouts that:

- includes the weight of dirt, debris, and ice for the entire diameter and length of the downspout;
- avoids long horizontal runs (15 feet or more);
- utilize 10-inch-diameter steel downspouts; and
- does not discharge against piers or abutments or cause erosion to the adjacent ground.

During Design Work, the Development Entity shall clean-out and perform a video camera inspection of existing underground drainage items that are connected to bridge downspouts that will remain functional.

The Development Entity shall provide an underground pipe/drainage item video inspection report that identifies and describes deficiencies with the existing underground drainage items and identifies and describes necessary remediation improvement.

14.4 Hauling Permits

The Development Entity shall adhere to state hauling and permit laws. For the avoidance of doubt, the Department will not grant state hauling or permit law waivers.

14.5 Scour

The Development Entity shall confirm that bridge foundations satisfactorily accommodate the anticipated scour as identified in the scour analysis outlined in *Section 13, Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control* of these Technical Provisions.

14.6 Retaining Walls

The Development Entity shall provide retaining wall design life in accordance with *Department Pub 15M: Design Manual Part 4, Structures*. The Development Entity shall only use wall types and components if:

- the Department has accepted the wall types and components for general use;
- the design of the wall type and components meets the functional requirements of the Project;
- the wall type and components meet the requirements of *Department Pub 15M: Design Manual Part 4, Structures*; and
- the wall type is on the Department's approved bridge and structure products list.

The Development Entity shall design and construct retaining walls in conformance with these Technical Provisions and shall:

- provide access doors in the retaining wall if required by local fire departments or for inspection in accordance with the Project Standards; and
- provide a constant post spacing for the entire length of wall (the constant post spacing may be interrupted to miss drainage pipes, utilities, expansion joints, construction joints, and/or other physical features).

The Development shall not implement the following retaining wall types as part of the permanent Work:

- gabion;
- Geosynthetic Reinforced Slope (GRS) or modular employing interlocking blocks where surcharge loads from vehicular traffic are present; or
- metal, including bin and sheet pile, recycled material, or timber.

Prefabricated retaining walls, including approved proprietary modular retaining wall systems and Mechanically Stabilized Earth (MSE) retaining walls may be used where Bridge Site conditions permit their use, provide they are in accordance with these Technical Provisions. The Development Entity's Engineer of Record must verify the acceptability of global stability, settlement, rotation, sliding and bearing pressure for these prefabricated retaining wall systems.

Alternate wall types using steel, concrete, timber, masonry, plastic, or other material must be accepted by the Department prior to fabrication and construction. As part of this process, the Development Entity shall submit design calculations and standard details addressing key aspects including post spacing, panel height limitations, and connection details for Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) and for submittal to the FHWA (as applicable). Standard details shall be in a format consistent with the applicable Project Standards.

The design of retaining walls shall include live load surcharges. The Development Entity shall apply the appropriate live loading condition to each retaining wall. The Development Entity shall base these live load surcharges on the following:

- *AASHTO LRFD Bridge Design Specifications* (8th Edition, 2017);
- Section 11 (Walls, Abutments and Piers) of *Department Pub 15M: Design Manual Part 4, Structures*;
- *American Railway Engineering and Maintenance of Way Association (AREMA) Manual for Railway Engineering*; or
- the requirements of the specific railroad and/or transit owner/operator, as appropriate.

The retaining wall layout shall address slope maintenance above and below the retaining wall. For moment slabs being placed near or on top of a retaining wall, the Development Entity shall design the moment slab such that an impact load does not crack the top of the retaining wall.

The Development Entity shall design and construct the Project to provide earthen embankments without the use of retaining walls, unless indicated otherwise in the Project Standards. Where earthen embankments are not feasible, the Development Entity may utilize retaining walls.

If pipe culverts are to extend through the retaining walls, the Development Entity shall install pipe so no joints are located within or under the wall.

The Development Entity shall provide Preliminary, Final, and Released for Construction Design Documents for retaining walls.

14.7 Culverts

The Development Entity shall account for maximum anticipated loadings as per Section 3 of *Department Pub 15M: Design Manual Part 4, Structures* when developing new culvert designs. The Development Entity shall implement the remediation improvements to existing culverts to remain functional within the Project Limits identified in the Package Proposal.

14.8 Noise Barriers

The Development Entity shall design noise barriers in accordance with the Project Standards and shall construct noise barriers to achieve the decibel reduction and aesthetic requirements of the Environmental Approvals. The Development Entity shall design and construct noise barrier panels to limit the risk of falling debris resulting from vehicular impacts. The Development Entity shall not implement timber sound barriers.

The Development Entity shall provide Preliminary, Final, and Released for Construction Design Documents for noise barriers.

14.9 Sign Structures

The Development Entity shall design sign structures (overhead, cantilever and Type A) in conformance with the Project Standards and as follows:

- *Department Pub 111: Standard Drawing TC-8702A (Post Mounted Signs, Type A)*;
- *Department Pub 15M: Design Manual Part 4, Structures*; and

- *Department Pub 218M, Bridge Design Standards – BD-600M Series.*

The Development Entity shall also review existing overhead and Type A sign structures, where new or additional sign plaques are proposed, to ensure the sign structures and their foundations can meet the requirements.

The Development Entity shall design sign structure attachments to the bridge, as may be required, in accordance with the Project Standards and shall evaluate the soil bearing pressure against the soil parameters in the field to ensure adequate bearing capacity for ground mounted sign structure foundations. The Development Entity shall provide Preliminary, Final, and Released for Construction Design Documents for sign structure foundations as well as their attachments to bridges.

14.10 Highway and Bridge Lighting

For the for Highway and bridge lighting designs, the Development Entity shall follow the submission requirements as outlined in *Section 18, Signing, Pavement Markings, Traffic Signals, and Lighting* of these Technical Provisions.

The Development Entity shall design lighting and Aids to Navigation (ATON) bridge attachments in accordance with *Department Pub 15M: Design Manual Part 4, Structures* and the *Department Pub 218M, Bridge Design Standards, BD-600M Series* and shall place light poles on bridge blisters or piers away from areas that could cause vibration to mast arms and shall evaluate the soil bearing pressure against the soil parameters in the field to ensure adequate bearing capacity for ground mounted light pole foundations.

The Development Entity shall install new lighting systems and poles, if required, to meet the requirements of Chapter 5 (Lighting) of *Department 13M: Design Manual Part 2, Highway Design*. The Development Entity shall coordinate and assist the Department negotiate and prepare third party lighting agreements with applicable local governments.

Where a Third Party Agreement exists to address existing Highway and bridge lighting within the Project Limits, the Development Entity shall coordinate with the Department and relevant third party to address the needs of the existing agreement and ascertain if a new Third Party Agreement is needed.

The Development Entity shall provide Preliminary, Final, and Released for Construction Design Documents for lighting and ATON bridge attachments as well as ground mounted light pole foundations.

14.11 Hydrology and Hydraulics

The Development Entity shall confirm the bridge opening satisfactorily accommodates the design storm as identified in the Hydrology and Hydraulics report outlined in *Section 13, Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control* of these Technical Provisions.

14.12 Traffic Signals

The Development Entity shall follow the Submittal requirements as outlined in *Section 18, Signing, Pavement Markings, Traffic Signals, and Lighting* of these Technical Provisions.

The Development Entity shall evaluate the soil bearing pressure against the soil parameters in the field to ensure adequate bearing capacity for traffic signal foundations and shall provide Preliminary, Final, and Released for Construction Design Documents for traffic signal foundations.

14.13 Shop Drawings

The Development Entity shall prepare and submit bridge Shop Drawings in accordance with Section 3.5.2.6, *Shop Drawings* of these Technical Provisions. Bridge Shop Drawings shall include at a minimum prestressed beams, precast beams, precast decks, steel beams and girders, and reinforcement bar schedules. Bridge Shop Drawings shall be submitted for each bridge individually (items pertaining to the same S-Number). Each bridge Shop Drawing shall follow the title block requirements within *Department Pub 15M: Design Manual Part 4, Structures*.

14.14 Construction Requirements

The Development Entity shall obtain the Development Entity's Engineer of Record's acceptance of working drawings required for centering and falsework before commencing Construction Work associated with the subject working drawings. The Development Entity shall obtain the IQFs acceptance of in-place concrete forms before commencing Construction Work associated with the subject concrete placement.

The Development Entity shall not use metal forms in the cantilever area on either side of the joint when portions of a bridge deck are constructed adjacent to each other and divided by an open or a preformed joint, except with written acceptance from the Department.

The Development Entity shall provide construction loading on Construction Documents in accordance with *Department Pub 408, Highway Construction Specifications* provide APRAS runs for the construction loading condition to the District, and coordinate construction loading/phasing with the District permit office two weeks prior to commencing Construction Work associated with the subject bridge.

The Development Entity shall not stage equipment or stockpile materials on a bridge unless written acceptance from the Department is provided.

The Development Entity shall provide the following Submittals to the Department for the Department's acceptance:

- Preliminary, Final, and Released for Construction Design Documents for Elements to be prefabricated, inclusive of design calculations;
- Falsework certification, as applicable (required prior to performing related Work);
- Support of Excavation adjacent to traffic (required prior to performing related Work);
- Jacking and/or demolition schemes (required prior to performing related Work);
- Pile driving records;
- Structural concrete cylinder break test results;
- Buy America documentation;

- U.S. Federal Highway Administration's National Bridge Inspection Standards (NBIS) 23 C.F.R. 650 inspection report including I-forms;
- Records of additional geotechnical investigations performed during construction along with testing results performed shall be submitted with the Record Drawings; and
- Public Utility Commission (PUC) Orders.

14.14.1 Superstructures

The Development Entity shall provide bridge erection plans to the Department for review and acceptance prior to commencing work associated with the erection plan.

14.14.2 Concrete Finishes

The Development Entity shall ensure that concrete surfaces not having aesthetic treatments have a uniform texture and appearance. Color treatment, where required as an aspect of the aesthetic treatment of the concrete, shall be performed at the same time in a continuous operation. Stains and color agents shall be from the same production run. The color shall not be added into the concrete mix, rather it shall be applied topically after the concrete has been placed and cured. The Development Entity shall provide clear coat protection compatible with the stain or color agent used.

The Development Entity shall ensure that the Department concurs or selects the concrete finish color as part of the Final Design Documents. The Development Entity shall provide a mockup of the form liner and color. The Development Entity shall apply a protective coating to the superstructure and substructures for surfaces that are exposed to salt spray from vehicles that are within 30 feet of the edge of traveled way. The protective coating shall be an epoxy resin coating and shall match the concrete color.

The Development shall provide concrete finish samples of the actual form liner, stain color, and epoxy resin color to be used to the Department for review and acceptance prior to start of related Construction Work.

14.14.3 Steel Finishes

The Development Entity shall protect weathering steel in accordance with *Department Pub 15M: Design Manual Part 4, Structures*. If weathering steel is used, the Development Entity shall protect components of the structure (superstructure and substructure) susceptible to corrosion and/or staining from weathering steel run-off. The Development Entity shall use paint color AMS-STD-595A (Color ID #10075) for weathering steel and obtain acceptance from the Department prior to use.

Non-weathering steel beam lengths less than 70 feet shall be galvanized.

The Development Entity shall provide paint color samples of the actual paint color to be used to the Department for review and acceptance prior to start of related Construction Work.

14.14.4 Photographic Documentation

The Development Entity shall prepare and submit to the Department digital photographic documentation with appropriate descriptions and labeling of structural components being constructed. The Development Entity shall ensure the documentation includes the following at a minimum:

- Site preparation including construction of access roads;
- foundation preparation and construction;
- footing preparation including photographs prior to concrete placement;
- substructure construction including photographs prior to backfilling;
- construction of scour protection;
- beam/girder fabrication;
- setting and final installation of bearings;
- erection including documenting crane locations and crane picks;
- final erected superstructure;
- construction of the deck including placement of deck reinforcing steel;
- setting and adjustment of expansion dams; and
- construction and placement of barriers.

The Development Entity shall prepare and submit to the Department digital photographic documentation with appropriate descriptions and labeling at the following completed activities:

- completion of substructure construction; and
- completion of superstructure construction.

14.15 Record Drawings

The Development Entity shall provide bridge Record Drawings in accordance with *Section 3.5.2.8, Record Drawings* of these Technical Provisions.

14.16 Pile Hammer Evaluations

The Development Entity's Engineer of Record shall ensure pile hammer and GRLWEAP evaluations are submitted in accordance with these Technical Provisions for the Department's acceptance. Pile hammers shall not be used without a formal certification letter from the Development Entity's Engineer of Record, specifying the approved pile driving parameters. Tip reinforcement and splice details shall be approved by the Development Entity's Engineer of Record based upon BC-757M.

14.17 Section 14, Structures Submittal Requirements

Whenever a Submittal identified in the following Table 14-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in

Section 3.5.1, Submittal Packaging Plan of these Technical Provisions and incorporates Table 14-1 information. The Department will conduct reviews and provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 14-1.

The Development Entity shall ensure that the Department's Chief Bridge Engineer and/or Chief Geotechnical Engineer signs structure related Released for Construction Documents.

The Development Entity shall coordinate with the Department to ensure all documents in Table 14-1 are placed in the Department's Bridge Management System (BMS).

Table 14-1. Section 14, Structures Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Alternate Deck Form System and Erection Details	2	10	Construction Work commencement for Submittal related Work	—	—
2	Utility Attachment Details	3	10	Construction Work commencement for Submittal related Work	—	—
3	Underground Pipe/Drainage System Video Inspection Report	1	10	Construction Work commencement for Submittal related Work	—	—
4	Hauling Permits	2	5	—	Term	—
5	Bridge Load Rating Computations	2	15	Each Bridge Completion	—	—
6	Bridge Shop Drawings	1	-	—	Construction Period	—
7	Bridge Birth Certificate	2	10	Each Bridge Completion	—	—
8	Falsework Certification	2	10	Construction Work commencement for Submittal related Work	—	—
9	Jacking and/or Demolition Schemes	2	10	Construction Work commencement for Submittal related Work	—	—
10	Pile Driving Records	1	10	Each Bridge Completion	—	—
11	Structural Concrete Cylinder Break Test Results	1	10	Each Bridge Completion	—	—
12	Buy American Documentation	2	10	Each Bridge Completion	—	—

14. Structures

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
13	U.S. Federal Highway Administration's National Bridge Inspection Standards (NBIS) 23 C.F.R. 650 Inspection Report including I-Forms	1	10	Each Bridge Completion and Substantial Completion	—	—
14	Records of Additional Geotechnical Investigations and Testing Performed during Construction	1	10	Bridge Completion	—	—
15	Public Utility Commission (PUC) Orders	2	10	Each Bridge Completion	—	—
16	Erection Plans	3	10	Construction Work commencement for Submittal related Work	—	—
17	Concrete Finish Samples	3	5	Construction Work commencement for Submittal related Work	—	—
18	Paint Color Samples	3	5	Construction Work commencement for Submittal related Work	—	—
19	Photographic Documentation	1	10	Bridge Completion and again for Final Acceptance		
20	Pile hammer and GRLWEAP Evaluations	3	10	Construction Work commencement for Submittal related Work	—	—
PRELIMINARY DESIGN DOCUMENTS						
21	Interstate Bridge Design Documents	2	15	Construction Work commencement for Submittal related Work	—	—
	Non-interstate Bridge Design Documents	2	15	Construction Work commencement for Submittal related Work	—	—
	Culvert Design Document	2	15	Construction Work commencement for Submittal related Work	—	—
22	Retaining Wall Design Documents	2	15	Construction Work commencement for Submittal related Work	—	—
23	Noise Barrier Design Documents	2	15	Construction Work commencement for Submittal related Work	—	—

14. Structures

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
24	Sign Structure Foundations	2	10	Construction Work commencement for Submittal related Work	—	—
25	Lighting and Aids to Navigation (ATON) Bridge Attachments	2	10	Construction Work commencement for Submittal related Work	—	—
26	Ground Mounted Light Pole Foundations	2	10	Construction Work commencement for Submittal related Work	—	—
27	Traffic Signal Foundations	2	10	Construction Work commencement for Submittal related Work	—	—
28	Elements to be Prefabricated	2	10	Construction Work commencement for Submittal related Work	—	—
FINAL DESIGN DOCUMENTS						
29	Interstate Bridge Design Documents	2	25	Construction Work commencement for Submittal related Work	—	—
	Non-interstate Bridge Design Documents	2	20	Construction Work commencement for Submittal related Work	—	—
	Culvert Design Document	2	15	Construction Work commencement for Submittal related Work	—	—
30	Retaining Wall Design Documents	2	15	Construction Work commencement for Submittal related Work	—	—
31	Noise Barrier Design Documents	2	15	Construction Work commencement for Submittal related Work	—	—
32	Sign Structure Foundations	2	10	Construction Work commencement for Submittal related Work	—	—
33	Lighting and Aids to Navigation (ATON) Bridge Attachments	2	10	Construction Work commencement for Submittal related Work	—	—
34	Ground Mounted Light Pole Foundations	2	10	Construction Work commencement for Submittal related Work	—	—
35	Traffic Signal Foundations	2	10	Construction Work commencement for Submittal related Work	—	—
36	Elements to be Prefabricated	2	15	Construction Work commencement for Submittal related Work	—	—

14. Structures

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
RELEASED FOR CONSTRUCTION DESIGN DOCUMENTS						
37	Interstate Bridge Design Documents	3	15	Construction Work commencement for Submittal related Work	—	—
	Non-interstate Bridge Design Documents	3	15	Construction Work commencement for Submittal related Work	—	—
	Culvert Design Document	3	15	Construction Work commencement for Submittal related Work	—	—
38	Retaining Wall Design Documents	3	15	Construction Work commencement for Submittal related Work	—	—
39	Noise Barrier Design Documents	3	15	Construction Work commencement for Submittal related Work	—	—
40	Sign Structure Foundations	3	10	Construction Work commencement for Submittal related Work	—	—
41	Lighting and Aids to Navigation (ATON) Bridge Attachments	3	10	Construction Work commencement for Submittal related Work	—	—
42	Ground Mounted Light Pole Foundations	3	10	Construction Work commencement for Submittal related Work	—	—
43	Traffic Signal Foundations	3	10	Construction Work commencement for Submittal related Work	—	—
44	Elements to be Prefabricated	3	15	Construction Work commencement for Submittal related Work	—	—

15 Railroad Coordination

15.1 General Requirements

The Development Entity shall conduct activities and coordinate with the Department as needed for the Department to enter into an agreement with the affected Railroads. Railroad coordination shall be subject to the conditions set forth in Project Agreement Section 7.11.

The Development Entity shall notify the Department 30 Days after NTP1 of the need for additional Railroad coordination, if any, after which, the railroad impacts defined by the Development Entity and accepted by the Department in the Development Entity's Package Proposal, shall be considered adequate for the Work. The Development Entity shall complete additional Railroad coordination, as agreed upon by the Department and necessary for the Department to enter into a Railroad Agreement.

Work affecting a Railroad generally is any Work over, under or within the Railroad's right of way or within the Railroad influence zone as defined by the Railroad in its standards and requirements.

15.2 Project Standards

Project Standards applicable to the Work are included *Attachment 1, Project Standards* of these Technical Provisions.

15.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

15.4 [Reserved]

15.5 Railroad Design Standards

Railroad design shall be based on the AREMA publications inclusive of the *Manual for Railway Engineering and Communications & Signals Manual of Recommended Practices* and the requirements of the operating Railroad. The Development Entity's Design shall minimize service interruptions to existing rail lines to the maximum extent possible with the use of non-revenue/nonoperating service hours as the primary option.

In the event that the Railroad items will be constructed within an existing quiet zone, or a Railroad crossing zone, the Development Entity shall obtain approval by the Railroad and other applicable Governmental Entities, as well as comply with the supplemental safety measures as required by U.S. Code Title 49 and maintain the operation of the safety features within the existing quiet zones.

The Development Entity shall coordinate with the Railroad when alterations are made to the crossing and/or clearance envelope at grade separated crossings. Clearances shall not be reduced below the minimum values set forth by the Pennsylvania Public Utility Commission (PUC) or required by individual Railroads. Note that this requirement also includes reductions made on a temporary basis (for example, painting containment structures).

The Development Entity shall maintain the roadway and drainage design parameters at Highway-rail at-grade crossings, except for the cross slope of the pavement which may be transitioned to match the grade across the rail line.

The Development Entity shall design structures of any Utilities, including Drainage Systems installed by Development Entity and crossing a rail line in accordance with the Railroad's design criteria and PUC approval, when required.

The Development Entity shall be responsible for required grade crossing gates, signals, or other safety features. The Development Entity shall develop the Traffic Control Plan (TCP) in accordance with *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions to minimize congestion at the grade crossing during the Construction Work where signalized intersections occur near an existing highway-rail at-grade crossing. Development Entity shall also include in its TCP dates of construction affecting the Railroad, proposed detours, length of such construction, any applicable Lane Closures, and an explanation of the time and duration of expected Railroad track closures.

The Development Entity shall maintain the minimum horizontal and vertical clearances as shown in Chapter 4 of *Department Pub 371, Grade Crossing Manual* over the entire Railroad ROW within the Project Limits unless otherwise approved by the Railroad.

Development Entity shall coordinate, design, and construct Work involving at-grade Railroad crossings in accordance with 23 C.F.R. Part 646 and *Department Pub 371, Grade Crossing Manual*.

15.5.1 CSX Transportation

In the event that CSX Transportation (CSX) owns and operates freight rail facilities within the Project Limits, the Development Entity shall, at a minimum, perform Work affecting the Railroad to adhere to the requirements of the *CSX Public Project Manual* if the Work affects the CSX facility.

The Development Entity shall comply with the documents below:

- *CSX Guide for Contractor Safety and Compliance* (dated January 1, 2022);
- *CSX Public Project Information Manual, For Construction and Improvement Projects that May Involve the Railroad*; and
- <https://www.csx.com/index.cfm/suppliers/doing-business-with-us/>.

The Development Entity shall be properly trained in the requirements of CSX's Contractor Safety & Roadway Worker Protection Program in accordance with CSX Transportation Safety Training Policy for CSX Contractors when entering CSX property under a temporary or permanent Railroad right-of-entry permit.

15.5.2 Norfolk Southern Railway Company

In the event that Norfolk Southern Railway Company (NS) owns and operates freight rail facilities within the Project Limits, the Development Entity shall, at a minimum, perform the Work affecting the Railroad to adhere to the requirements of the *NS Public Projects Manual for Projects Which May Impact Norfolk Southern Railway Company*.

Development Entity personnel shall be required to have been properly trained regarding the requirements of NS's safety program prior to entering on NS property under a temporary or permanent Railroad right-of-entry permit. The Development Entity shall comply with the documents below:

- *Public Projects Manual for Projects Which May Impact Norfolk Southern Railway Company*;
- *Norfolk Southern Railway Company Specifications for Design and Construction of Privately Owned Industry Tracks*; and
- <http://www.nscorp.com/content/nscorp/en/transportation-terms/other-requirements/public-project-guidelines.html>.

15.5.3 Reading Blue Mountain & Northern Railroad

In the event that the Reading Blue Mountain & Northern Railroad (RBMN) owns and operates rail facilities within the Project Limits, the Development Entity shall follow the procedure included at <https://www.rbmnrr.com/contractor-access-procedure> for Contract Access, and *RB6-Specific Requirements for Working on Reading Blue Mountain & Northern Railroad Right of Way* for work affecting this Railroad.

15.5.4 Wheeling and Lake Erie Railway Company

In the event that the Wheeling and Lake Erie Railway Company (W&LE) owns and operates facilities within the Project Limits, the Development Entity shall comply with the below for work affecting this Railroad:

- W&LE Specifications for Wire, Conduit and Cable Occupations for the Wheeling and Lake Erie Railway Company Right of Way/Property and Tracks (Specification for Overhead Occupancy);
- W&LE Specification for Pipeline Occupancy of the Wheeling and Lake Erie Railway Company Right of Way/Property and Tracks (specification for underground occupancy); and
- <https://www.wlerwy.com/real-estate/accessing-property/>.

15.5.5 AMTRAK

In the event that the AMTRAK (also known as the National Railroad Passenger Corporation) owns and operates passenger lines within the Project Limits, the Development Entity shall comply with the requirements of the AMTRAK *Construction Manual*, inclusive of work over tracks and other AMTRAK facilities, intrusion into the AMTRAK dynamic space and construction adjacent to aerial structures, and work near other AMTRAK surface features for Work affecting AMTRAK facilities.

The Development Entity shall plan Work such that AMTRAK operations are not impacted and shall coordinate with AMTRAK to not interfere with operating hours. In the event impacts to AMTRAK's operations or facilities occur, the Development Entity shall coordinate with AMTRAK to provide a remedy as approved by AMTRAK.

Development Entity personnel shall be required to attend AMTRAK's Safety and Security Awareness Training prior to entering upon AMTRAK property.

15.6 Administrative Requirements

The Development Entity shall make submittals directly to the Railroad when the Development Entity is required to obtain an action (e.g., review, Comment, approval) from the Railroad. The Development Entity shall concurrently submit a duplicate submittal, notice, application or other communication or correspondence relating to the Project to the Department.

15.6.1 Public Utilities Commission Coordination

The Development Entity shall, as part of the Work, coordinate with the Department to establish and confirm the applicability of the Public Utility Commission (PUC) process with respect to each Bridge.

The Development Entity shall support the Department with respect to the Public Utility Commission (PUC) process in accordance with *Department Pub 371, Grade Crossing Manual*, 23 C.F.R. Part 646, and 49 C.F.R. Parts 222 and 229 including, at a minimum, the PUC order and subsequent PUC activities.

Where coordination with the PUC is required, the Development Entity shall gather the required information and coordinate with the Department in preparing the PUC application. Correspondence and coordination with the PUC shall be conducted through the Department. The Development Entity shall (without limitation) conduct the following activities relating to coordination with the PUC:

- prepare Final Plans indicating Railroad location and Work affecting Railroad;
- prepare construction staging and sequencing of the Work;
- coordinate the anticipated schedule for the Work;
- coordinate the anticipated temporary track outage requests;
- coordinate anticipated track protection methods;
- prepare the PUC application for submission by the Department;
- attend, with Department personnel, the PUC field conferences;
- coordinate on required submissions to the PUC and parties of record; and
- support the Department on the preparation of ROW appropriation documents with the PUC.

15.6.2 Project Work Affecting Railroad Operations

The Development Entity shall support the Department with respect to the PUC process and the development of Railroad Agreements in accordance with *Department Pub 371, Grade Crossing Manual*, 23 C.F.R. Part 646, and 49 C.F.R. Parts 222 and 229. The Development Entity shall, as part of the Work, adhere to the PUC Order and Railroad Agreements.

15.6.3 Railroad Agreements

The Development Entity shall coordinate with the Department to provide information for the Department to enter into an agreement with an affected Railroad.

Required information, at a minimum, shall include:

- Final Plans indicating Railroad location and Work affecting Railroad;
- construction staging and sequencing of the Work;
- anticipated schedule for the Work;
- anticipated temporary track outage requests; and
- anticipated track protection methods.

15.6.4 Railroad Property Acquisitions

Any necessary acquisition of Railroad ROW shall be conducted in accordance with the ROW acquisition requirements and procedures set forth in *Section 8, Right of Way* of these Technical Provisions and *Department Pub 371, Grade Crossing Manual* and *Department Pub 378, Right of Way Manual*.

15.6.5 Railroad Right-of-Entry Permit

Independent of potential acquisition of Railroad Property, the Development Entity shall obtain a Railroad right-of-entry permit for entry onto a Railroad Property. Development Entity shall secure a Railroad right-of-entry permit and shall coordinate the arrangements of the necessary permits and insurance directly with the Railroad at least 60 Days in advance. Development Entity shall coordinate with affected Railroads to obtain access to their ROW.

Development Entity shall procure and maintain, prior to working adjacent to, working over, or working within Railroad Property, Insurance Policies necessary to comply with each of PA Exhibit 14 (Insurance Requirements), *Department Pub 408, Highway Construction Specifications*, and 23 C.F.R. Part 646.

Development Entity obtained Insurance Policies shall be in a form acceptable to the Railroad. Copies of all such Insurance Policies shall be submitted to the Department prior to any entry by Development Entity upon Railroad property.

15.7 Construction Requirements

In addition to, and in no way in limitation of, any construction requirements set forth in the Railroad manuals and the Railroad Agreement(s), the Development Entity shall perform the Work in compliance with *Section 15.7.1* through *Section 15.7.3* of these Technical Provisions.

15.7.1 Flagging

The Development Entity shall request Railroad flaggers from the Railroads when needed at least 60 days in advance of the need for flaggers. The Development Entity shall cooperate and coordinate with Railroad flagging requirements when Work within the Railroad ROW and activities involving persons, equipment, tools, materials, or vehicles are within 25 feet of tracks, or other threshold as set by the pertinent Railroad.

15.7.2 Safety Certification

The Development Entity shall comply with the Railroad's requirements for contractor safety training and the providing of appropriate insurance documentation prior to performing Work or other activities within the Railroad's ROW and shall maintain current registration prior to working on Railroad Property.

15.7.3 Railway Highway Provisions

The Development Entity shall perform the Work in accordance with the approved plans and additional regulations stipulated in the PUC order when Work is indicated to be performed within, or adjacent to, the right of way or trackage belonging to, or upon which a common carrier operates. If it is necessary to use grade crossings other than public grade crossings, the Development Entity shall make arrangements with the applicable Railroad for the use of or development of additional grade crossings.

15.8 Bridge Inspection and Maintenance

The Development Entity shall coordinate directly with any impacted Railroad when scheduling required Bridge inspections, Maintenance, and Rehabilitation Work Coordination in this regard includes, without limitation, preparing agreements, executing rights-of-entry, and acquiring Railroad protective flagging.

15.9 Section 15, Railroad Coordination Submittal Requirements

Whenever a Submittal identified in the following Table 15-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 15-1 information. The Department will conduct reviews and provide Department Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 15-1 and Project Agreement Section 6.3.

Table 15-1. Section 15, Railroad Coordination Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Public Utility Commission (PUC) Application	2	10	Design Work commencement for Submittal related Work	—	—
2	Railroad Right-of-Entry Permit	1	10	Construction Work commencement for Submittal related Work	—	—

16 Context Sensitive Design, Aesthetics, and Landscaping

16.1 General Requirements

This section defines requirements with which the Development Entity shall design and construct aesthetic treatments for the roadway, structures, drainage, and landscaping where applicable. Aesthetic treatments shall be designed to be context-sensitive with the local setting and to harmonize with the local landscape and architecture.

16.2 Project Standards

Project Standards applicable to the Work are included in *Attachment 1, Project Standards* of these Technical Provisions.

16.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions. The Development Entity shall develop a plan for aesthetic refinements that is consistent with the aesthetics of the NEPA Basic Configuration. Aesthetics consistent with the NEPA Basic Configuration is the minimum requirement for each Bridge in the first Package Proposal.

16.4 [Reserved]

16.5 Aesthetics Design Requirements

16.5.1 Aesthetic Guidelines and Requirements

The Development Entity's Context Sensitive Design (CSD), aesthetics, and landscaping shall:

- not interfere with safety, constructability, and maintenance requirements;
- minimize impacts on the existing natural environment to the extent possible;
- be responsive to the context and in proportion to the visual and experiential impact the structure has on the bicyclist/pedestrian population using and viewing the Bridge;
- be detailed and responsive to the context so as to achieve the greatest level of aesthetic fit, and achieve continuity along the length of the Bridge;
- be responsive to the viewed context on the condition that the feature being crossed is a part of a scenic byway, historic district, historic landscape, park, trail, water trail, or a multi-use facility, containing one or more of the following:
 - Historical monuments;
 - parking areas;
 - bikeways;
 - pedestrian paths; and/or
 - other shared-use facilities on the Highway Right of Way (ROW).
- utilize appropriate color, texture, and form for structures;

16. Context Sensitive Design, Aesthetics, and Landscaping

- preserve existing trees and natural features to the greatest extent possible as required by *Section 16.6, Landscaping Design Requirements* and *Section 16.6.1, Existing Vegetation* of these Technical Provisions;
- ensure the visual quality of replaced or augmented landscaping is consistent across the extent of the local region where the Bridge will be located per *Section 16.6, Landscaping Design Requirements* of these Technical Provisions;
- use indigenous native and/or naturalized plant materials per *Section 16.6, Landscaping Design Requirements* of these Technical Provisions;
- implement aesthetics that are low maintenance and require little care or maintenance;
- implement graphics, signage, and lighting that is consistent along the entire length of the Project; and
- integrate aesthetics with the overall structure and adjacent landscape design.

Where the Bridge will be contributing to a historic district, the Development Entity shall present aesthetic options to agencies having authority for historic review as the first option for discussion and consultation on how to resolve potential adverse effects to the historic district.

16.5.2 Asset Databases (Landscape Inventory)

The Development Entity shall inventory the Project Limits for assessment of existing enhanced features or existing landscaping to be retained and incorporated into the Work. The Development Entity shall submit an Asset Databases (Landscape Inventory) to the Department for review and acceptance.

16.5.3 Process and Recommendations of AASHTO's *Bridge Aesthetics Sourcebook: Practical Ideas for Short- and Medium-Span Bridges*

The AASHTO *Bridge Aesthetics Sourcebook: Practical Ideas for Short- and Medium-Span Bridges* should be referenced as guidance for understanding the process and recommendations for developing Bridge aesthetics that are responsive to CSD.

The Development Entity should develop the detailed design by evaluating the ten determinants of appearance in the order of importance outlined in the AASHTO *Bridge Aesthetics Sourcebook: Practical Ideas for Short- and Medium-Span Bridges*. Reference Table 16-1.

16. Context Sensitive Design, Aesthetics, and Landscaping**Table 16-1. The 10 Determinants of Appearance**

1	Horizontal and Vertical Geometry	The design should be governed by the nature of the Bridge and have limited flexibility in treatment
2	Superstructure Type	
3	Pier/Support Placement and Span Arrangements	
4	Abutment Placement and Height	
5	Superstructure Shape	The design should be responsive to the remaining six determinants which have significant impacts to the appearance of the finished Bridge
6	Pier Shape	
7	Abutment Shape	
8	Color	
9	Texture, Ornamentation and Details	
10	Lighting, Signing and Landscaping	

The Development Entity should select, incorporate, and document the following fundamentals and processes as outlined in the *AASHTO Bridge Aesthetics Sourcebook: Practical Ideas for Short- and Medium-Span Bridges*:

- Visual Characteristics;
- Visual Qualities;
- Context Sensitive Design;
- Community and Stakeholder Involvement;
- Approach to Historic Bridges or Historic Settings;
- Collaboration with Design Disciplines; and
- Bridge Aesthetics and Cost

16.5.4 Alternate Aesthetic Concepts

The Development Entity shall submit to the Department alternate recommendations for developing Bridge aesthetics for review and acceptance as outlined in *Section 16.5.3, Process and Recommendations of AASHTO's Bridge Aesthetics Sourcebook: Practical Ideas for Short- and Medium-Span Bridges* of these Technical Provisions. This shall consist of a design intention/vision list and graphic representations of conceptual renderings for each Bridge.

16.5.5 Aesthetics and Landscaping Design Documents

The Development Entity shall submit Preliminary, Final, and RFC Design Documents for Aesthetics and Landscaping Design to the Department for review and acceptance. Aesthetics and Landscaping Design consistent with the NEPA Basic Configuration is the minimum requirement for each Bridge in the first Package Proposal. Finishes, textures, colors, features, hardscapes, softscapes, fencing, and signs shall be included in this submittal, or submittals.

The Development Entity shall submit panel samples of the various patterns and surface treatments for review and acceptance by the Department with Final Design Documents as part of the Aesthetics and Landscaping Design as part of *Section 16.8, Section 16, Context Sensitive Design, Aesthetics, and*

16. Context Sensitive Design, Aesthetics, and Landscaping

Landscaping Submittal Requirements of these Technical Provisions. The Development Entity shall prepare full size, physical mock-ups with the planned treatments for Department review and acceptance.

16.5.6 Colors

The Development Entity shall submit to the Department a Color Palette Plan that indicates where each color is to be applied at Preliminary Design, Final Design and RFC Documents as part of the Aesthetics and Landscaping Design Documents. This plan shall be diagrammatic in nature but shall list each item and its color(s). In addition to integrated colors, painting, and staining, the Development Entity may use colored lighting in selected areas to add color. There shall be no more than two to three colors per Bridge.

16.5.7 Bridges

The Development Entity shall ensure bridges shall be consistent in form and texture, with similar shapes and details used for the appropriate classification for the Project in accordance with the designated level of treatment. Development Entity shall minimize or eliminate exposed conduits or drainpipes on visible surfaces.

16.5.8 Abutment and Wing Walls

The Development Entity shall submit to the Department for review and acceptance abutment and wingwall aesthetic patterns appropriate for the treatment level and the setting of each Bridge at Preliminary Design, Final Design and RFC Documents as part of the Aesthetics and Landscaping Design Documents. Application of an aesthetic pattern shall be conditional on the presence of vehicle and bicyclist/pedestrian observers on the feature being crossed.

16.5.9 Retaining Walls and Fencing

The Development Entity shall submit to the Department for review and acceptance retaining walls aesthetic treatments consistent with other physical features including, at a minimum, structures, landscaping, and other Highway components within the Bridge limits or as identified in the Environmental Approvals at Preliminary Design, Final Design and RFC Documents as part of the Aesthetics and Landscaping Design Documents. Where applicable, Development Entity shall design pedestrian safety fencing to blend in with the surrounding aesthetic context through careful use of material, surface, pattern, finish, and color. The Development Entity shall provide protective fencing on bridges as required by the Bridge Fencing Safety Act and *Department Pub 15M: Design Manual Part 4, Structures*.

16.5.10 Noise Barriers

The Development Entity shall design noise barriers to be similar in color, texture, style, and aesthetic treatment to retaining walls. The Development Entity shall apply aesthetic treatments to the vertical surfaces of retaining and noise barriers where the surface will be visible from the roadway or adjacent residential dwelling units. Consistent treatments shall be used for retaining and noise/sound walls and exposed concrete column sign support structures that articulate the design themes established.

The Development Entity shall clearly detail and identify how patterns shall be incorporated into the chosen design solution in the structural Submittals. The roadside face of noise barriers shall have a consistent appearance throughout their length. The noise barrier color and texture facing the roadway shall be accepted by the Department to match the other noise barriers along the corridor. The outward facing noise barrier

16. Context Sensitive Design, Aesthetics, and Landscaping

color and texture shall be consistent with the aesthetic characteristics agreed upon through outreach and information as described in *Section 4, Public Information and Communication* of these Technical Provisions.

16.5.11 Traffic Barriers

The Development Entity shall submit to the Department at least one context-sensitive aesthetic pattern scheme for traffic barriers. Barriers that rely on imitation stone for the pattern are not allowed. A simulated stone is acceptable for locations adjacent to or within a historic district and shall complement existing stone and patterns used in neighboring structural Elements.

16.5.12 Lighting

The Development Entity shall submit to the Department lighting in compliance with *Section 18, Signing, Pavement Markings, Traffic Signals, and Lighting* of these Technical Provisions.

16.6 Landscaping Design Requirements

Development Entity shall submit Aesthetics and Landscaping Design Documents to the Department for review and acceptance at Preliminary Design, Final Design and RFC Documents. The Development Entity's Aesthetics and Landscaping Design Documents shall include:

- a plan that indicates plant palettes, plant size and locations, plant specifications, planting specifications and staking details, soil preparation plan, and planting dates;
- a landscape establishment program;
- a maintenance program to be submitted to the Department for acceptance; and
- composite drawings of Utilities, easements, and other appurtenances that would interfere or hinder landscaping, markers, and/or other identified enhancements.

The Aesthetics and Landscaping Design Documents shall include plans, elevations, perspectives, isometrics, and details as needed to fully convey the aesthetic treatment. Soil preparation plans, landscape staking, mulching, and other aspects of plant installation and maintenance of the Bridge shall comply with *Department Pub 408, Highway Construction Specifications* and Chapter 22 (Landscape Planting) of *Department Pub 13M: Design Manual Part 2, Highway Design*.

The Aesthetics and Landscaping Design Documents shall serve as the primary standard guidance necessary to produce the intended aesthetic form, function, and appearance of the Bridge.

Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of the Aesthetics and Landscaping Plan shall be required prior to construction of items affected by the Bridge.

All planting activities and materials shall be located in a manner that does not interfere with the safe use of travel ways. Plantings shall be designed and constructed in a manner that provides a mix of plant material species to create seasonal interest for the traveling public.

16. Context Sensitive Design, Aesthetics, and Landscaping

Existing trees shall be removed within the grading limits except for specimen trees and champion trees, which are to be identified by the Development Entity and agreed upon by the Department. Tree replacement and mitigation shall follow the requirements of *Section 16.6, Landscaping Design Requirements* through *Section 16.6.3, Wetland Mitigation Areas and Mitigation Site Planting Plans* of these Technical Provisions.

Plantings shall be maintained by watering, mulching, fertilizing, inspecting, and treating with Integrated Pest Management (IPM) methods for pests and diseases for a 100 percent survivability at the end of the one-year minimum establishment period.

Existing trees within the Project Limits posing a hazard to the public through decline or damage, as determined by a certified arborist, shall be removed. The Development Entity shall remove portions of those trees that are hazardous using methods preventing damage or injury to the facility, property, and nearby vegetation.

The Development Entity shall implement measures to prevent the transport and spread and support the eradication of noxious weeds, invasive plant species, and invasive insect species. The Development Entity shall prevent and eradicate noxious weeds, invasive plant species, and invasive insect species found within the Bridge limits, and shall not propagate, import, transfer, sell, purchase, transport, or introduce Rank One (1) Invasive Plants nor supply Rank Two (2) Invasive Plants for use in the Work. The Development Entity shall not use invasive plant species included on the *Pennsylvania Department of Conservation & Natural Resources (DCNR) Invasive Plant Fact Sheets*, or a monoculture of plant species, to reduce the potential for disease or invasive insect species to eradicate the proposed planting.

16.6.1 Existing Vegetation

The Development Entity shall minimize existing vegetation removal and disturbance within the Project Limits, notwithstanding other relevant information provided within this *Section 16*. Removal of existing vegetation, whether within the cut/fill limits or beyond those areas, shall be replaced in kind with native species appropriate for the *USDA Plant Hardiness Planting Zone* of the Bridge.

Vegetation outside the Limits of Disturbance (LOD) shall be protected with temporary plastic barrier fence along the LOD.

Disturbed areas shall receive topsoil and turf establishment. The type of topsoil and turf establishment, either roadside or lawn, shall comply with Project Standards and may vary based on location.

16.6.2 Replacement Locations

The Development Entity shall submit to the Department replacement plantings at locations within the Project Limits near the original locations of the trees that were removed, to the maximum extent possible.

Replacement planting may be provided on private property on condition that private property owners provide written permission to the Development Entity and agree to take over the long-term care and maintenance of the plant material. The Development Entity shall obtain appropriate releases from the private property owners.

16. Context Sensitive Design, Aesthetics, and Landscaping**16.6.3 Wetland Mitigation Areas and Mitigation Site Planting Plans**

The Development Entity shall ensure wetland mitigation areas and mitigation site planting plans comply with the Pennsylvania DEP Chapter 105 and USACE Section 404 Permit documents.

16.7 Construction Requirements

The Development Entity shall comply with construction requirements as follows:

- Landscape limit of disturbance shall be established to limit access to the area needed to perform the Work. Unless otherwise indicated, Work shall not occur outside of the Project Limits, except when a Landscape limit of disturbance has been established for temporary impacts involving the installation of individual trees or shrubs, wetland buffer enhancements, ROW fence repair, maintenance activities, and control of noxious and invasive weeds in compliance with local and statewide noxious weed and invasive plant species regulations meeting a one Day stabilization requirement for earthwork. These activities shall not result in Bridge Site grading or create new environmental impacts. Specimen or champion trees as defined by the governing municipality for areas outside of the Project Limits shall not be disturbed or removed without the local jurisdiction's acceptance. Impacts to greater than 30 percent of the critical root zone (as defined by the International Society of Arboriculture as of the Technical Setting Date) of an individual tree beyond the Project Limits shall require mitigation;
- The Development Entity shall submit a Landscape Maintenance Plan to the Department for review and acceptance which shall address plant establishment; and
- The Development Entity shall submit Record Drawing Landscape Plans to the Department for review and acceptance.

16.8 Section 16, Context Sensitive Design, Aesthetic and Landscaping Submittal Requirements

Whenever a Submittal identified in the following Table 16-2, becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described within *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates information from Table 16-2. The Department will conduct reviews and provide Department Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 16-2 and Project Agreement Section 6.3.

Table 16-2. Section 16, Context Sensitive Design, Aesthetics and Landscaping Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Landscape Maintenance Plan	2	15	Each Bridge Completion	—	—
2	Record Drawing Landscape Plans	2	15	Each Bridge Completion	—	—

16. Context Sensitive Design, Aesthetics, and Landscaping

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
PRELIMINARY DESIGN DOCUMENTS						
3	Asset Databases (Landscape Inventory)	1	15	Design Work commencement for Submittal related Work	—	—
4	Alternate Aesthetic Concepts	2	15	Design Work commencement for Submittal related Work	—	—
5	Preliminary Aesthetics and Landscaping Design Documents	2	15	Construction Work commencement for Submittal related Work	—	—
FINAL DESIGN DOCUMENTS						
6	Final Aesthetics and Landscaping Design Documents	2	15	Construction Work commencement for Submittal related Work	—	—
7	Panel samples	2	10	Construction Work commencement for Submittal related Work	—	—
RELEASED FOR CONSTRUCTION DESIGN DOCUMENTS						
8	RFC Aesthetics and Landscaping Design Documents	3	10	Construction Work commencement for Submittal related Work	—	—

17 Traffic Analysis

17.1 General Requirements

The Development Entity shall perform traffic analyses to complete the planning and design of new, reconstructed, rehabilitated, and temporary roadways and bridges meeting the requirements of the Project. This section does not apply to the following bridge projects:

- Canoe Creek
- Nescopeck
- North Fork
- Lehigh
- Lenhartsville
- Susquehanna

This Section 17 is intended to provide directions to the Development Entity to conduct traffic engineering analyses when, and as needed, during the D&C Period and Maintenance Period.

17.2 Project Standards

Project Standards applicable to the Work are included in *Attachment 1, Project Standards, Table A1-1* of these Technical Provisions.

17.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

17.4 Operational Assessment of the Work

The Development Entity shall prepare and submit, subject to review and acceptance by the Department, a complete traffic operational analysis, summarized in an engineering and traffic study, needed to support the Work, including Environmental Summary/NEPA re-evaluation, Interstate Point of Access (POA) approval, or other required documentation needed for the Department or Governmental Approvals. This traffic operational analysis, including model files, studies, and reports, shall be coordinated with the Department, and submitted during Preliminary Design to the Department once the need for the modifications is identified and evaluated. Additional traffic operational analyses may be required to support the Design Work and Construction Work as the Work progresses.

The traffic operational analysis completed for the Work shall include both the AM and PM peak periods, at a minimum utilizing existing and projected future volumes (utilizing accepted Department growth factors). The analysis methods described below may be required in the preparation of reports, studies, or analyses. When coordinating the methodology, additional traffic analysis operational periods may need to be identified to address day of week, seasonal, or major event impacts.

17.5 Design and Analysis Software

The Development Entity shall utilize software outlined in *Attachment 1, Project Standards* of these Technical Provisions (currently in Chapter 12 (Traffic Engineering Software) of *Department Pub 46, Traffic Engineering Manual*) and verify with the Department the software version and outputs required for

each operational analysis to be conducted and perform the analysis based for the Related Transportation Facility(ies).

17.5.1 Traffic Operational Analysis

17.5.1.1 Mainlines, Ramps, and Weaving

The Development Entity shall submit a Traffic Operational Analysis to the Department utilizing methodologies outlined in the *Highway Capacity Manual* (6th Edition or newer), for the mainlines, ramp junctions (merge and diverge locations), and weaving sections.

17.5.1.2 Arterials and Signalized Intersections

The Development Entity shall utilize software outlined in *Attachment 1, Project Standards* of these Technical Provisions (Chapter 12 (Traffic Engineering Software) of *Department Pub 46, Traffic Engineering Manual*, which currently specifies Synchro/SimTraffic from Trafficware) to evaluate operations for unsignalized (including stop-controlled) and signalized intersections along arterials. Signal timing Plans shall consider corridor-wide cycle lengths and appropriate offsets.

17.5.1.3 Freeways

The Development Entity shall utilize software outlined in *Attachment 1, Project Standards* of these Technical Provisions (Chapter 12 (Traffic Engineering Software) of *Department Pub 46, Traffic Engineering Manual*, which currently specifies the FREEVAL-PA tool) to analyze traffic for freeway operations.

All results, including all output files, shall be submitted to the Department for evaluation.

17.5.1.4 Queueing Analysis

The Development Entity shall identify projected queue lengths to determine the appropriate length of turn lanes, auxiliary lanes, merge, diverge, and weaving segments, and other operational components. This shall include both the through lane(s) and turn lane(s) where applicable. For auxiliary lane queueing analysis, the Development Entity shall utilize methodology outlined in *Attachment 1, Project Standards* of these Technical Provisions (Chapter 11 (Traffic Studies) of *Department Pub 46, Traffic Engineering Manual*).

The Development Entity shall demonstrate that ramp queues will not extend from the ramp terminus to the Mainline or side road queues will not extend to adjacent intersections, and the Development Entity shall demonstrate that the sight distance will be adequate for vehicles exiting and entering the Mainline at prevailing speeds to see the back of the queue and decelerate to a stop.

The queueing analysis shall be supplemented with simulation analysis. The Development Entity shall coordinate the approval of the queue analysis method with the Department.

17.5.2 Signal Warrant Analysis

The Development Entity shall perform and submit to the Department a signal warrant analyses to determine if signalization is appropriate at the new traffic signal locations, based on the Department's guidelines and standards outlined in *Attachment 1, Project Standards* of these Technical Provisions (Department TE-150 form). Study findings shall be submitted to the Department in a report outlining the warrants evaluated.

Consideration shall be given to traffic and pedestrian volumes, safety, operations, delay, and available gaps in traffic resulting from adjacent signalized intersection(s). Recommendations shall also be included in the report and provided to the Department to support the summary of results.

17.5.3 [Reserved]

17.5.4 Safety Analysis

The Development Entity shall perform, summarize, and submit to the Department a safety analyses for the build year, five-year, and 20 year design horizon utilizing the Pennsylvania Crash Information Tool (<https://crashinfo.penndot.gov/PCIT/welcome.html>) along with the Pennsylvania Highway Safety Manual (HSM). Pennsylvania specific Tools & Data from the Department's safety website should be referenced (<https://www.penndot.gov/TravelInPA/Safety/Pages/Safety-Infrastructure-Improvement-Programs.aspx>) along with OneMap (<https://gis.penndot.gov/onemap/>) and PennShare (<https://pennshare.maps.arcgis.com/home/index.html>).

17.6 Section 17, Traffic Analysis Submittal Requirements

Whenever a Submittal identified in the following Table 17-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 17-1 information. The Department will conduct reviews and provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 17-1.

Table 17-1. Section 17, Traffic Analysis Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Traffic Operational Analysis	2	15	Design Work commencement for Submittal related Work	—	—
2	Signal Warrant Analysis	2	15	Design Work commencement for Submittal related Work	—	—
3	Safety Analysis	2	15	Design Work commencement for Submittal related Work	—	—

18 Signing, Pavement Markings, Traffic Signals, and Lighting

18.1 General Requirements

The Development Entity shall design, construct, and maintain traffic control devices, including signing, delineation, pavement markings, signalization, and lighting for the Project.

18.2 Project Standards

Project Standards applicable to the Work are included in Table A1-1 of *Attachment 1, Project Standards*, of these Technical Provisions.

18.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

18.4 [Reserved]

18.5 [Reserved]

18.6 Design and Analysis Software

The Development Entity shall prepare plans in accordance with *Department Pub 14M: Design Manual Part 3, Plans Presentation*. The Development Entity shall use current clearance calculation spreadsheets within the Department's Traffic Signal Portal website (<https://www.dot.state.pa.us/public/Bureaus/BOMO/Portal/TSPortal/WB.html>), along with lighting calculation software that complies with the photometric calculation and design requirements as detailed in accordance with the Contract Documents. The Development Entity shall prepare plans at a minimum scale of 1 inch = 25 feet or larger if required to clearly show the design intent. The Released for Construction Design Documents shall include PDF and electronic CADD Data. The Development Entity shall submit CADD Data per Appendix B of *Department Pub 14M: Design Manual Part 3, Plans Presentation*.

18.7 Existing Inventory

The Development Entity shall, prior to the commencement of Construction Work, document and record the location and condition of signs, pavement markings, signals, fiber interconnect, lighting, etc. within the Project Limits in accordance with *Section 22.9.4, Baseline Inspections* of these Technical Provisions. For all signs within the Project Limits, the Development Entity shall:

- summarize in spreadsheet format the sign location coordinates (latitude and longitude) and convert to Segments/Offsets (<https://gis.penndot.gov/sol/latlong>);
- provide and summarize measurements of each sign size (length x width);
- record video for documentation of sign locations (optional);
- take photographs of each sign (front, back, and foundation);
- summarize all the above in a submission to the Department to include write-up, inventory spreadsheet, and plan development.

18. Signing, Pavement Markings, Traffic Signals, and Lighting

For pavement markings, traffic signals, fiber interconnect, and lighting, the Development Entity shall summarize in the development of plans.

18.8 Design Requirements

The Development Entity shall design the signing, pavement marking, traffic signals, and lighting design in accordance with the publications listed in accordance with the Contract Documents. Design, placement operation, maintenance, and uniformity shall be considered to ensure road users can easily recognize and understand devices and safely respond to the information provided.

18.8.1 Signing

The Development Entity shall prepare and submit a signing plan for acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) by the Department for all regulatory, warning, and guide signs.

Replace all signs within the Project Limits with new signs. Existing signs no longer applicable shall be removed. New signs that were not existing shall be provided. In no case shall any existing sign be relocated unless temporarily. At the conclusion of the project and before handback, inventory all signs in the finished location, provide the specified information as stated in Section 22.9.4, including integrating the data collected into a geographic information system (GIS) format to the Department.

The Development Entity shall review all existing sign structures (overhead, cantilever, and Type A) to verify foundation and structure loading meet the criteria per *Section 14.9, Sign Structures* of these Technical Provisions, unless they are proposed to be replaced.

18.8.2 Project Signing Outside of the Project Right of Way

Development Entity shall install the signs within the ROW controlled by other Governmental Entities. The Development Entity shall coordinate with appropriate Governmental Entities for the design and installation of such signs.

18.8.3 Third Party Signing

The Development Entity shall coordinate and cooperate with a third party installing signage in the ROW. The Department may solicit input from the Development Entity in reviewing applications for new third party signs but will retain sole authority for approving these signs. Costs associated with fabricating and installing these signs shall be borne by the sign applicant.

18.8.4 Pavement Marking

The Development Entity shall provide a Pavement Markings Plan to the Department for review and acceptance. The Development Entity shall design pavement markings to comply with applicable standards and requirements in accordance with the Contract Documents.

The Department will be responsible for the maintenance of all pavement markings except the pavement markings on decks of bridges and 100 feet of approach pavement on each side of the bridge in the Maintenance Limits (see *Section 22, Maintenance* of these Technical Provisions). The Development Entity is responsible for all pavement markings and delineation in the Project Limits during the Construction Period.

18. Signing, Pavement Markings, Traffic Signals, and Lighting

The Development Entity shall replace pavement markings when they no longer meet the minimum retroreflectivity requirements. The minimum retroreflectivity values after one year for waterborne and three years for durables are as follows:

- for waterborne markings, the values are 150 mcd/m²/lux for white and 100 mcd/m²/lux for yellow; and
- for durable markings, the values are 100 mcd/m²/lux for white and 85 mcd/m²/lux for yellow.

Pavement markings and delineation devices for the Work shall be designed to provide a complete and functional system meeting the following:

- eradication of all pavement markings, permanent or temporary, where no longer applicable or required, such that they do not conflict with current pavement markings;
- modification of pavement surface(s) impacted by the removal of existing pavement marking by milling and overlay; and
- installation of pavement markings and markers in accordance with the Department's performance expectations and specifications. Once in construction, the Department's materials standards will apply.

The pavement marking system shall utilize long life paint in accordance with the Contract Documents.

For Interstate shoulders wider than 14 feet, the Development Entity shall provide in the signing and pavement marking plans striping solutions to prevent traffic from using such shoulders as active lanes.

18.8.5 [Reserved]**18.8.6 Traffic Signals, Interconnect, and Pre-Emption**

The Development Entity shall coordinate with the Department to assure that the traffic signal(s) are integrated with the unified command and control platform, where needed, in accordance with the *Department Traffic Signal Unified Command and Control Integration Guidelines* (April 8, 2020) in compliance with all Commonwealth IT Policies (<https://www.oa.pa.gov/Policies/Pages/itp.aspx>).

The Development Entity shall provide modifications to an existing traffic signal based on recommendations from traffic analyses and studies performed in *Section 17, Traffic Analysis* and revise the traffic signal permit accordingly and obtain the required Department and the appropriate Governmental Entities' approvals. All traffic signal equipment shall be in accordance with the Contract Documents and specifically *Department Pub 148, Traffic Standards, Signals TC-8800 Series*.

The Development Entity shall provide vehicular and pedestrian clearance timings at all impacted traffic signals per the Department's clearance calculation spreadsheets in accordance with the Contract Documents and specifically <https://www.dot.state.pa.us/public/Bureaus/BOMO/Portal/TSPortal/WB.html>.

Traffic signal designs and modifications to existing traffic signals shall be in accordance with Department standards and specifications, the MUTCD and accepted by the Department and the appropriate Governmental Entity.

18.8.7 Lighting

The Development Entity shall develop and submit lighting plans to the Department for acceptance, per Department standards and publications and in accordance with the Contract Documents at locations with existing lighting, at locations where the existing lighting is affected due to construction, or at new locations meeting Department requirements for portions of the Work.

18.8.7.1 Highway and Bridge Lighting

The Development Entity shall provide lighting consistent with Chapter 5 (Lighting) of *Department Publication 13M: Design Manual Part 2, Highway Design* and any Bridge-Specific Requirements. Review and answers to technical questions are available from the Department's Bureau of Operations – Maintenance Technical Leadership Division.

Pedestrian level lighting shall be provided for sidewalks where it currently exists.

If lighting is damaged by construction activities, the Development Entity shall replace in kind with new materials. Lighting shall meet the Department standards at all times for all lanes of traffic.

Changes in lighting design must meet the requirements in accordance with the Contract Documents. The Development Entity shall submit lighting calculations with the lighting plans showing the proposed lighting plan meets the illumination criteria.

Modifications to an existing lighting system must complete the required system tests outlined in accordance with the Contract Documents, for permanent lighting.

All third party requests for lighting within the Work shall be subject to Department approval. If approved and executed by the Department and the third party, the Development Entity shall provide the lighting as indicated in *Section 2.4, Coordination with Governmental Entities and Third Parties* of these Technical Provisions. The Development Entity shall address Department approved third party requests for lighting through a Change Request.

Luminaire poles and breakaway bases shall be designed in accordance with the Contract Documents.

The Development Entity shall not place Intelligent Transportation System (ITS) cable, fiber-optic lines, signal conductors, or other non-lighting related cables or conductors in the lighting conduits, ground boxes, or junction boxes.

The Development Entity shall place all understructure lighting in a location minimizing the need for lane closures during future maintenance.

18.8.7.2 Additional Lighting Requirements

The Development Entity shall provide lighting consistent with the following:

18. Signing, Pavement Markings, Traffic Signals, and Lighting

- For all changes to aviation lighting, the Development Entity shall coordinate directly with the Federal Aviation Administration (FAA), provide Aviation lighting design that is approved by the FAA and meets the FAA standards. The Development Entity shall provide all applications / drawings to the FAA in order to meet the FAA approval. The Development Entity shall provide Preliminary, Final, and PS&E plan submissions for Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3). For each of the three submittals, include a narrative describing the status with the FAA and a copy of review Comments / emails from the FAA;
- For all changes to navigation, the Development Entity shall coordinate directly with the United States Coast Guard (USCG), provide navigation lighting design that is approved by the USCG and meets the USCG standards. The Development Entity shall provide all applications / drawings to the USCG in order to meet the USCG approval. The Development Entity shall provide Preliminary, Final, and PS&E plan submissions for Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3). For each of the three submittals, include a narrative describing the status with the USCG and a copy of review Comments / emails from the USCG;
- At a minimum, underground conduit shall not be less than 2 inches (inside diameter) Schedule 40 Polyvinyl Chloride (PVC);
- The minimum conductor size shall be #8 American Wire Gauge (AWG) copper for all circuits. The Development Entity shall not use duct cable for illumination purposes;
- Electrical components shall be designed and installed in conformance with the National Electrical Code; and
- The Development Entity shall coordinate with the Utility Owner providing power on the availability of service within the proximity of the proposed Work location.

18.9 Construction Requirements

The Development Entity shall minimize impacts to existing Department devices, equipment, and materials.

18.9.1 Signing

The Development Entity shall use established industry and Utility safety practices to erect and remove signs located near overhead or underground utilities and shall consult with the appropriate Utility Owner prior to beginning such Work.

With the Department's concurrence, and consistent with the Project plans, the Development Entity shall remove all signing no longer warranted and justified and return it to the nearest Department maintenance facility or another location approved by the Department.

The Development Entity shall relocate as needed or leave all applicable guide signs and/or exit direction signs in place at all times during construction and shall not obstruct the view of the signs to the motorist. All existing, relocated, and proposed sign foundations, supports, and posts shall not be placed in drainage ditches.

18. Signing, Pavement Markings, Traffic Signals, and Lighting

The Development Entity shall submit sign fabrication sheets to the Department for acceptance before manufacturing.

The Development Entity shall procure signs in accordance with the Contract Documents and shall install signs as shown on the Pavement Marking and Signing Plan. Locate signs to avoid conflicts with other signs, vegetation, lighting, utilities, and structures.

The Development Entity shall inspect all regulatory, warning, and guide signs after installation is complete. Signs shall be installed to eliminate specular reflection and provide retroreflectivity in accordance with the Contract Documents. Inspect each new sign location to determine if clearing is required to provide for the required sight distance.

18.9.2 Pavement Marking

The Development Entity shall ensure that there are no conflicting pavement markings during construction phasing and when completing the final conditions Work.

The Development Entity shall coordinate with the Department to ensure the following utilization:

- black shadow lines with broken lane lines for concrete road surfaces;
- thermoplastic pavement markings within City of Philadelphia limits;
- epoxy pavement markings on bridge surfaces;
- highly reflective pavement markings (such as retroreflective tape or epoxy in a groove) for all interstate and freeways; and
- the use of raised pavement markers (RPMs) on expressways is not allowed as the Department is transitioning to recessed wet reflective pavement markings on the interstates for the skip lines in lieu of RPMs.

The Useful Life for all pavement markings shall be a minimum of one year for waterborne, three years for durable, and three to 5 years for recessed wet reflective pavement markings. As outlined in Section 18.8.4, The minimum retroreflectivity values after one year for waterborne markings are 150 mcd/m²/lux for white and 100 mcd/m²/lux for yellow and three years for durable markings are 100 mcd/m²/lux for white and 85 mcd/m²/lux for yellow.

Before modifying pavement marking, the Development Entity shall provide the Department and applicable Governmental Entity a complete pavement marking design for review and acceptance.

The Development Entity shall provide temporary pavement markings during construction, per *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions. If pavement markings are to be relocated during construction, temporary markings shall be provided. Conflicting pavement markings, either temporary or permanent, shall be removed. Permanent pavement markings shall be installed by the Development Entity upon completion of pavement construction.

18. Signing, Pavement Markings, Traffic Signals, and Lighting

18.9.3 Delineation

The Development Entity shall verify there are no conflicting delineators during construction phasing and when completing the final conditions Work.

Before modifying delineators, the Development Entity shall provide the Department a complete signing and pavement marking design for acceptance.

The Development Entity shall provide delineators as a condition of each Bridge Completion. The Development Entity shall provide delineators during construction. Permanent delineators shall be installed by the Development Entity upon completion of the Work.

The Development Entity shall install delineators, as necessary, along all roadways as well as on barriers, guiderail, and relevant roadside features.

18.9.4 Traffic Signals

The Development Entity shall coordinate with the Utility Owner and ensure necessary power service is maintained for traffic signal systems.

Before modifying a permanent traffic signal, the Development Entity shall provide the Department and applicable Governmental Entity a complete traffic signal design for acceptance.

18.9.5 Lighting

The Development Entity shall submit Shop Drawings showing the details of lighting support structures, mounting arms, and foundations. The Development Entity shall submit Shop Drawings showing the details of lighting, including luminaires and lamps and electrical service connection to a utility company service.

Prior to construction activities, the Development Entity shall perform an inventory of the existing lighting system to document which luminaires, including signs and roadway, are operating. All proposed luminaires shall be working upon completion of the Work. All existing luminaires to remain shall be in working order upon completion of the Work and are to be maintained throughout the duration of the construction. All existing lighting systems, when possible, shall be upgraded to Light-Emitting Diode (LED).

The Development Entity shall coordinate with the Utility Owner and ensure power service is maintained for lighting systems. Where the Work impacts existing lighting, the Development Entity shall maintain existing lighting, as temporary lighting during construction and restore or replace prior to each Bridge Completion. At all times, safe lighting conditions shall be maintained through the Project.

The Development Entity shall contact Utility Owners regarding their specific required working clearance requirements.

The Development Entity shall coordinate temporary Highway lighting requirements with the Department for nighttime construction and temporary crossovers.

18. Signing, Pavement Markings, Traffic Signals, and Lighting**18.10 Section 18, Signing, Pavement Markings, Traffic Signals, and Lighting Submittal Requirements**

Whenever a Submittal identified in the following Table 18-1 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 18-1 information. The Department will conduct reviews and provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 18-1.

Table 18-1. Section 18, Signing, Pavement Markings, Traffic Signals, and Lighting Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
PRELIMINARY DESIGN DOCUMENTS						
1	Preliminary Signing Plans	2	15	Construction Work commencement for Submittal related Work	—	—
2	Preliminary Pavement Marking Plans	2	15	Construction Work commencement for Submittal related Work	—	—
3	Preliminary Traffic Signal Plans	2	15	Construction Work commencement for Submittal related Work	—	—
4	Preliminary Lighting Analysis	2	15	Construction Work commencement for Submittal related Work	—	—
5	Preliminary Lighting Plans	2	15	Construction Work commencement for Submittal related Work	—	—
FINAL DESIGN DOCUMENTS						
6	Final Design Signing Plans	2	15	Construction Work commencement for Submittal related Work	—	—
7	Final Design Pavement Marking Plans	2	15	Construction Work commencement for Submittal related Work	—	—
8	Final Design Pedestrian Clearance Calculations	2	15	Construction Work commencement for Submittal related Work	—	—

18. Signing, Pavement Markings, Traffic Signals, and Lighting

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
9	Final Design Vehicular Clearance Calculations	2	15	Construction Work commencement for Submittal related Work	—	—
10	Final Traffic Signal Plans	2	15	Construction Work commencement for Submittal related Work	—	—
11	Final Lighting Analysis	2	15	Construction Work commencement for Submittal related Work	—	—
12	Final Lighting Plans	2	15	Construction Work commencement for Submittal related Work	—	—
RELEASED FOR CONSTRUCTION DESIGN DOCUMENTS						
13	PS&E Signing Plans	3	10	Construction Work commencement for Submittal related Work	—	—
14	PS&E Pavement Marking Plans	3	10	Construction Work commencement for Submittal related Work	—	—
15	PS&E Traffic Signal Plans	3	10	Construction Work commencement for Submittal related Work	—	—
16	PS&E Lighting Plans	3	10	Construction Work commencement for Submittal related Work	—	—

19 Intelligent Transportation System

19.1 General Requirements

The Development Entity's work requires planning, design, specification, construction, installation, commissioning, integrating, testing, training, and documentation of repaired or relocated Intelligent Transportation System (ITS) devices and systems as required by the Department. The Development Entity shall design and construct one 4-inch minimum diameter communications conduit (suitable to accommodate four 1.25-inch PVC inner ducts) and one 2-inch diameter power conduit for future ITS on all bridge within the Project Limits in accordance with *Section 14.3.9, Intelligent Transportation System Conduit* of these Technical Provisions and in accordance with the requirements in the Bridge-Specific Requirements Technical Provisions. The Department will maintain and operate ITS devices and systems constructed by the Development Entity. The Development Entity shall conduct Work necessary to meet these Technical Provisions and the performance requirements for Department ITS devices and systems.

The Development Entity shall maintain all existing ITS assets with the Project Limits during construction. Should a construction activity interfere with an ITS asset, the Development Entity shall design a temporary relocation of the asset, including providing power and communications. Coordinate with the Department as required for any relocation and interference of power and communications to the asset.

19.2 Project Standards

Project Standards applicable to the Work are included in *Attachment 1, Project Standards* of these Technical Provisions.

19.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

19.4 [Reserved]

19.5 [Reserved]

19.6 Design and Analysis Software

The Development Entity shall prepare plans in accordance with *Department Pub 14M: Design Manual Part 3, Plans Presentation*. The Development Entity shall prepare plans at a minimum scale of 1 inch = 25 feet or larger if required to clearly show the design intent. The Released for Construction Design Documents shall include PDF and electronic CADD Data. The Development Entity shall submit CADD Data per Appendix B of *Department Pub 14M: Design Manual Part 3, Plans Presentation*.

19.7 Intelligent Transportation System Principles and Strategies

The Development Entity shall follow the ITS principles and strategies established by the Department, including required ITS Design guidelines referenced in *Attachment 1, Project Standards* of these Technical Provisions.

19.8 Intelligent Transportation System Design Requirements

The Development Entity shall, as required by the Department, design and specify materials and equipment for the ITS system to meet or exceed the functional, operational, performance, and maintenance requirements in conformance with these Technical Provisions. The ITS design shall:

- install ITS components completely within the ROW;
- facilitate and accommodate Routine Maintenance by locating components where access to equipment will not require temporary traffic control significantly affecting traffic operations;
- provide safe maintenance access to ITS devices and cabinets by coordinating device locations with Department;
- avoid existing and proposed underground and overhead utilities;
- be located outside of drainage ditches and areas prone to water buildup;
- be located on a Bridge Site graded to provide safe access for maintenance including construction of retaining walls or other structures with space around the equipment or infrastructure for safe access; and
- provide access using stairs and handrails as necessary following Pennsylvania Occupational Safety and Health requirements, or the requirements of the Authority Having Jurisdiction (AHJ).

The Development Entity shall prepare and present ITS Plans with a scale appropriate for the Work being detailed. The Plans shall, at a minimum:

- provide existing and proposed geometry;
- provide existing and proposed utilities;
- provide existing and proposed ROW;
- provide existing and proposed landscape features;
- provide existing and proposed applicable drainage features;
- provide existing and proposed structures including bridges, retaining walls, small structures, major traffic control device structures;
- provide other existing or proposed Bridge Site features influencing, that could conflict with, or that need to be coordinated with the ITS;
- provide electrical and communication service connection locations, details, and provider coordination details;
- provide existing and proposed ITS equipment;
- provide details of removal and relocation of existing ITS equipment;
- provide conduit types, quantities, and installation method;
- provide cable types and quantities;
- provide enclosure (manholes/handholes/junction boxes) types and details;

- provide electrical grounding and bonding details;
- provide equipment cabinet details;
- provide equipment details;
- provide equipment installation and mounting details;
- provide electrical and communications single line diagrams and connectivity; and
- provide other details pertinent to the construction of the ITS.

19.8.1 Closed-Circuit Television

In the event that the Development Entity damages or is required to relocate a closed-circuit television (CCTV) device, the Development Entity shall design and construct a closed-circuit television system and furnish and install a dedicated CCTV system of camera(s) as follows:

- provide a design of a CCTV system in accordance with the requirements in the Bridge-Specific Requirements Technical Provisions. provide a CCTV system design that consists of cameras, poles, foundations, mounting hardware, electrical systems, communications systems, control systems, and other supporting equipment, infrastructure, hardware, software, or firmware necessary for the CCTV system. The Department will be responsible for the operations and maintenance of the Department's CCTV system;
- relocate existing Department CCTV cameras impacted by the Construction Work in accordance with the requirements in the Bridge-Specific Requirements Technical Provisions. Relocated cameras will have the same view or greater view than the existing field of view before relocation. The Development Entity shall perform a field of view study considering line and grade to demonstrate conformance with this requirement;
- if Construction Work roadway geometry, structures, or obstructions are introduced because of the Development Entity Work reducing the field of view of existing Department CCTV cameras, new Department CCTV sites will be furnished and installed by the Development Entity to restore the field of view to a level equal to or greater than the field of view prior to the Development Entity construction;
- camera poles and lowering systems installed for the Department will meet current Department requirements and be consistent with existing poles and lowering systems maintained by Department. The Department will issue final acceptance of the pole, lowering system, and associated equipment; and
- coordinate with the Department to determine mounting requirements and other parameters necessary for the design and construction of the CCTV support structures, ITS equipment cabinets, and other items as required. Only Department shall have control of Department cameras.

19.8.2 Dynamic Message Signs

In the event that the Development Entity damages or relocates a permanent dynamic message sign (DMS) device, the Development Entity shall design and construct a permanent DMS system and shall furnish and install a dedicated permanent DMS system. The Development Entity shall:

19. Intelligent Transportation System

- provide a DMS system design that consist of DMS, structures, foundations, mounting hardware, electrical systems, communications systems, control systems, and other supporting equipment, infrastructure, hardware, software, or firmware necessary for the DMS system;
- select the Department's DMS system equipment as required; however, use DMS system equipment and other equipment, hardware, software, or firmware necessary to provide the functionality, operation, and interfacing with the Department's systems if required by Department in the future;
- furnish and install the DMS and control cables and connectors for the DMS in accordance with the manufacturer's recommendations;
- relocate existing Department DMS affected by the Work and ensure the view of vehicular traffic to the DMS is equal to or better than the existing view in accordance with the Bridge-Specific Requirements Technical Provisions. Perform a DMS Field of View Study considering line and grade to demonstrate conformance with this requirement. If roadway geometry, structures, or obstructions are introduced as a result of the Development Entity construction reducing the view of vehicular traffic to the DMS or functionality of the DMS, the Development Entity shall furnish and install new Department DMS sites to restore the DMS view and functionality to a level equal to or greater than the DMS view and functionality prior to the Development Entity construction; and
- coordinate with the Department to determine mounting requirements and other parameters necessary for the design and construction of the DMS support structures, ITS equipment cabinets, and other items as required. The DMS controller and main incoming electrical and communications equipment shall be installed on the ground in the equipment cabinet, not over the roadway within the DMS assembly.

19.8.3 Intelligent Transportation System Equipment Cabinets

New ITS equipment cabinets shall meet the requirements of *Department Pub 647, Intelligent Transportation Systems Standard Drawings* and *Department Pub 408, Highway Construction Specifications*.

For repaired and relocated ITS Equipment Cabinets, the Development Entity shall determine ITS Equipment Cabinet design requirements including, but not limited to, base mount details, pole mount details, concrete technician pads, heating, ventilation, lighting, and other cabinet equipment, system, and operational requirements and include in requirements and/or requirements references in the ITS design plans.

The Development Entity shall design, furnish, and install base-mounted cabinets with foundations for new locations with integral front and rear concrete technician pads to provide level and dry surfaces for a maintenance technician to stand on while servicing the cabinet sites. This work includes excavation, gravel base, backfilling, and treated timber cribbing.

The Development Entity shall design, furnish, and install pole mounted cabinets with concrete technician pads to provide level and dry surfaces for a maintenance technician to stand on while servicing the cabinet sites. This work includes excavation, gravel base, backfilling, and treated timber cribbing.

The Development Entity shall furnish and install cabinets provided for new ITS equipment with heating, ventilation, thermostat, and LED lighting systems, and will have a pull-out “laptop” drawer/shelf situated in an appropriate rack position below the device controller to allow ease of maintenance by technicians.

The Development Entity shall relocate, repair, or replace existing Department ITS equipment cabinets impacted by the Work. The Development Entity shall relocate existing Department ITS equipment cabinets if maintenance access to the cabinet is restricted by the finished Work, a device is relocated such that the operating ability of the device is negatively impacted, or such that the maintenance access between the equipment cabinet and device is negatively impacted. If equipment cabinet relocation is not practical, the Development Entity shall provide a new equipment cabinet. Where ITS equipment cabinets are relocated, the Development Entity shall sequence and schedule the construction and relocation to minimize downtime to the maximum extent possible, subject to review and acceptance by the Department.

The Development Entity shall provide ITS equipment cabinet layouts and details for new or modified equipment cabinets. The equipment cabinet layouts and details shall show the placement of equipment within the cabinet and the electrical and communications connections of equipment within the cabinet. The Development Entity shall design new equipment cabinets with at least 25 percent spare capacity.

The Development Entity shall configure ITS equipment cabinets for specific applications (e.g., DMS, CCTV, etc.). The Development Entity shall coordinate with the Department for an ITS equipment cabinet naming convention to identify each ITS equipment cabinet with a specific cabinet ID.

19.9 Construction Requirements

The Development Entity shall comply with construction requirements and specifications set forth by using a construction sequencing approach to minimize impacts to existing Department ITS devices and maximize the ability to use temporary or permanent ITS devices to actively monitor and manage recurring and non-recurring traffic congestion, as well as to detect and confirm Incidents during construction activities. The Development Entity shall coordinate construction so as to not interfere with the ITS equipment commissioning, testing, and integration activities. The Development Entity shall provide necessary Maintenance and Protection of Traffic (MPT) required for construction, commissioning, integration, and testing of ITS equipment and systems.

The Development Entity shall conform to the following construction requirements related to Department ITS:

- construct and integrate repaired or relocated ITS components at the earliest practical time to improve traffic operations;
- design, construct, install, relocate, integrate and test existing (if impacted), relocated, Department ITS equipment and systems;
- survey and inventory existing ITS field equipment to serve as documentation of conditions prior to the start of Work;
- maintain the operation of existing ITS components throughout the duration of construction, except as otherwise stated herein; and

- maintain the existing and newly installed Department ITS until acceptance for maintenance by the Department.

The Development Entity shall:

- limit outage times of existing ITS devices to 24 hours, unless approved by the Department;
- ensure existing and new ITS components are functional upon completion of new component installation; and
- repair or replace existing ITS equipment impacted by new component installation.

19.10 Intelligent Transportation System Integration and Testing

The Development Entity shall perform end-to-end ITS integration and testing of installed, repaired, or relocated devices and systems. Testing shall demonstrate the device or system meets the performance requirements and compatibility and interoperability with the existing Department systems and communication networks, where required.

The Development Entity shall provide the Department with testing procedures and results for verification and acceptance.

The Department may provide oversight, audits and review of the testing procedures and results.

19.10.1 Configuration, Commissioning, and Integration

The Development Entity shall, as required by the Department, configure network switches, routers, other specialized communications equipment, and devices as shown on the plans and notes, and accepted in the ITS Plan. The Development Entity shall:

- furnish and install the network switches, routers, specialized communications equipment, and devices for the Department ITS; and
- collaborate, coordinate with, and support the Department in its integration efforts.

The Department will configure, commission, and integrate Department equipment into its systems.

The Development Entity shall commission network switches, routers, specialized communications equipment, and devices, providing Department coordination and access.

19.10.2 Intelligent Transportation System Testing Plan

The Development Entity shall, as required by the Department, develop and submit an ITS Testing Plan for review and acceptance by the Department. The ITS Testing Plan shall include Department integration and testing and will include at a minimum:

- the scope, requirements, and objectives of the ITS Testing Plan;
- an overall high-level Plan for testing the ITS, including the test stages and processes, and the scheduling of required tests;

- the roles and responsibilities of those involved with the testing program and dependencies on third parties, including Department personnel; and
- test strategies detailing how the individual system/device testing Plans will demonstrate conformance of the proposed solution, device, or system to the various functional, technical, and performance requirements providing the level of detail to ensure compliance with the overall testing requirements.

19.10.3 Factory and Bench Testing Plan

The Development Entity shall perform acceptance testing associated with unproven devices or systems prior to production, fabrication, shipment, installation, or construction. The Development Entity shall develop factory/bench acceptance testing Plans and submit to the Department for review and acceptance. The test plans will fully demonstrate the viability of the device or system to ensure it meets performance requirements.

The Department will have the right to reject devices or systems if the Development Entity cannot prove its ability to meet the ITS performance requirements or if the device or system poses health or safety risk.

19.10.4 Field Acceptance Test Plan

The Development Entity shall, based on review and acceptance of the ITS Test Plan, develop a field acceptance test plan, and perform field acceptance tests for ITS devices and systems to demonstrate equipment, hardware, cables, and connections furnished and installed by the Development Entity meet the technical and performance requirements at the ITS device site level. The field acceptance test plan shall detail how the Development Entity will conduct tests that, at a minimum, demonstrate device signals are present at the control cabinet and control of the equipment can be performed locally at the control cabinet.

19.10.5 Systems Integration Test Plan

The Development Entity shall, based on review and acceptance of the ITS Test Plan, develop, and perform system integration testing of ITS equipment. The Development Entity shall test equipment installed and provide the results of those tests to the Department. The Development Entity must coordinate the testing with the Department personnel. The Development Entity shall develop and perform system integration testing on newly constructed, temporary, or relocated Department ITS devices and systems in coordination with the Department. The Development Entity shall demonstrate the control cabinet and equipment have communications capability to and from the Department's systems and demonstrate to the Department's satisfaction that the Department can remotely view and control the equipment.

19.10.6 Systems Operations Test Plan

The Development Entity shall develop a Department accepted (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) Systems Operations Test Plan for testing each site for proper functional operation for 30 consecutive Days after successful completion of system integration testing. During the testing period, equipment is to operate without failure. The Development Entity shall:

- troubleshoot and find the exact cause of failure if a component malfunctions or fails to meet functional requirements during the 30-Day test period;
- remove and replace failed equipment; and

- restart the 30-Day test period from the beginning (Day 0) if there are equipment failures.

In cases where Department-furnished equipment or Department configuration caused the failure, the 30-Day test period will be suspended until these failures are corrected, after which the 30-Day test period will restart from the beginning (Day 0).

19.10.7 Testing Execution

The Development Entity shall, based on review and acceptance of the ITS Test Plan, identify and troubleshoot issues preventing the successful completion of tests and maintain a log to track issue identification and resolution. Resolve these issues as necessary to successfully complete required testing.

Testing for Department ITS shall be performed in the presence of Department personnel. A minimum notification of 7 Days shall be provided for the scheduling of tests witnessed by the Department for tests occurring locally. For tests occurring outside of the Project Limits, the minimum notification shall be eight weeks.

19.10.8 Certification of Testing Results and Acceptance

The Development Entity shall, based on review and acceptance of the ITS Test Plan and upon successful completion of each test for Development Entity's ITS, provide documentation of the testing, and results shall be certified as completed and accepted. The certified testing documentation shall be provided to the Department.

No Department ITS devices or systems will be accepted for maintenance by the Department until certified testing documentation for the Department ITS has been received.

19.11 Warranties

The Development Entity shall, based on the plans, notes and ITS Plan as reviewed and accepted, provide original equipment manufacturer warranties for furnished and installed Department ITS equipment. The warranties shall be transferred to the Department upon acceptance of the equipment by the Department for maintenance.

19.12 Section 19, Intelligent Transportation System Submittal Requirements

Whenever a Submittal identified in the following Table 19-1, becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described within *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions, and incorporates Table 19-1 information. The Department will conduct reviews and provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 19-1.

19. Intelligent Transportation System**Table 19-1. Section 19, Intelligent Transportation System Submittal Requirements**

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Intelligent Transportation Systems (ITS) Testing Plan	2	15	Construction Work commencement for Submittal related Work	—	—
2	Factory/Bench Testing Plan	2	15	Construction Work commencement for Submittal related Work	—	—
3	Field Acceptance Test Plan	2	15	Construction Work commencement for Submittal related Work	—	—
4	System Operations Test Plan	2	15	Construction Work commencement for Submittal related Work	—	—
5	DMS Field of View Study	2	15	Construction Work commencement for Submittal related Work	—	—
6	Certification of Testing Results and Acceptance	2	15	-	Construction Period	—
PRELIMINARY DESIGN DOCUMENTS						
7	Preliminary ITS Design Plans	2	15	Construction Work commencement for Submittal related Work	—	—
FINAL DESIGN DOCUMENTS						
8	Final ITS Design Plans	2	15	Construction Work commencement for Submittal related Work	—	—
RELEASED FOR CONSTRUCTION DESIGN DOCUMENTS						
9	PS&E ITS Design Plans	3	10	Construction Work commencement for Submittal related Work	—	—

20 Maintenance and Protection of Traffic

20.1 General Requirements

The Development Entity shall design, construct, and maintain the Project, in conformance with the requirements stated in this *Section 20*, to provide for the safe and efficient movement of people, goods, and services, through and around the Project, while minimizing negative impacts to Users, residents, and businesses. The Development Entity shall coordinate with the Department and local Governmental Entities, as applicable, on the development of a Transportation Management Plan (TMP) and the Traffic Control Plans (TCP). The Development Entity shall request permission of the Department 14 Days in advance of Lane Closure or stoppage.

20.2 Project Standards

Project Standards applicable to the Work are included in *Attachment 1, Project Standards* of these Technical Provisions.

20.3 Bridge-Specific Requirements

The Department will provide project specific traffic control restrictions for each Interstate Highway in the Work Zone. Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

20.4 [Reserved]

20.5 Design and Analysis Software

The Development Entity shall prepare plans in accordance with *Department Pub 14M: Design Manual Part 3, Plans Presentation*. The Development Entity shall prepare plans at a minimum scale of 1 inch = 25 feet or larger if required to clearly show the design intent. The Released for Construction Design Documents shall include PDF and electronic CADD data. The Development Entity shall submit CADD Data per Appendix B (Data Transfer Guidelines) of *Department Pub 14M: Design Manual Part 3, Plans Presentation*.

The Development Entity shall utilize software outlined in *Attachment 1, Project Standards* of these Technical Provisions (*Department Pub 46, Traffic Engineering Manual*), verify with the Department the software version and outputs required for each operational analysis to be conducted, and perform the analysis for the Related Transportation Facility(ies).

In accordance with Department's Work Zone Safety and Mobility Policy (reference *Department Pub 46, Traffic Engineering Manual*), the Development Entity shall utilize FREEVAL-PA freeway analysis tool or other software required by the Department to perform Work Zone traffic analysis as necessary, prior to implementing Maintenance and Protection of Traffic (MPT) on limited access Highway, if not already performed and approved in preliminary engineering in the PDA phase. The Department will determine whether the Development Entity shall prepare sketch planning or detailed analysis in FREEVAL-PA, and whether The Development Entity shall prepare further detailed analysis for each location, using one or more of the traffic analysis tools, methods, and commercial software packages listed in *Department Pub 46, Traffic Engineering Manual*). The work zone analysis must be re-performed should the Development Entity change the design from the approved preliminary design. Documentation of the analysis must be provided to the Department.

In the analysis, the Development Entity shall not include speed limit reductions during construction unless an approved TE-162 is obtained prior to the analysis.

20.6 Maintenance and Protection of Traffic Design Requirements

The Development Entity shall design the MPT in accordance with the publications listed in *Attachment 1, Project Standards* of these Technical Provisions.

20.6.1 Transportation Management Plan

The Development Entity shall perform a Work Zone alternatives and impacts analysis and shall submit them with the TMP. As part of the PMP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Transportation Management Plan (TMP) expanding upon the information submitted with the Package Proposal. The Development Entity shall implement, manage, and update the accepted TMP in accordance with the PMP requirements.

The Development Entity's TMP shall, at a minimum, include the following items, unless otherwise amended:

- Traffic Control Plans (TCP), Transportation Operations Plans (TOP), Public Involvement Plans (PIP), and Incident Management Plans (IMP);
- descriptions of the qualifications and duties of the Traffic Control Manager, and other personnel with traffic control responsibilities;
- procedures for the development of TCP;
- procedures to maintain access for first responders;
- procedures to minimize traffic impacts;
- procedures for updating the TMP;
- procedures to comply with local ordinances. This includes, but is not limited to local noise ordinances;
- procedures to maintain and control pedestrian, bicycle, and other non-vehicular traffic;
- procedures to coordinate the TMP for the Project with other Department, Governmental Entity, or private projects which are or will be under construction;
- procedures to research, identify and include special events, including fairs, expositions, shows, and other community events for inclusion in each TCP;
- procedures to identify and incorporate the needs of transit operators, Utility Owners, Governmental Entities, first responders, school districts, business owners, and other related patrons, customer groups or entities affected by the Project and surrounding affected areas;
- procedures for notifying transit operators, Utility Owners, Governmental Entities, first responders, school districts, business owners, and other related patrons, customer groups or entities affected by the Project of detours, road and Lane Closures and other traffic pattern modifications, and implementing and maintaining those modifications;

20. Maintenance and Protection of Traffic

- procedures for signing transitions during construction from one stage to the next and from temporary signing to permanent signing;
- procedures for maintenance and replacement of traffic control devices, including pavement markings and traffic barriers, if used;
- procedures to incorporate the coordination and accommodation of snow plowing and other Department maintenance procedures into the TCP, including, but not limited to provisions for equipment turn-around and temporary lane widths allowing the passage of the Department's equipment;
- procedures to verify twice daily that construction is in accordance with the accepted TCP;
- procedures to regularly evaluate and recommend modifications to, if necessary, traffic signal timings, and the procedures for the development, the Department approval, implementation, testing, and maintenance of affected signals;
- procedures to adjust the TCP if it results in unsafe conditions relative to railroad grade crossings;
- procedures to coordinate with the appropriate Governmental Entities operating signals affected by the Project or detour routes to ensure temporary system compatibility, establish responsibilities for temporary signal installation, maintenance, operation and removal, and coordinate traffic signal timing with local signals;
- procedures and processes for the safe ingress and egress of construction vehicles in the Work Zone;
- provisions to provide continuous access to established truck routes and Hazardous Material routes, and to provide suitable detour routes, including obtaining approvals required by the appropriate Governmental Entities for these uses;
- procedures to modify plans as needed to adapt the Work to unanticipated changes in traffic including a contingency plan to alleviate Work Zone congestion which can be implemented immediately;
- procedures to communicate TMP information to Development Entity's public information personnel and notify the public of maintenance of traffic issues in conjunction with the requirements of *Section 4, Public Information and Communication* of these Technical Provisions;
- descriptions of contact methods, personnel available, and response times for Defects or Emergency conditions requiring attention during off-peak hours;
- procedures for night Work to incorporate Department requirements and to include a Work Zone light system in accordance with *NCHRP Report 498, Illumination Guidelines for Nighttime Highway Work*;
- Department requirements for Pennsylvania State Police protection for Work on interstate roadways; and
- a MPT safety analysis, examining reported crashes that occurred in the area that will become the Work Zone over the most recent available past 5 years of crash data, including the types of crashes, contributing factors, and the recommended mitigation measures to be incorporated into the TCP.

For traffic signals within the Project Limits, Development Entity shall coordinate with the relevant Governmental Entities. Development Entity shall notify the traveling public by placing post mounted signs or portable Dynamic Message Signs (DMS) a minimum of 14 Days in advance of actual Lane Closure or major traffic modifications, per *Department Pub 213, Temporary Traffic Control Guidelines* and *Department Pub 200, Changeable Message Sign (CMS) Operating Standards*. Where available, the Development Entity shall utilize DMS on the regional ITS system, per *Section 19, Intelligent Transportation System* of these Technical Provisions.

The Development Entity shall maintain existing access to residences, business, or affected properties within each Project or Development Entity shall provide alternative access.

If the Department, in its sole discretion, determines Work Zone congestion is unreasonable, the Development Entity shall immediately make modifications to alleviate the congestion. Development Entity shall include contingency plans for modifying Work Zone congestion in the TMP.

The Development Entity shall provide state police for traffic control on Interstates as required by the Department.

20.6.2 Traffic Control Plan

The Development Entity shall submit a TCP for each Bridge. The TCP shall set forth the Development Entity's proposed construction staging and proposed traffic control devices (including anticipated Lane Closures and the procedures required in connection therewith) consistent with the Contract Documents, TMP and the Department-accepted construction schedule. The Development Entity shall develop the detailed TCPs which provide for construction stages and phasing, as well as required switching procedures. The TCP shall correspond with the construction schedule. For Bridges spanning other roadways, Development Entity shall minimize the use of Lane Closures and obtain approval from the appropriate Governmental Entity and the Department for Lane Closure prior to the Work. The Development Entity shall coordinate with appropriate Governmental Entities on the development of the TCP. The Development Entity shall obtain necessary permits, approvals, and agreements necessary to implement the TCP.

Development Entity shall follow the guidance provided in the MPT Restrictions Tables for reduction of lane widths and shoulder widths.

Within the TCP, Development Entity shall include details for detours, traffic control devices, pavement markings, and signage applicable to each phase of construction. The TCP shall be of sufficient detail to allow verification of design criteria and safety requirements, including typical sections, alignment, pavement markings layout, drop off conditions, and temporary drainage. The TCP shall clearly designate temporary reductions in speed limits in accordance with Contract Documents including Strike off Letter 494-20-02.

Development Entity shall maintain detour signing continuity on active roadways within or intersecting the Project and along a detour route. The TCP shall address pedestrian and bicycle traffic using roadways within the Project Limits. The Development Entity shall maintain access to and along trails affected by the TCP and as directed by the trail's owner.

Development Entity shall prepare public information notices, referred to as traffic advisories, in coordination with *Section 4, Public Information and Communication* of these Technical Provisions, in advance of the implementation of Lane Closures or traffic switches.

20.6.3 Contingency Plan

The Development Entity shall prepare a contingency plan specifying actions to minimize traffic impacts if unexpected events (unforeseen traffic demand, inclement weather, length of traffic queue exceeding thresholds) occur in the Work Zone. This plan shall also address activities under the Development Entity's control within the Work Zone. The Contingency Plan shall include:

- information clearly defining trigger points which require lifting Lane Closures such as inclement weather, length of traffic queue exceeding thresholds, and other disruptive issues which occur in the Work Zone;
- a decision tree with clearly defined lines of communication and authority;
- the description of specific duties of participants during Lane Closure operations, such as coordination with Pennsylvania State Police or other Governmental Entity;
- plans for removal of traffic control devices in advance of a major weather event; and
- standby equipment and availability of personnel for implementing the Contingency Plan.

20.7 Automated Speed Enforcement in Work Zones

Before implementing a Traffic Control Plan, the Development Entity shall collaborate with the Department to determine which Work Zones are candidates for using Pennsylvania's Automated Speed Enforcement in Work Zones (AWZSE) program. The Department will determine if, when, and in which Work Zone the Automated Speed Enforcement in Work Zones will be used. When the Department determines the Automated Speed Enforcement in Work Zones will be used, the Department will notify the Development Entity and the Development Entity shall coordinate with the Department and provide access to the Work Zone and required space and conditions for the Automated Speed Enforcement in Work Zones deployment. The Department will be responsible for the implementation and operation of the Automated Speed Enforcement in Work Zones, which will be separate from the Traffic Control Plan.

20.8 Maintenance and Protection of Traffic Construction Requirements

The Development Entity shall comply with construction requirements and specifications and shall:

- not have a period of Work inactivity greater than 14 Days for Lane Closure unless accepted by the Department in writing;
- begin Construction Work adjacent to an initial traffic shift or traffic detour within 24 hours of shifting or detouring traffic; and
- not have in place a detour or Lane Closure one Day in advance of or during a holiday or special event adversely affecting traffic flows relative to those holidays or special events. Refer to the MPT Restrictions Tables in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions more information.

The Development Entity shall follow the requirements of the Department policy letter titled “Road Condition Reporting System Requirements” and in Section A (Worksite Procedures) of *Department Pub 213, General Notes*. When the Development Entity creates a Lane Closure that meets the requirements identified for a “Road Condition Reporting System Reportable Event,” the Development Entity shall report the event as defined for an unplanned event to the Department. Events shall be reported in real time at the actual time the Lane Closure or lane restriction occurs and when it is removed in accordance with the procedures identified in the Development Entity’s Public Information and Communications Plan (PICP).

The Development Entity shall notify the Department a minimum of 17 Business Days prior to prohibiting oversize/overweight vehicles from traveling through restricted areas. The notification shall be on the Department form M-937R(3-13). Additionally, the Development Entity must notify the Department 5 Business Days before opening a restricted area to oversize/overweight vehicles. The notification shall be on Department Form M-937RO(3-09). The Development Entity shall notify the appropriate Regional Traffic Management Center (RTMC) at least 15 minutes prior to beginning Work within the roadway of numbered traffic route. The Development Entity shall report the Work location, beginning time of traffic restrictions, what traffic restrictions drivers may encounter, the expected time traffic patterns are expected to return to the original pattern and what *Department Pub 213, Temporary Traffic Control Guidelines* Pennsylvania Typical Application (PATA) number is being utilized, if any. The Development Entity shall notify the Regional Traffic Management Center (RTMC) immediately upon ending traffic restrictions.

As necessary, and as approved by PennDOT, the Development Entity shall maintain the traffic flow through the Project Limits (including without limitation on intersecting roadways), along detour routes during the period from NTP3 until the respective Bridge Completion. If the Department determines the Development Entity’s traffic control operations do not meet the TMP or specific TCP, the Development Entity shall immediately revise or discontinue those operations to correct the deficient conditions.

The Development Entity shall not stop construction vehicles on active Interstate lanes.

The Development Entity shall ensure temporary signage is in place during all stages as necessary.

The Development Entity shall not perform lane closures nor road closures between November 1 and April 1 without a Department accepted Traffic Control Plan addressing winter operations. The Development Entity shall coordinate the design and construct of temporary roadways, traffic control devices, and crossovers with the District maintenance teams to account for snow storage areas.

Throughout the D&C Period and the Maintenance Period, the Development Entity shall, as necessary, coordinate with adjacent Districts as well as the local District to ensure daily content on Variable Message Signs throughout the Interstate corridors are correctly representative of the Bridge Site conditions. Throughout the D&C Period and the Maintenance Period, the Development Entity shall, as necessary, coordinate with the RCRS throughout to coordinate oversized loads and road conditions.

20.8.1 Driveway Closures

The Development Entity shall coordinate with affected property owner(s) on each driveway closure, and shall maintain access to roadways, intersections, and properties. The Development Entity shall maintain written documentation of coordination in the e-Builder system.

The Development Entity shall maintain a minimum of one all-weather driveway per business. For businesses with multiple driveways, closures may be permitted but are subject to approval and timeframe restrictions by the Department. Development Entity shall notify property owners 10 Business Days in advance of driveway restrictions affecting their properties.

20.8.2 Local Road Detour Usage

The Development Entity shall coordinate with appropriate Governmental Entities on routing detours along local roadways and the closure and detour of local roads. The Development Entity shall obtain the necessary permits, approvals, and agreements from such local Governmental Entities to implement the TCP.

The Development Entity shall use state roadways of a similar character for detour routes, wherever applicable. If state roadways are unavailable, the Development Entity may use local roadways, provided the Development Entity has written approval from the Governmental Entity with the jurisdiction of the roadway. The Development Entity shall prepare a courtesy letter for the Department to provide the Governmental Entity indicating the Department and the Development Entity desire to use the local road(s) as a detour. Detour routes shall be capable of handling the traffic volume and characteristic of the existing route and shall contain no vertical clearance restrictions or bridges with a weight limit more restrictive than the bridges in the Project requiring the detour. The Development Entity shall maintain local routes on the detour to be safe and passable and shall restore the roadway and associated roadway appurtenances to preconstruction conditions when the detour is no longer required. The Development Entity shall submit to the Department in accordance with *Section 22, Maintenance* of these Technical Provisions, an existing conditions report, including video documentation, prior to implementing the detour.

The Development Entity shall provide notice to the public at least 14 Days in advance of implementing a detour, in coordination with *Section 4, Public Information and Communication* of these Technical Provisions. Notice shall be provided through appropriate media outlets as well as the use of portable variable message signs.

20.8.3 Pedestrian and Bicycle Access

The Development Entity shall maintain existing bicycle, pedestrian, and non-motorized access and mobility in accordance with *Attachment 1, Project Standards* of these Technical Provisions and applicable state and federal law, regulation, and policy. The Development Entity shall maintain bicycle and pedestrian facilities in accordance with the requirements applicable to accommodations, design, and construction of bicycle and pedestrian facilities referenced in this and other sections of the Technical Provisions, including *Section 12, Bicycle and Pedestrian Facilities* of these Technical Provisions.

The Development Entity shall maintain existing pedestrian and bicycle access along existing facilities during construction, unless otherwise amended during the preliminary engineering design process. The Development Entity shall make the pedestrian accessway compliant with applicable regulations for accessibility, as defined by the 2010 ADA Standards for Accessible Design. Whenever an existing pedestrian access route or bicycle route in the public right of way is blocked by a construction, alteration, or maintenance activity, the Development Entity shall provide an alternate accessible pedestrian route. The Development Entity shall provide access to recreational facilities and shall coordinate with the appropriate Governmental Entity.

The Development Entity shall maintain access to existing transit stop locations during the Construction Period or shall coordinate reasonable alternative locations with transit operators. The Development Entity shall gain concurrence from transit operators on the reasonable alternative locations. The Development Entity shall maintain signing associated with alternate access.

20.8.4 Pavement Marking

The Development Entity shall remove existing pavement markings conflicting with temporary or permanent pavement markings in accordance with *Department Pub 408, Highway Construction Specifications*. The Development Entity shall remove conflicting pavement markings during construction and relocate as indicated in the Development Entity's TCP. Before traffic lines or markings are removed, the Development Entity shall have a paint truck available to immediately establish new pavement markings. The Department will direct the Development Entity to use the Department's preferred type of temporary pavement marking, including the type of wet reflective temporary pavement markings to be used throughout construction, including during winter operations. Refer to MPT Restrictions Tables in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions. The Development Entity shall apply a double application of temporary waterborne pavement markings for use in active construction, before each Bridge's Bridge Completion, to maintain pavement marking reflectively, unless temporary wet reflective tape is specified in MPT Restrictions Tables.

20.8.5 Hauling Equipment and Materials.

The Development Entity shall accept responsibility for hauling done on the Project and on adjacent Highways, in connection with the Work. Hauling restrictions on Highways shall be according to the applicable sections of the Pennsylvania Vehicle Code, Act of 1976, No. 81.

For delivery of long bridge members (in excess of 70 feet), the Development Entity shall obtain, in writing, a determination if a Department's heavy hauling permit can be issued for the routing from the proposed source(s) of supply to the Project. The Development Entity shall utilize the APRAS map routing tool to check dimensions and current restrictions on the hauling route.

The Development Entity shall not move and/or operate heavy-duty construction grading and hauling equipment over existing or new pavements, subbase, base and surface courses, and structures to remain in service without written permission from the Department.

The Development Entity shall not block traffic on active Interstate lanes.

The Development Entity shall coordinate with local Governmental Entities and obtain required heavy hauling permits for the transfer of oversize or overweight equipment or vehicles from one Work area to another Work area. The Development Entity shall correct damage caused by the transfer of equipment or vehicles on local roads and State Routes.

The Development Entity shall limit hauling to Department owned roadways where possible. If hauling through residential areas cannot be avoided, the Development Entity shall adhere to noise or other restrictions per applicable law.

The Development Entity shall not transport or operate, without a Department issued permit, on public Highways, vehicles that are in excess of the registered, gross, and/or axle weight limits established in Chapter 49 of the Vehicle Code, 75 PA C.S. Chapter 49, or as posted by the Department.

The Development Entity shall keep traveled surfaces used in its hauling operations clear and free of dirt or other debris hindering the safe operation of roadway traffic.

The Development Entity shall use rubber-tired equipment for moving dirt or other materials along or across paved surfaces. Where the Development Entity moves equipment not licensed for operation on public Highways on or across pavement, the Development Entity shall protect the pavement from damage caused by such movement. Damage caused by the operation of the Development Entity shall be repaired at the expense of the Development Entity.

The Development Entity shall coordinate haul routes utilizing streets of an adjacent Governmental Entity with the appropriate Governmental Entity and shall provide the Department with evidence of Governmental Entity permission if requested.

The Development Entity's placement of construction equipment, materials and vehicles shall comply with Department and AASHTO policies and guidelines.

20.8.6 Temporary and Existing Intelligent Transportation Systems, Traffic Signals, and Lights

The Development Entity shall keep temporary or existing ITS equipment, streetlights, and traffic signals in operation so new and existing equipment operate as a coherent system in accordance with the requirements of the Bridge-Specific Requirements Technical Provisions. The Development Entity shall coordinate signal timing adjustments with the local Governmental Entity and the Department.

20.8.7 Emergency Response and Incident Management Plan

The Development Entity shall develop an Incident Management Plan (IMP) within the TMP (see *Section 20.6.1, Transportation Management Plan* of these Technical Provisions) in accordance with *Department Pub 46, Traffic Engineering Manual*. The Development Entity shall incorporate the Emergency Detour Route for Limited Access Freeways document, if available, from each District. The document illustrates Department-established standard detour routes in anticipation of a freeway closure between each adjacent pair of exits, for the entire corridor, in both directions. The IMP shall ensure the safe, fast, and efficient resolution in the event that an Incident should occur during construction within the Bridge limits. The Department will provide a copy of the accepted IMP to Emergency response agencies with jurisdiction in the Bridge limits in an effort to prepare for and organize roles in responding to Emergency situations.

The IMP shall include information necessary for responding to and managing Incidents. The Development Entity shall coordinate with the Department and other stakeholders involved in the response and management of Incidents during the development of the IMP. The IMP shall include:

- Incident and crash prevention strategies;
- Incident mitigation strategies;
- Emergency response procedures, including:

- roles and responsibilities identified for response agencies and entities;
- notification procedures, including an Emergency response telephone tree with appropriate Emergency response agencies/personnel identified for immediate response in the event of an Emergency organized into areas of expertise, so the proper people are contacted for specific Emergency situations;
- response plans for various types and levels of Incidents;
- response equipment; and
- response staging areas and locations.
- Development Entity reporting procedures and requirements, which at a minimum shall provide documentation to the Department on the following:
 - the cause of disruption;
 - actions being taken to alleviate the problem;
 - responsible parties for the actions; and
 - anticipated duration of the disruption.

20.8.8 Lane Closures

20.8.8.1 Restrictions on Lane Closures

All Lane Closures in the Traffic Control Plan submitted by the Development Entity per *Section 20.6.2, Traffic Control Plan* shall conform to the MPT Restrictions Tables included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

20.8.8.2 Lane Closure Rental Fees

In the event any Lane Closure other than a Permitted Lane Closure occurs during the Term, the Development Entity shall be subject to Lane Closure Rental Fees. The Lane Closure Rental Fee tables included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions set forth separate Lane Closure Rental Fees for each Bridge comprising the Project. The amount of Lane Closure Rental Fees payable for any assessment period shall be the sum of the Lane Closure Rental Fees accumulated with respect to each Bridge during such assessment period.

Attachments 2 through 10, Bridge-Specific Requirements of these Technical Provisions set forth two types of Lane Closure Rental Fee for each Bridge:

- “Interstate”, which includes mainline interstate lanes including lanes on bridges, shoulders, gores, median, and ramps. This fee has a list of Work Zone types associated with the direction of travel on the Interstate and the ramps.
- “Non-interstate” within or in the vicinity of the Project Limits, inclusive of detour routes. This fee is based on the closure of travel direction (one or both directions) on a specific roadway listed in the table.

The Development Entity shall notify the Department 14 Days prior to any Lane Closure.

20.8.9 Traffic Control Devices

The Development Entity shall furnish, place, and maintain the traffic control devices in accordance with *Department Pub 408, Highway Construction Specifications, Department Pub 213, Temporary Traffic Control Guidelines*, and as necessary and as required by the Department and the Traffic Control Plan.

20.8.10 Final Clean-Up

The Development Entity shall clear and remove from the Project Limits, the surplus and discarded materials and debris and leave the entire Project in a functional and neat condition, prior to the final inspection.

20.8.11 Stockpiles

The Development Entity shall place barricades and warning signs at stockpiles to warn motorists of a hazard. No material stockpiles shall be located within the clear zone of travel lanes unless positive protection is provided.

20.9 Opening Portions of the Project to Traffic

The Department may require the Development Entity to open to traffic substantially completed unopened portion of the Project when seasonal, local, or other conditions relating to the Project or public convenience justify such action, at the Department's discretion. Direction to open a portion of the Project will be provided in writing by the Department.

Before the substantially completed unopened portion of the Project is opened to traffic, the Development Entity shall furnish, place, and maintain the necessary traffic control devices. Once the portion is opened to traffic, the Development Entity shall conduct the remainder of construction operations while causing the least impact to traffic.

20.10 Maintenance and Protection of Traffic During the Maintenance Period

The Development Entity shall utilize the temporary traffic control restrictions established for the Construction Period under this *Section 20* during the Maintenance Period, unless otherwise accepted by the Department. Other traffic control while performing Maintenance Work shall be in accordance with *Section 20.9, Opening Portions of the Project to Traffic* of these Technical Provisions.

20.11 Aides to Navigation Plan

The Development Entity shall prepare an Aids to Navigation (ATON) Plan, per *Department Publication 13M: Design Manual Part 2, Highway Design* when construction activities will obstruct any portion of a recreational boating waterway. For the purposes of ATON, a recreational boating waterway is one where motorized boating, canoeing, and kayaking are possible during suitable flow conditions. The Department will submit the ATON plan to the Pennsylvania Fish & Boat Commission (PFBC). The ATON Plan shall be submitted to the Department within the TCP.

20.12 Section 20, Maintenance and Protection of Traffic Submittal Requirements

Whenever a Submittal identified in the following Table 20-1, becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 20-1

20. Maintenance and Protection of Traffic

information. The Department will conduct reviews and provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 20-1.

Table 20-1. Section 20, Maintenance and Protection of Traffic Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Transportation Management Plan (TMP)	2	15	NTP3	—	—
2	TMP Updates	2	15	—	Construction and Maintenance Period	—
3	Work Zone Traffic Analysis	2	15	—	Construction and Maintenance Period	—
4	Contingency Plan	2	15	NTP3	—	—
5	Incident Management Plan	2	15	NTP3	—	—
6	Existing Conditions Report	1	15	—	Construction Period	—
PRELIMINARY DESIGN DOCUMENTS						
7	Preliminary TCP	2	15	Construction Work commencement for Submittal related Work	—	—
FINAL DESIGN DOCUMENTS						
8	Final TCP	2	15	Construction Work commencement for Submittal related Work	—	—
RELEASED FOR CONSTRUCTION DESIGN DOCUMENTS						
9	PS&E TCP	3	15	Construction Work commencement for Submittal related Work	—	—

21 [Reserved]

22 Maintenance

22.1 General Requirements

The Development Entity shall plan, manage, and perform Maintenance During Construction, and Maintenance Work during the Maintenance Period.

The Development Entity shall perform Maintenance Work to meet or exceed the Department standards and specifications, industry design standards, and manufacturers' specifications. The relevant requirements in the Technical Provisions respecting D&C Work shall equally apply to Maintenance Work.

22.2 Project Standards

Project Standards applicable to the Work are included in *Attachment 1, Project Standards* of these Technical Provisions.

22.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

22.4 [Reserved]

22.5 Software

The Development Entity shall establish and utilize a Maintenance Management Information System (MMIS) in accordance with *Section 22.8.1, Maintenance Management Information System* of these Technical Provisions.

22.6 Specific Maintenance Requirements

The Development Entity shall perform Maintenance During Construction within the Project Limits. The Development Entity shall perform Maintenance Work within the Maintenance Limits. The Development Entity's Work applies to natural and built assets with exceptions where the Department will perform the operations and certain retained maintenance responsibilities (Department-Retained O&M Work) as designated in Table A31-1 (Construction Period Maintenance Responsibilities) and Table A31-2 (Maintenance Period Maintenance Responsibilities) of *Attachment 31, Maintenance Responsibilities* of these Technical Provisions. The Development Entity shall take necessary actions to:

- ensure the safe, functional, and reliable operation of the Project for which the Development Entity has responsibility;
- execute Maintenance Work in a timely manner in accordance with the accepted Maintenance Management Plan;
- ensure and verify the quality of the Maintenance Work;
- minimize delay and inconvenience to Users and stakeholders and to Users of Related Transportation Facilities in accordance with *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions;

- coordinate Work with Railroads in accordance with *Section 15, Railroad Coordination* of these Technical Provisions;
- ensure the safety of the Users and the general public and minimize the risk of damage, disturbance, or destruction of Department property and third party parcels;
- coordinate with Department to ensure transparency of Maintenance Work activities; and
- coordinate with Department to establish and maintain uniform and seamless transitions within and outside the Project Limits and Maintenance Limits.

The Development Entity shall perform Maintenance Work within the Maintenance Limits in accordance with this *Section 22, Maintenance* and *Section 23, Handback* of these Technical Provisions, and the Maintenance Management Plan (MMP) during the Maintenance Period. The Development Entity shall implement a preventative and proactive maintenance system to prevent the degradation of the Work.

The Development Entity shall perform Maintenance Work including general and winter maintenance on curbs, sidewalks, and bicycle and pedestrian facilities, and maintenance of Highway Service Systems within the Project Limits and within Maintenance Limits, unless and until responsibility has been assigned to and accepted by a municipality pursuant to *Section 2.4, Coordination with Governmental Entities and Third Parties* of these Technical Provisions and Section 6.7 of the Project Agreement (PA).

The Development Entity shall perform Maintenance Work within the Maintenance Limits with the exception of activities identified in *Section 22.6.10, Department's Inspections, Planned Maintenance, and Closures* of these Technical Provisions as being the responsibility of the Department. Maintenance and protection of traffic during Maintenance Work shall meet the requirements of *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions. Lane Closure requirements, restrictions and fees will apply to Maintenance Work in accordance with *Section 20.8.8, Lane Closures* of these Technical Provisions.

The Development Entity shall perform Maintenance Work in accordance with Governmental Approvals and shall not cause or allow Maintenance Work to disturb or alter the habitat or threaten the life of Endangered Species.

The Development Entity shall not encroach or otherwise use third party parcels for Maintenance Work without prior Department and third party approvals.

The Development Entity shall cooperate and coordinate with the Department and third parties with statutory duties or functions in relation to the Project or Related Transportation Facilities as it performs the Development Entity's duties and functions from NTP3 until end of the PA Term. The Development Entity shall coordinate the planning and execution of Rehabilitation Work and other Planned Maintenance with the Department and affected third parties.

The Development Entity shall develop and implement a quality system for the Maintenance Work and ensure the quality of Maintenance Work in accordance with the requirements of *Section 3.3.9, Quality Management Plan (QMP)* of these Technical Provisions. The Development Entity shall provide resources and qualified personnel necessary to meet the requirements of this Section 22 and to perform the Work identified in the MMP.

22.6.1 Maintenance Limits

As a condition precedent to Bridge Completion of each Bridge, the Development Entity shall prepare and obtain Department acceptance of the Bridge's final Maintenance Limits to include plan drawings in electronic drawing format in accordance with *Department Pub 14M: Design Manual Part 3, Plans Presentation*, accompanied by a narrative describing the Elements and boundaries of the proposed final Maintenance Limits in accordance with the Contract Documents.

The Development Entity shall establish in the drawings the final boundaries of the Maintenance Limits for the Project using the Pennsylvania Location Reference System per *Department Pub 336, Automated Pavement Condition Surveying Field Manual*. The Development Entity shall ensure plans cross-reference to an inventory describing each Element of the Project contained within the Maintenance Limits. The Development Entity shall record the boundaries of the final Maintenance Limits for the Project and the inventory describing each Element of the Project contained within the Maintenance Limits into the Development Entity's MMIS per *Section 22.8.1, Maintenance Management Information System* of these Technical Provisions.

When a bridge in the Project crosses over a stream channel or waterway, the Development Entity shall ensure the Maintenance Limits include the channel (including banks and walls) 50 feet upstream and 50 feet downstream, measured from the relevant outer edge of the bridge.

22.6.2 Maintenance During Construction

The first date on which the Development Entity establishes an Active Work Zone at a Bridge, which shall be defined as a portion of Work performed within the Project Limits that (i) encroaches onto the roadway, shoulders, or bridge, and (ii) requires the Development Entity to deploy traffic control measures, ("Active Work Zone"), will trigger the start of Maintenance During Construction for such Bridge.

For the avoidance of doubt, each Bridge will have a respective date of Active Work Zone and a Department-issued Bridge Completion. The Development Entity shall, for each Bridge, starting at the date of the Active Work Zone and ending at the respective date of Bridge Completion, perform Maintenance During Construction, and be subject to NCEs, as designated in and in accordance with Table A31-1 (Construction Period Maintenance Responsibilities) of *Attachment 31, Maintenance Responsibilities*, and Table A32-1 (D&C Period Noncompliance Events) and Table A32-2 (Maintenance Performance Requirements During the Construction Period) in *Attachment 32, Noncompliance Events and Performance Requirements* of these Technical Provisions. Notwithstanding, however, the Development Entity shall be subject to NCEs beginning at NTP1, in accordance with the Project Agreement and Table A32-1 (D&C Period Noncompliance Events) in *Attachment 32, Noncompliance Events and Performance Requirements* of these Technical Provisions.

The Development Entity's Maintenance During Construction responsibilities include sites temporarily open to traffic, temporary Work, and local and state roads used as detour routes. The Development Entity shall maintain open travel lanes free of hazards, debris, and encumbrances and generally in compliance with the requirements of *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions, with the exception of winter maintenance activities as identified in *Section 22.6.9, Winter Maintenance* of these Technical Provisions. The Development Entity shall perform Maintenance During Construction in accordance with the Department-approved Package Proposal, Table A31-1 (Construction Period

Maintenance Responsibilities) of *Attachment 31, Maintenance Responsibilities* of these Technical Provisions, and the Performance Requirements.

22.6.3 Self-Monitoring and Self-Reporting Requirements

The Development Entity shall establish a self-monitoring and self-reporting program, as part of the Development Entity's quality system per *Section 3.3.9, Quality Management Plan (QMP)* of these Technical Provisions as a tool to evaluate the condition of the Project assets and the overall effectiveness of the Development Entity's Maintenance Work and to meet the obligations under the Contract Documents. The Development Entity shall present details of this program in the MMP.

22.6.4 [Reserved]

22.6.5 Planned Maintenance

As part of the MMP, the Development Entity shall prepare a schedule of Planned Maintenance (including routine maintenance work, inspection work, and Rehabilitation Work) in accordance with the requirements set forth in this Section 22.6.5 and *Section 22.8, Maintenance Management Plan (MMP)* of these Technical Provisions.

The Development Entity shall prepare a Transportation Management Plan (TMP) for the Department's acceptance for this Planned Maintenance work, in accordance with *Section 20.6.1, Transportation Management Plan* of these Technical Provisions. The Development Entity shall develop Traffic Control Plans (TCP) and maintenance and protection of traffic procedures in accordance with *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions.

The Development Entity shall describe in the schedule of Planned Maintenance the Planned Maintenance activities for the given period and shall include at a minimum the expected dates, Elements included, times, durations of each Planned Maintenance activity, and impact on traffic. The Development Entity shall develop the schedule of Planned Maintenance, and changes thereto, in cooperation with the Department and other Governmental Entities or third parties impacted by the Development Entity's activities to minimize the impact on traffic and avoid scheduling during local events.

When changes occur in the Development Entity's schedule of Planned Maintenance (including changes in the Rehabilitation Work Schedule), the Development Entity shall request and obtain acceptance from the Department at least 14 Days before undertaking the Work.

22.6.6 Unplanned Maintenance Activities

22.6.6.1 Incident Management

According to *Section 20.6.1, Transportation Management Plan* of these Technical Provisions, the Development Entity shall develop an Incident Management Plan (IMP) involving the Department, police, Development Entity, and first responders to minimize the length and impact of Incidents. The Development Entity shall follow the IMP when performing unplanned maintenance related to an Emergency, Incident, or severe weather event.

22.6.6.2 Damage Assessment Following Emergency, Incident, and Severe Weather Event

During or after the occurrence of an Emergency, Incident, or severe weather event, the Department may conduct cursory visual inspections of the affected Project Limits as part of its routine maintenance patrols and if observed, may notify the Development Entity of possible Noncompliance Events. Inspection by the Department in no way relieves the Development Entity of its inspection, reporting, and maintenance responsibilities.

Upon obtaining knowledge or receiving notification of an Emergency, Incident or severe weather event, the Development Entity shall notify the Department and appropriate Emergency response agencies per the IMP. The Development Entity shall promptly respond (within 4 hours or as soon as it is safe to enter the Project Limits) to the affected Project Limits and assess damages to the Elements and repairs necessary in accordance with the *Section 22.7, Performance Requirements* of these Technical Provisions.

The Development Entity shall provide to the Department a detailed damage assessment report in response to Emergency, Incident, or severe weather events within 10 Business Days of the end of the event. The Development Entity shall conduct an analysis of the Project Limits affected by the Emergency, Incident, or severe weather event and in the report shall:

- record the date and time of the event;
- identify a cause and describe damages to the Project Elements (and third party assets, if applicable);
- describe Noncompliance Event(s), if present, including Noncompliance Event classification and corresponding procedure for Cure Periods;
- describe issue(s) or failure(s) and resulting system impacts;
- describe Bridge Site conditions, supported by photo documentation (digital only);
- list damaged Elements with damage assessment;
- assess traffic flow impact; and
- determine hazard exposure.

The Development Entity shall coordinate with the Department to establish timeframes for damage assessment reports to be delivered to the Department depending on the severity of the Emergency, Incident, or severe weather event. The Development Entity shall immediately notify the Department if field observations reveal deficiencies sufficiently critical to warrant immediate actions, traffic restriction, or Lane Closure.

The Development Entity shall also document events and related damage assessments for structures in BMS2, including Bridge Problem Reports, in accordance with *Department Pub 238, Bridge Safety Inspection Manual*.

22.6.7 Hazardous Materials

The Department and the Development Entity shall undertake Hazardous Materials Management for Hazardous Materials in accordance with the terms set forth in Project Agreement Section 7.8. All Hazardous Materials Management provisions contained in these Technical Provisions shall be subject to those terms.

The Development Entity shall provide and enforce secure storage and handling of Hazardous Materials associated with the Work. Hazardous Materials should be maintained in secure facilities when not in use. The Development Entity shall not store hazardous or flammable materials beneath bridges or in unsecure locations within the Project Limits.

Upon the release of Hazardous Materials, time is of the essence. The Development Entity shall immediately notify the Department should the Development Entity become aware of Hazardous Material Releases or fuel spills onto the Project Limits.

22.6.7.1 Third Party Hazardous Materials Release

For Hazardous Material Releases or fuel spills onto the Project Limits caused by third parties, the Department will contain and mitigate the contamination, clean-up the affected area(s), and remove, transport, and dispose (as applicable) of Hazardous Materials. The Development Entity shall, upon obtaining knowledge of a Hazardous Material Release incident or receiving notification from the Department, respond to the Project Limits in a timely manner and assess the affected area(s) for Maintenance Work needed in order to ensure compliance with the Performance Requirements.

22.6.7.2 Development Entity Release of Hazardous Materials

For Hazardous Material Releases or fuel spills onto the Project Limits or Maintenance Limits caused by the Development Entity or the Development Entity-Related Entity, the Development Entity shall respond and take remedial actions per the provisions of the MMP respecting Hazardous Materials and the minimum Performance Requirements set forth in *Section 22.7, Performance Requirements* of these Technical Provisions.

The Development Entity shall respond promptly to assess the affected area(s), contain, mitigate the contamination, and clean-up the affected area(s) (whether within and/or outside the Project Limits or Maintenance Limits). The Development Entity shall treat, handle, store, remediate, remove, transport, and dispose (as applicable) of Hazardous Materials in accordance with applicable law and Governmental Approvals.

The Development Entity shall provide a written report describing the Hazardous Material Release event, documenting the cause(s) of the event and the Development Entity's response and actions taken to remedy and mitigate the impacts of the Hazardous Material Release. The Development Entity shall provide the report to the Department within two Business Days after the initial clean-up is completed and shall be included in the Maintenance Monthly Report.

The Development Entity shall further develop and implement a corrective and preventative action plan to prevent Hazardous Material Releases from reoccurring and modify the MMP accordingly to incorporate lessons learned from the event. Within seven Days after the initial clean-up is completed, the Development Entity shall submit the corrective and preventative action plan(s) to the Department for review and acceptance.

The Development Entity shall provide qualified staff with the appropriate levels of training and certification and equipment necessary for remediation of a Hazardous Material Release.

22.6.8 Landscape Management, Vegetation Control, and Use of Herbicides and Pesticides

During the D&C Period, the Development Entity shall perform Work within the Project Limits necessary to establish sustainable landscape and planting and maintain healthy and vibrant landscape and shall perform vegetation management activities necessary to meet the Performance Requirements.

During the Maintenance Period, the Development Entity shall perform Work within the Maintenance Limits necessary to meet the Performance Requirements.

The Development Entity shall perform vegetation control, weeding, brush cutting, fertilization, herbicide vegetation management, mowing, watering, seeding/reseeding, pruning, plant replacement, mulching, tree trimming, and tree removal and replacement, as well as vegetation control work necessary to ensure safe roadway passage and maintain travel lanes free of debris and encumbrances.

With respect to vegetation management, the Development Entity shall:

- perform vegetation management activities necessary to maintain the normal flow of streams and keep stream channel free of obstructions;
- remove weeds and other undesirable vegetation growing directly on, under, or directly adjacent to an Element, including sidewalks, and curbs;
- perform tree trimming and tree removal to facilitate roadway passage and safety within Department Right of Way;
- mow, cut, and clear brush; and
- ensure that vegetation is controlled to ensure regulatory signs remain visible to drivers and pedestrians.

In carrying out its responsibilities respecting vegetation control, the Development Entity shall minimize the use of pesticides and herbicides.

The Development Entity acknowledges vegetation control activities performed by the Department may deposit chemicals, including pesticides and herbicides, on Elements within the Maintenance Limits.

22.6.9 Winter Maintenance

The Department will carry out winter snow and ice removal activities on the Project to facilitate general traffic flow. Winter snow and ice removal activities, including application of treatment material on bridges, travel lanes, shoulders, and offsets, will be provided by the Department, following the procedures identified in *Department Pub 23, Maintenance Manual*. The Development Entity acknowledges winter snow and ice removal activities performed by the Department will deposit antiskid materials and chemicals on bridge decks, which can accumulate over the winter near scuppers, deck joints, and around structural members (panel points of trusses, flange angles, bottom flanges of plate girders, etc.)

Notwithstanding the above, the Development Entity shall carry out winter snow and ice removal activities for roadway that is closed as a result of the Development Entity's Work for as long as the Lane Closure is in place prior to the respective Bridge's Bridge Completion. When a road is closed for Work, the Development Entity shall carry out winter snow and ice removal activities within the Project Limits and

from the Project Limits to the locations of the traffic control devices that indicate the road is being closed in order to provide access to commercial and residential driveways affected by the detour.

The Development Entity shall remove obstructions that create standing water or hazardous ice buildup in the travel way associated with the aforementioned activities.

During the Maintenance Period, the Development Entity shall be responsible for winter maintenance of bicycle and pedestrian facilities (including sidewalks) unless and until responsibility is transferred to a municipality under a third party agreement in accordance with *Section 2.4, Coordination with Governmental Entities and Third Parties* of these Technical Provisions.

22.6.10 Department's Inspections, Planned Maintenance, and Lane Closures

For operation or maintenance activities that are the Department's responsibility under the Contract Documents within or outside the Maintenance Limits during the Maintenance Period, the Development Entity shall grant the Department access to the Project Limits without restriction and the Department will reserve the right to shift or re-direct traffic as necessary. The Development Entity shall not be responsible for Department's costs associated with its inspection, planned maintenance and lane closures including changing and restoring the pavement markings to account for any temporary traffic patterns as necessary. The Department will notify the Development Entity of maintenance activities the Department plans to undertake within the Maintenance Limits, including the general nature, expected dates, locations, times, and durations of Department activities. The Development Entity shall cooperate with the Department to coordinate and accommodate the Department's Planned Maintenance activities.

The Department may:

- perform inspections and condition assessment reviews at its sole discretion;
- periodically perform independent assessments, testing, and reviews by inspecting repairs and other Maintenance Work performed or being performed by the Development Entity;
- perform field reviews for quality and completeness assessments. The Development Entity shall make records of the Maintenance Work performed available to the Department for review according to the requirements in *Section 22.8.1, Maintenance Management Information System* of these Technical Provisions; and
- close a portion of the Project Limits when it determines, in its sole discretion, an Incident, Emergency, or severe weather event has occurred or is about to occur.

22.7 Performance Requirements

For each Element in the Project Limits, the Development Entity shall perform necessary Work to achieve or exceed the Performance Requirements and the NBIS rating requirements in *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions or the requirements in the Design Documents, whichever is stricter, within the Maintenance Limits during the Maintenance Period. With respect to references in the Performance Requirements requiring specific types of repairs, the Development Entity shall follow the intent of those publications to achieve the specified outcome but shall have discretion as to the use of means and methods, subject to the Contract Documents.

Where the Development Entity bears maintenance responsibility according to *Attachment 31, Maintenance Responsibilities* of these Technical Provisions, in affecting repairs to flexible pavement, the Development Entity shall remove and replace distressed layers full lane width to a depth necessary to correct observed distress not less than 10 feet longitudinally beyond the distressed area, in any case not to exceed the Maintenance Limits. In effecting repairs to flexible pavement approaches, should the distance between repair areas be less than 20 feet, the Development Entity shall make one continuous repair. Repairs to flexible pavement must meet the surface tolerance as specified in Section 501.3(o) of *Department Pub 408, Highway Construction Specifications*.

In effecting repairs to rigid pavement, the Development Entity shall follow the repair criteria delineated in *Department Pub 408, Highway Construction Specifications* and *Department Pub 72M, Roadway Construction Standards, RC-26M*, in any case not to exceed the Maintenance Limits. Repairs to rigid pavement must meet the surface tolerance as specified in Section 501.3(o) of *Department Pub 408, Specifications*.

In effecting repairs to rigid pavement and bridge decks, the Development Entity shall follow the requirements of *Department Pub 408, Highway Construction Specifications*, and the Department's applicable standard drawings. The Development Entity shall be responsible for maintaining delineation and pavement markings associated with the Work on bridge decks and 100 feet of approach pavement on each side of the bridge from the Construction Period to the end of the Term.

22.7.1 Department's Responsibilities within the Maintenance Limits

During the Maintenance Period, the Development Entity shall perform Maintenance Work within the Maintenance Limits, with the exception of Department-Retained O&M Work, provided however:

- the Work meets the requirements of *Section 23.1, General Requirements for Handback* of these Technical Provisions prior to transfer of maintenance responsibilities after the D&C Period; and
- if the Development Entity's Maintenance or Rehabilitation Work during the Maintenance Period affects the condition of elements adjoining or nearby its Work but not under its purview, including Early Handback Elements that were transferred to the Department, the Development Entity shall restore the affected elements, at a minimum, to their condition prior to the Maintenance or Rehabilitation Work.

For the avoidance of doubt, each Bridge will require a Department-issued Bridge Completion. The Development Entity shall, for each Bridge, starting at the date of the respective Bridge Completion and ending at the end of the Term, perform Maintenance Work, and be subject to NCEs, as designated in and in accordance with Table A31-2 (Maintenance Period Maintenance Responsibilities) of *Attachment 31, Maintenance Responsibilities*, and Table A32-3 (Maintenance Period Noncompliance Events) and Table A32-4 (Maintenance Performance Requirements During the Maintenance Period) in *Attachment 32, Noncompliance Events and Performance Requirements* of these Technical Provisions.

The Development Entity shall coordinate its Maintenance Work with the Department so as to ensure the proper, continuous functioning of the Early Handback Elements. The Department will be responsible for the following activities during the Maintenance Period:

- first response to Incidents and Emergencies, including consequential traffic control and cleanup activities;
- first response to severe weather events per *Section 22.6.6, Unplanned Maintenance Activities* of these Technical Provisions;
- response to a Hazardous Materials Release except Development Entity Release(s) of Hazardous Materials per *Section 22.6.7, Hazardous Materials* of these Technical Provisions;
- winter maintenance activities per *Section 22.6.9, Winter Maintenance* of these Technical Provisions; and
- maintenance of ITS devices (other than structural supports per Table A31-2 (Maintenance Period Maintenance Responsibilities) of *Attachment 31, Maintenance Responsibilities*) of these Technical Provisions.

For bridges spanning other roadways, the Department will be responsible for Maintenance Work on the pavement of the other roadways under the bridges, except for:

- maintenance and protection of traffic on other roadways under a bridge necessary to carry out Maintenance Work performed by Development Entity on the bridge per *Section 20.1, General Requirements* and *Section 20.6, Maintenance and Protection of Traffic Design Requirements* of these Technical Provisions; and
- Maintenance Work as may be necessary to remove obstructions or repair damages on other roadways under a bridge caused by the Development Entity's Maintenance Work on the bridge and detour routes.

The Development Entity is not required to measure skid resistance within the Maintenance Limits. The Department will notify the Development Entity when low skid resistance is detected, and the Development Entity shall consequently investigate and perform Maintenance Work to eliminate the unsafe condition in accordance with the Performance Requirements and submit a repair plan to the Department for review and acceptance.

22.7.2 Noncompliance Events

The Development Entity shall identify and classify Nonconforming Work and Noncompliance Events according to procedures defined in *Section 2.12, Noncompliance Events* of these Technical Provisions. Noncompliance Events related to Maintenance Work will be defined according to the Performance Requirements.

The Development Entity shall investigate reports and complaints on the condition of the Project received from all sources. The Development Entity shall record response times, maintenance records, and relevant inspections and actions taken in the MMIS, including temporary protective measures and repairs per the requirements of *Section 22.8.1, Maintenance Management Information System* of these Technical Provisions.

22.7.3 National Bridge Inspection Standards Bridge Rating Requirements

For each bridge and other structures being maintained by the Development Entity within the Maintenance Limits, the Development Entity shall perform NBIS Inspections and establish general condition ratings in accordance with *Section 22.9, Inspections* of these Technical Provisions. Each bridge shall achieve NBIS Bridge Rating (the least of NBIS General Condition Ratings, item numbers 58 through 62 and 113 where applicable, as defined in *Recording and Coding Guide for Structure Inventory and Appraisal of the Nation's Bridges, FHWA-PD-96-001, FHWA 1995*) of at least 7.

22.8 Maintenance Management Plan

As part of the PMP, the Development Entity shall prepare and obtain Department acceptance (which review, comment and acceptance shall be subject to Project Agreement Section 6.3) of a Maintenance Management Plan (MMP) that establishes the procedures and processes to administer Maintenance Work, expanding upon the information the Development Entity submitted with the Package Proposal. The Development Entity shall implement, manage, and update the accepted MMP in accordance with the PMP requirements. The Development Entity shall clearly identify in the MMP the approach, methods, staffing, schedule, inspections, reporting frequencies, systems, and procedures necessary for the Development Entity to perform Maintenance Work and ensure each Element continuously meets or exceeds the requirements of the Contract Documents including without limitations, this *Section 22, Maintenance* of these Technical Provisions, and the Performance Requirements.

The Development Entity shall implement the MMP and shall manage and perform Maintenance Work in accordance with the MMP. There shall be only one MMP for the Development Entity and the Development Entity-Related Entities performing Maintenance Work.

The MMP shall include, at a minimum, the following components:

- MMIS per *Section 22.8.1, Maintenance Management Information System* of these Technical Provisions;
- schedule of Planned Maintenance and Routine Maintenance;
- Maintenance Manual;
- Rehabilitation Work Plan, including Rehabilitation Work Schedule;
- Maintenance Safety and Security Plan, and
- Transition and Coordination Plan.

The Development Entity shall develop and submit a comprehensive draft MMP (including component plans and systems) to the Department for acceptance, as a part of the PMP in accordance with *Section 3.3, Project Management Plan* of these Technical Provisions. The Development Entity shall submit a final MMP (including component plans and systems) to the Department, provided, however, information specific to individual Bridges shall only reflect the information reasonably known at the time of the MMP Submittals.

The Development Entity shall submit updated sections and components of the MMP in respect to the Project, reflecting Record Drawings and final Maintenance Limits as a condition precedent to each Bridge Completion.

Subsequently, the Development Entity shall update the MMP within 30 Days prior to the beginning of each calendar year and as the Department determines is necessary to comply with the requirements of the Contract Documents. The Development Entity shall include in each update of the MMP changes to Contract Documents as they relate to Maintenance Work and the Technical Provisions, subject to the Department's acceptance.

The Development Entity shall incorporate into the MMP, rely on, and fully utilize the MMIS for Maintenance Work and comply with the requirements of *Section 22.8.1, Maintenance Management Information System* of these Technical Provisions.

The Development Entity shall describe in the MMP and subsequent updates, its approach to inspections, Routine Maintenance, Planned Maintenance, preventative Maintenance Work, Rehabilitation Work, replacements, and other maintenance activities to be performed by the Development Entity. In the MMP, the Development Entity shall, at a minimum:

- provide plan drawings showing the Maintenance Limits for the Project;
- list an inventory and clear description of each Element of the Project contained within the Maintenance Limits with its proper location and with a unique Performance Requirement Identification consistent with Performance Requirements;
- describe Maintenance Work during the Construction Period for the Project (in a standalone, separate section of the MMP);
- identify acceptable criteria for Maintenance Work;
- include a schedule of Planned Maintenance and preventative Routine Maintenance (including bridge washing) and associated Lane Closures along with an explanation of required frequencies;
- describe Work and procedures for executing the Work, for each Element Category and for each Project;
- provide plans and procedures for maintenance and protection of traffic during Maintenance Work (for Planned Maintenance and Unplanned Maintenance Work) per *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions, including without limitations site-specific Traffic Control Plans respecting the Project on which Planned Maintenance is scheduled following the requirements of *Section 20.6.2, Traffic Control Plan* of these Technical Provisions;
- describe the Development Entity's approach to minimize delay and inconvenience to Users and to users of Related Transportation Facilities in accordance with *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions;
- describe the Development Entity's approach to minimize the risk of harm to Users and the general public and minimize the risk of damage, disturbance, or destruction of Department property and third party property;
- describe the Development Entity's approach to coordinate with the Department and third parties;
- indicate the status (permit type, permit number, issuing agency, issue date and expiration date) of permits in force and a listing of new permits or approvals required;

- describe the Development Entity's quality system and approach to Quality Management, QC, Quality Assurance and Acceptance, and processes and procedures for achieving the requirements under this *Section 22, Maintenance* and the obligations of the Contract Documents;
- describe the Development Entity's quality system and approach to Quality Management, QC, Quality Assurance and Acceptance, and processes and procedures for achieving the requirements of *Section 3.3.9, Quality Management Plan (QMP)* of these Technical Provisions;
- describe the Development Entity's approach to coordination with the Independent Quality Firm (IQF) for Quality Assurance and Acceptance of the Work during the Maintenance Period;
- Describe the Development Entity's approach and procedures for monitoring and inspecting the condition of the Project and self-monitoring and self-reporting processes and procedures for identifying, classifying (per *Section 22.7.2, Noncompliance Events* of these Technical Provisions), tracking, notifying the Department of and reporting Noncompliance Events, response time and cure times, and procedures to permanently cure Noncompliance Events;
- establish procedures for tracking, calculating, and reporting Noncompliance Points accurately;
- describe corrective and preventative actions to eliminate or minimize future occurrences of Noncompliance Events;
- establish performance target metrics, measurement procedures and threshold values at which Maintenance Work is required, for inspection procedures and frequencies and subsequent Maintenance Work to address deficiencies noted in inspections, for each Element of the Project in accordance with this *Section 22, Maintenance* of these Technical Provisions;
- describe the Development Entity's self-monitoring processes and procedures for identifying and notifying the Department of Lane Closures (including Permitted Closures);
- describe procedures to assess damages, required Maintenance Work, and coordination with the Department and third parties, the Development Entity following Emergencies, Incidents, and severe weather events;
- describe the Development Entity's approach for fully utilizing the MMIS per *Section 22.8.1, Maintenance Management Information System* of these Technical Provisions, including procedures for managing records of inspection and Maintenance Work, including appropriate measures for control of records and control of documents;
- describe the Development Entity's approach to obtaining Governmental Approvals required for the Maintenance Work including revision, modification, amendment, supplement, rehabilitation, or extension thereof and coordination with the Department and third parties;
- describe the Development Entity's plan and procedures for responding to a Hazardous Material Release per *Section 22.6.7, Hazardous Materials* of these Technical Provisions, including monitoring and evaluation and clean-up procedures of Hazardous Materials;
- describe the Development Entity's approach to controlling vegetation per *Section 22.6.8, Landscape Management, Vegetation Control, and Use of Herbicides and Pesticides* of these Technical Provisions;

- provide a list of Contractors employed to undertake Maintenance Work, including name of business, mailing address, primary contact person name, title, phone, and e-mail;
- list the Development Entity's maintenance personnel, staff organization chart and staffing plan including geographical and functional responsibilities, positions, qualifications, training and certification processes, Work locations, Work hours, and contact details;
- list the addresses and phone numbers for the facilities to be used by the Development Entity, including off Site storage or maintenance facilities;
- list an inventory of vehicles, tools, spare parts, and other major equipment furnished by the Development Entity to support the Maintenance Work;
- describe the Maintenance Work activities and schedule planned for next 12 months, updated on a monthly basis; and
- establish guidelines and procedures for the efficient, coordinated, and consistent implementation of the Maintenance Manual, Maintenance Safety and Security Plan, Transition and Coordination Plan, Rehabilitation Work Plan, and any other plan required for the performance of the Maintenance Work.

The Development Entity shall comply with the requirements in the documents listed below and incorporate these documents in the MMP:

- *Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual;*
- *Department Pub 238, Bridge Safety Inspection Manual;*
- *Department Pub 408, Highway Construction Specifications;*
- *Department Pub 213, Temporary Traffic Control Guidelines; and*
- *FHWA Publication, MUTCD, Manual on Uniform Traffic Control Devices (MUTCD) (FHWA 2009; and Revisions 1 and 2, 2012).*

Furthermore, in the development of the MMP, the Development Entity shall review and demonstrate an understanding of the documents listed below, which are used by the Department for a series of maintenance activities:

- *Department Pub 2, Project Office Manual (POM);*
- *Department Pub 23, Maintenance Manual;*
- *Department Pub 55, Bridge Maintenance Manual;*
- *Department Pub 336, Automated Pavement Condition Survey Field Manual; and*
- *Department Pub 242, Pavement Policy Manual.*

22.8.1 Maintenance Management Information System

As part of its MMP, the Development Entity shall develop, populate, manage, and utilize a computer-based database to manage the Project and meet the obligations under the Contract Documents, including without

limitations the requirements under this Section 22.8.1. The MMIS shall provide for control of records and control of documents procedures in accordance with Quality Management Systems — Requirements, International Organization for Standardization (ISO), ISO 9001:2015. There shall be only one MMIS for Development-Entity Related Entities.

With respect to the MMIS, the Development Entity shall, at a minimum, accurately:

- record and organize information in manner consistent, logical, user-friendly, and searchable by individual Bridge, Element, attribute, time, location, or nature of Work performed, or other relevant field of information pertinent to the identification of the Project Elements, Maintenance Work, and their performance;
- incorporate a Geographical Information System (GIS), fully integrated with the MMIS;
- include the delineation of the final Maintenance Limits for each Project;
- inventory and provide clear description of each bridge or other structure within a Project using the applicable BRKEY number, Multi-Modal Project Management System (MPMS) number, and S-Number;
- inventory and provide clear description of each Element of the Project contained within the Maintenance Limits with its proper location and with a unique Performance Requirement identification consistent with Performance Requirements;
- record, as part of the inventory, relevant information respecting each Element, including material and fabrication certifications, vendor, Supplier or Contractor certifications or quality records, date of installation, date and type of Maintenance Work, maintenance personnel, and date of replacement;
- record spare parts inventory;
- record information related to each bridge within a Project consistent with the NBIS and include in particular the National Bridge Inventory (NBI) summary Structure Inventory and Appraisal (SI&A) sheets;
- record and track occurrence, time, location (including identifying the respective Element), and nature of Noncompliance Events, degradation, damages to, and failures of Elements, time of response following identification of Noncompliance Events, and cure of Noncompliance Events and associated time to cure;
- record and track accruals of Noncompliance Points in accordance with *Section 2, General and Attachment 32, Noncompliance Events and Performance Requirements* of these Technical Provisions;
- keep records, including time, location, and nature of the Development Entity's Maintenance Work in respect to each Element including inspections and inspection results (including NBIS inspections), Maintenance Work to address issues identified during inspections, preventative, Planned Maintenance and Unplanned Maintenance Work, repairs (including maintenance priority codes), Rehabilitation Work, replacements, and Lane Closures;

- calculate and record statistical data on mean time between failures or reported noncompliance events and mean time from identification or notification of Noncompliance Events to Department acceptance of completed repair or cure in accordance with the terms of the Contract Documents; and
- record time, location, and nature of Emergencies, Incidents, including severe weather events, and release of Hazardous Materials and consequential damages to the Elements and consequential actions taken by the Development Entity.

Locations shall be identified following the Pennsylvania Location Reference System per *Department Pub 336, Automated Pavement Condition Survey Field Manual*. The Element locations shall be accurate to within one foot in 100 feet.

When an Element is constructed, installed, maintained, inspected, modified, rehabilitated, replaced, or removed, the Development Entity shall update the MMIS within two Business Days of completion of the Work. The Development Entity shall record in the MMIS, Noncompliance Events no later than 48 hours after obtaining knowledge of, or receiving notification from the Department of, a Noncompliance Event. Other ongoing MMIS recording requirements shall be fulfilled within two Business Days of completion or occurrence of the relevant activity.

The Development Entity shall use the MMIS functionalities to provide clear reporting to the Department (including as part of the Maintenance Monthly Reports, Maintenance Annual Reports, Rehabilitation Work Reports, and Handback Work Plan) demonstrating the Development Entity's compliance with the obligations under the Contract Documents and in particular with this Section 22 and *Attachment 32, Noncompliance Events and Performance Requirements* of these Technical Provisions.

The Development Entity shall provide the Department with real-time, high-speed, remote unrestricted read/view access to the functionalities of the MMIS and Project records contained in the MMIS and the ability to download information contained in the MMIS from the first Bridge Completion until the end of the Term. Project records in the MMIS shall be made available to the Department in an electronic format compatible with the Department's maintenance management systems for uploading. The Development Entity shall provide the Department with access to the same data and have the ability to run the same reports and analyses on the MMIS data as the Development Entity.

For bridge Elements, the Development Entity shall input inspection and performance data along with any required additional information directly into the Department's Bridge Management System 2 (BMS2) in accordance with *Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual*. The MMIS shall reflect the same information as contained in the BMS2 for bridges.

The Development Entity shall maintain and preserve MMIS records during the entire Term. The Development Entity shall handover Project records contained in the MMIS in electronic format compatible with the appropriate Department system at the end of the Term.

The Development Entity shall design the structure of the MMIS to fully support its obligations under the Contract Documents. The structure of the MMIS (including without limitation the data fields, information type, functionalities, and architecture) shall be subject to the Department's acceptance. The Development Entity shall make the MMIS fully functional and populated with information respecting each Project and

meet the requirements in this Section 22.8.1 as a condition precedent to the first Bridge Completion. The Development Entity shall update the MMIS with the latest available information and ensure it remains functional and accessible by the Department from the first Bridge Completion date to the end of the Term.

22.8.2 [Reserved]

22.8.3 Maintenance Manual

The Development Entity shall develop and submit as part of the MMP, a detailed Maintenance Manual based on its Maintenance Work. This Maintenance Manual shall include the complete set of information detailing the specific maintenance procedures for the execution of Maintenance Work, consistent with the MMP. The Maintenance Manual shall be used by the Development Entity's maintenance staff in the performance of Maintenance Work and shall be updated in accordance with the requirements set forth in this Section 22. The Maintenance Manual for the Development Entity's Maintenance Work shall rely on, and fully utilize the MMIS. The Development Entity shall update the Maintenance Manual annually within 30 Days prior to the beginning of each calendar year (as part of the annual update to the MMP) and as the Development Entity or the Department determine is necessary to comply with the requirements of the Contract Documents. The Development Entity shall base the Maintenance Manual on the specific Maintenance Work program of the Development Entity and therein:

- identify the locations of each Element subject to Maintenance Work per the MMIS;
- list Planned Maintenance and preventative Routine Maintenance procedures and required frequencies for each Element;
- describe diagnostic procedures for Elements, equipment, and systems;
- provide procedures and forms used for inspections including scheduling, programming, reporting and inspections systems, including inspection procedures necessary to the establishment of the NBIS rating;
- describe procedures for routine monitoring, detection and evaluation of Noncompliance Events including patrolling; procedures for responding, assessing, and remediating events related to Hazardous Materials or fuel spills per *Section 22.6.7, Hazardous Materials* of these Technical Provisions;
- describe procedures for responding, assessing, and remediating Emergencies, Incidents, and severe weather events per *Section 22.6.6, Unplanned Maintenance Activities* of these Technical Provisions, and in particular procedures for monitoring weather events and preparing to respond to severe weather-related events;
- describe procedures for systematic coordination with the Department and relevant third parties for logistics, regulatory approvals, stakeholder input, and seamless integration with intersecting or abutting elements to the Project;
- describe procedures for public information and communication of upcoming Maintenance Work per *Section 4, Public Information and Communication* of these Technical Provisions;
- describe procedures for maintenance and protection of traffic per *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions;

- provide copies of Record Drawings detailing the components of the Maintenance Work and Rehabilitation Work to be provided by the Development Entity, including logic block diagrams, assembly and disassembly drawings clearly identifying the components;
- append manufacturers' instruction manuals and service manuals as appropriate, including systems, software, and equipment manufacturer's maintenance manuals;
- include copies of forms, checklists, certificates, etc. to be used by the Development Entity's personnel in the execution of Maintenance Work; and
- append system-specific user manuals including the user manual for the MMIS.

The Department will accept standard service manuals for commercially available equipment and products as part of the Maintenance Manual only if the equipment provided is standard off-the-shelf equipment without custom features or functions. For custom equipment and systems, the Development Entity shall provide custom Maintenance Manuals that include detailed information addressing the custom features of the equipment provided and include drawings.

22.8.4 Rehabilitation Work Plan

The Development Entity shall develop and submit, as part of the MMP, a detailed Rehabilitation Work Plan. The Development Entity shall update the Rehabilitation Work Plan annually within 30 Days prior to the beginning of each calendar year (as part of the annual update to the MMP) and as the Development Entity or the Department determine is necessary to comply with the requirements of the Contract Documents. The Development Entity shall include changes to Contract Documents as they relate to Maintenance Work and the Technical Provisions in each update of the Rehabilitation Work Plan.

In the Rehabilitation Work Plan, the Development Entity shall:

- provide an overview of the overarching approach to Rehabilitation Work during the entire Maintenance Period;
- identify the planned Rehabilitation Work cycles (including replacement cycles) for each Element; and
- describe the Development Entity's approach, assumptions, means and methods for the Rehabilitation Work (including Useful Life and Residual Life assumptions) during the entire Maintenance Period.

The determination as to whether a bridge requires rehabilitation or replacement shall be in accordance with the National Bridge Inspection Standards and Highway Bridge Replacement and Rehabilitation Program (23 C.F.R. 650 Subparts C and D).

In the Rehabilitation Work Plan, the Development Entity shall identify and detail the program, approach, procedures, records, type, and schedule of Rehabilitation Work the Development Entity shall perform during the following 5 calendar years to ensure each Element continuously meets or exceeds the requirements of the Contract Documents including without limitations Article 10 of the PA, this Section 22, and the Performance Requirements.

In developing and executing the Rehabilitation Work Plan, the Development Entity shall rely on and fully utilize the MMIS and comply with the requirements of *Section 22.8.1, Maintenance Management Information System* of these Technical Provisions.

The Development Entity shall identify in the Rehabilitation Work Plan the Rehabilitation Work per Element and shall:

- identify the Useful Life for each Element of the Project;
- identify the estimated Residual Life for each Element of the Project;
- identify the planned Rehabilitation Work cycles (including replacement) for each Element for the entire Maintenance Period;
- describe the type of Rehabilitation Work anticipated to be performed at the end of the Element's Residual Life;
- describe Rehabilitation Work anticipated to be performed, or which has been performed, before the end of the Element's Useful Life, including reasons why this Work is anticipated or has been performed at the proposed time;
- describe the nature of Rehabilitation Work and Rehabilitation Work Schedule to be conducted over the following 5 calendar years per *Section 22.8.4.1, Rehabilitation Work Schedule* of these Technical Provisions;
- include plans and procedures for public information and communication of upcoming Rehabilitation Work per *Section 4, Public Information and Communication* of these Technical Provisions;
- include plans and procedures for maintenance and protection of traffic during Rehabilitation Work per *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions, including without limitations site-specific TCP respecting the Project on which Rehabilitation Work is scheduled following the requirements of *Section 20.6.2, Traffic Control Plan* of these Technical Provisions;
- include plans and procedures for the coordination with the Department and affected third parties in the planning and execution of Rehabilitation Work;
- establish the quality system for Rehabilitation Work;
- summarize results of most recently completed inspections (including Department independent inspections or audits) and how the results are incorporated into the Rehabilitation Work;
- describe details of alterations or replacements to structural Elements of Bridges;
- describe (including photographs) the nature and dates of Rehabilitation Work performed over the past calendar year, highlighting unplanned activities;
- incorporate the Rehabilitation Work Schedule per *Section 22.8.4.1, Rehabilitation Work Schedule* of these Technical Provisions; and
- summarize remaining Work required to meet the Handback Requirements once the five-year Rehabilitation Work Plan extends into the Handback Period.

22.8.4.1 Rehabilitation Work Schedule

The Development Entity shall submit to the Department a Rehabilitation Work Schedule as part of the Rehabilitation Work Plan. The Development Entity shall plan Rehabilitation Work Schedule and develop in cooperation with Department, other Governmental Entities, and third parties impacted by proposed Lane Closures to minimize the impact on traffic and avoid the scheduling of proposed Lane Closures during local events.

The Development Entity shall identify the Rehabilitation Work for each Element in the Rehabilitation Work Schedule and provide a detailed schedule of Rehabilitation Work to be conducted over the following 5 calendar years with a daily resolution for the next 24 months, and monthly resolution for the 36 months thereafter. The Development Entity shall include in the Rehabilitation Work Schedule the estimated cost in current dollars of such Rehabilitation Work, and the total estimated cost in current dollars of Rehabilitation Work in each of the years Rehabilitation Work is anticipated to be performed under the Rehabilitation Work Schedule. The Development Entity shall include in the Rehabilitation Work Schedule an explanation, anticipated start and end dates and duration of each planned Rehabilitation Work, and anticipated start and end dates and duration of Lane Closures along with a description of proposed Lane Closures and mitigating measures to avoid an Unavailability Event or negative impact on traffic.

The Development Entity shall show revisions, if any, to the prior Rehabilitation Work Schedule and include an explanation of the reasons for the revisions in Annual updates to the Rehabilitation Work Schedule as part of the annual MMP update. The Development Entity shall make revisions as reasonably indicated by experience and then-existing conditions respecting the Maintenance Limits, the factors described in *Section 10.12.2, Rehabilitation Work Schedule* of the PA, changes in estimated costs of Rehabilitation Work, changes in technology, changes in the Development Entity's planned means and methods of performing Rehabilitation Work, and other relevant factors. The updated Rehabilitation Work Schedule shall show the revisions, if any, to the prior Rehabilitation Work Schedule and include an explanation of reasons for revisions. If no revisions are proposed, the Development Entity shall include an explanation of the reasons no revisions are necessary. During the period the Handback Requirements Reserve Account is in effect, the updated Rehabilitation Work Schedule also shall set forth, by Element, the Development Entity's planned draws from the Handback Requirements Reserve Account during the forthcoming calendar year.

22.8.5 Maintenance Safety and Security Plan

The Development Entity shall perform Maintenance Work in a manner to:

- ensure the safety of the Users, the general public, the Department's employees, and the Development Entity's and the Development Entity-Related Entities' employees in accordance with Safety Standards, and the MMP; and
- minimize the risk of damage, disturbance, or destruction of Department property and third party property.

As part of the MMP, the Development Entity shall develop and implement a Maintenance Safety and Security Plan that addresses staff training, safety procedures, protocols, and specialized equipment associated with the Development Entity's Maintenance Work. The Development Entity shall ensure the Maintenance Safety and Security Plan complies with the requirements of *Section 3, Work Management and Administration* and *Section 20, Maintenance and Protection of Traffic* of these Technical Provisions.

The Development Entity shall address in the Maintenance Safety and Security Plan the Development Entity's approach to meeting the safety objectives set forth in the Contract Documents and in the plan and in its execution, shall:

- provide safety equipment and procedures for the protection of employees, Users, and the general public in the execution of Maintenance Work;
- direct that equipment shall be maintained in a safe and efficient manner in accordance with safety standards, safety organizations, regulations and guidelines pertaining to providing the required services;
- follow safety requirements outlined in the National Electric Safety Code, OSHA and standards or practices for safe installation or maintenance of required equipment per the Contract Documents; and
- notify the Department immediately after injury incurred by Person(s) working on the Project or involving Users or members of the general public.

22.8.6 Transition and Coordination Plan

The Development Entity shall coordinate with the Department to achieve a smooth transition of Maintenance Work between the Department and the Development Entity at the commencement of Maintenance During Construction, at each Bridge Completion (for early handbacks), and at the end of the Maintenance Period (for handback).

As part of the MMP, the Development Entity shall develop and implement a Transition and Coordination Plan. The Transition and Coordination Plan shall detail how the Development Entity plans to Work with the Department, including proposed schedule, to ensure a seamless transfer of maintenance responsibilities at each bridge Completion and at the end of the Term, as applicable. The Development Entity shall also detail in the Transition and Coordination Plan how the Development Entity plans to coordinate with the Department for Department Maintenance Work within the Maintenance Limits during the Maintenance Period.

At least six months prior to each Bridge Completion (for Early Handback Elements) and again at six months prior to the end of the Term (for handback), the Development Entity shall provide a comprehensive training session for the Department's staff, which shall cover in detail maintenance functions of the Project. The training session shall include a review of certain Project records as well as maintenance requirements, and other plans and procedures. The complete curriculum for this training session shall be contained in the Transition and Coordination Plan.

The Transition and Coordination Plan shall be submitted to the Department for review and acceptance 90 Days before the start of Maintenance During Construction.

22.9 Inspections

The Development Entity shall conduct inspections of Elements within the Project Limits during the Construction Period and within the Maintenance Limits during the Maintenance Period per *Section 22.6.1, Maintenance Limits* of these Technical Provisions. The Development Entity shall report to the Department

on a regular basis about the scheduling and completion of inspections and shall provide documentation in BMS2 to ensure NBIS compliance.

22.9.1 Inspection Requirements

The Development Entity shall perform inspections, including NBIS inspections, to maintain Department compliance with FHWA reporting requirements for bridges and Highway assets and to demonstrate compliance with the requirements in the Performance Requirements and *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions. The Development Entity shall conduct routine inspections, underwater inspections, Fracture Critical Member inspections, special inspections, and load rating as necessary to comply with Project Standards and Performance Requirements for operation and maintenance of the Elements. The Development Entity shall perform initial inspections of newly constructed elements, including phased construction wherein each phase must be inspected before being opened of traffic.

The Development Entity shall conduct inspections and load ratings in accordance with the current editions of:

- NBIS requirements per 23 C.F.R. Part 650, National Bridge Inspection Standards (NBIS);
- *Department Pub 238, Bridge Safety Inspection Manual*;
- *Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual*;
- *Department Pub 240, Bridge Safety Inspection Quality Assurance Manual*;
- *Bridge Inspector's Reference Manual*, FHWA NHI 03-001, FHWA;
- *Manual for Bridge Evaluation (MBE)*, MBE-3, American Association of State Highway and Transportation Officials (AASHTO) (with Interims);
- *Manual for Bridge Element Inspection (MBEI)*, MBEI-1, American Association of State Highway and Transportation Officials (AASHTO) (with Interims);
- *LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, LRFDLTS-1, American Association of State Highway and Transportation Officials (AASHTO); and
- *Department Pub 242, Pavement Policy Manual*.

The Development Entity shall record the results of the inspections per *Section 22.8.1, Maintenance Management Information System* of these Technical Provisions and shall include the results of the inspections as part of the Maintenance Reports described in *Section 22.10, Reporting Requirements* of these Technical Provisions.

The Development Entity shall inspect other Elements within the Maintenance Limits at least once every two years to demonstrate compliance with requirements in the following Table 22-1. The Development Entity shall identify and cure Noncompliance Events within Cure Periods shown in *Attachment 32, Noncompliance Events and Performance Requirements*, or as described in *Section 22.7, Performance Requirements* of these Technical Provisions.

Table 22-1. Inspections Requirements within the Maintenance Limits

Element	Inspection Requirements
Bridge Elements and other structural Elements	The Development Entity shall conduct inspections and load rating calculations at the required frequency. In addition, NBIS inspections shall comply with the requirements in <i>Department Pub 238, Bridge Safety Inspection Manual</i> ; and <i>Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual</i> ; and FHWA regulations and at the frequency specified in <i>Department Pub 238, Bridge Safety Inspection Manual</i> ; and <i>Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual</i> ; and FHWA regulations. Inspections shall identify Noncompliance Events with the requirements of <i>Section 22.7, Performance Requirements</i> of these Technical Provisions.
Underground Drainage Systems	The Development Entity shall clean and inspect underground drainage systems with a video camera and provide a report at a minimum of every 10 years throughout the Maintenance Period.
Other Elements	The Development Entity shall conduct inspections at least once every two years or more frequently as indicated in Project Standards to document Element conditions and performance and to identify Noncompliance Events with the requirements of <i>Section 22.7, Performance Requirements</i> of these Technical Provisions. Inspections may be concurrent with the NBIS inspections.

The Development Entity shall update the MMIS and notify the Department of Noncompliance Events in accordance with *Section 2.12, Noncompliance Events* of these Technical Provisions.

The Development Entity shall include planned inspection (including type, date and location and including contact information of the team planned to perform the inspection) as part of the Maintenance Work activities planned for next 12 months in the annual update of the MMP and shall notify the Department on the first calendar day of the month of an inspection scheduled for the current month and the following month.

The Development Entity shall create a new maintenance record in the MMIS for each Element inspected in accordance with *Section 22.8.1, Maintenance Management Information System* of these Technical Provisions. Such maintenance records with respect to inspections shall include employee identifier, details of the manner of inspection, stream conditions, weather conditions, unusual features of the inspection, and Lane Closures.

22.9.2 Inspection Personnel Requirements

The Development Entity shall provide trained and competent personnel to plan and implement the required inspections. The Development Entity shall ensure personnel performing inspections of any Element are certified as inspectors and/or raters in accordance with the following qualification requirements:

- For bridge inspection, personnel and team leader(s) must:
 - Meet the requirements of *Department Pub 238, Bridge Safety Inspection Manual* and 23 C.F.R. 650.309, Qualifications of Personnel;
 - Attend and successfully pass Department’s Bridge Safety Inspector Certification Course, and hold a valid certification as “Bridge Safety Inspector” issued by the Department; and

- Attend and successfully pass the Department’s Bridge Safety Inspector Certification Course and Bridge Inspection Refresher Course as necessary to maintain certification per *Department Pub 238, Bridge Safety Inspection Manual*.
- For Fracture Critical Member inspections, personnel must attend and successfully pass FHWA’s (NHI) Fracture Critical Inspection Techniques for Steel Bridges Course; and
- For underwater inspections, personnel must:
 - As the Engineer in charge of inspection and preparation of the inspection report, be a Professional Engineer licensed in Pennsylvania with a minimum of 5 years of experience in underwater inspection assignments in responsible capacity; and
 - As the underwater bridge inspection diver(s), meet the requirements of 23 C.F.R. 650.309, Qualifications of Personnel and be a certified diver, with at least two years of experience in underwater bridge inspection.

For underwater inspections, a Professional Engineer shall be on the Bridge Site either in the boat or as an underwater bridge inspection diver during the inspections. A team leader meeting the NBIS qualification requirements shall be on the Bridge Site. The Professional Engineer on the Bridge Site or the underwater bridge inspection diver can also be the team leader if they meet the applicable requirements.

The Development Entity shall request the Department’s acceptance for inspection team leaders, inspection supervisors, and the approving Professional Engineer a minimum of 60 Days before initiating the inspections. Changes in such personnel must be accepted by the Department.

22.9.3 Department Inspections and Auditing

The Department will retain the unfettered right to perform periodic inspection, inspection audits, and testing of the Development Entity’s Maintenance Work to assess each category of Element and verify compliance with the Performance Requirements and the other requirements of the Contract Documents. The Department reserves the right to participate in inspections conducted by the Development Entity.

22.9.4 Baseline Inspections

The Development Entity shall perform inspections and / or tests to determine the condition of each Element (the “Baseline Inspections”) toward preparation of the Baseline Element Condition Report (BECR). The Development Entity shall perform the inspections and/or tests in accordance with this *Section 22.9, Inspections* of these Technical Provisions. The Development Entity shall submit to the Department for review and Comment the proposed scope of Baseline Inspections, the methodology proposed for the inspections and/or tests. Upon Department review and Comment of the scope of the Baseline Inspections, the Development Entity shall provide to Department a minimum of 14 Days’ notice to witness the inspections and/or tests at the Department’s discretion.

22.10 Reporting Requirements

During the Term, the Development Entity shall perform initial and regular reporting on Maintenance Work, Rehabilitation Work, and Baseline conditions as follow.

22.10.1 Maintenance Monthly Report

From the date of the first Bridge Completion, the Development Entity shall deliver a Maintenance Monthly Report to the Department for review and Comment no later than the fifteenth calendar day of each month covering the Maintenance Work performed the previous reporting period. The Development Entity shall submit the format of the Maintenance Monthly Report to the Department for review and Comment as part of the MMP. The reporting period used for the Maintenance Monthly Report does not have to be a complete calendar month, but the reporting period used for the Maintenance Monthly Report and other information included in the reporting shall align. The Development Entity shall prepare the monthly reports in electronic format and therein, at a minimum:

- summarize the Planned Maintenance for the upcoming reporting period;
- summarize the Maintenance Work performed and completed for the previous reporting period and confirm the Development Entity performed Maintenance Work in accordance with the Contract Documents;
- summarize the Planned Maintenance previously scheduled for the reporting period that was not completed in the reporting period, including the reasons for not completing Planned Maintenance and a revised schedule for uncompleted Work;
- summarize the maintenance activities performed in the previous reporting period beyond the Planned Maintenance for the reporting period;
- detail results of Planned Maintenance and other Maintenance Work performed during the reporting period;
- summarize inspection activities, assessments, testing activities and results, identified Noncompliance Events, and consequential Maintenance Work;
- report Noncompliance Events starting or ending during the reporting period, describing at a minimum:
 - the corresponding name and identification number per Table A32-1 (D&C Period Noncompliance Events) and Table A32-3 (Maintenance Period Noncompliance Events) of *Attachment 32, Noncompliance Events and Performance Requirements*, and the Performance Requirements of these Technical Provisions;
 - the applicable Cure Period;
 - the Noncompliance Start Date;
 - Noncompliance Rectification Date;
 - the Party who first identified the event;
 - whether the event was the result of an Incident or an Emergency;
 - details regarding the cure of such Noncompliance Events, including the steps taken and the time it took to cure;
 - the status of the event as of the end of the reporting period;
 - confirmation of cure if applicable;

- Noncompliance Points accrued if any associated with each event; and
- the changes (if any) made to the MMP based upon the events.
- summarize a calculation of Noncompliance Points accrued by the Development Entity for the past reporting period and cumulative number of Noncompliance Points assessed during the last rolling 12-month period and 48-month rolling period, and a detailed assessment of the Monthly Maintenance Noncompliance Deductions, per *Section 2.12, Noncompliance Events* of these Technical Provisions and *Exhibit 6, Payment Mechanism* of the PA;
- list and total the number of Lane Closures, including details describing the location and duration and explaining as applicable for each Closure whether it is an Unavailability Event or a Permitted Closure, and whether it is a Lane Closure or a detour, and a detailed assessment of Monthly Maintenance Unavailability Deductions per *Exhibit 6, Payment Mechanism* of the PA;
- provide a detailed assessment and calculation of the Monthly Maintenance Unavailability Deductions for the past reporting period and cumulative amount of Monthly Maintenance Unavailability Deductions assessed during the last rolling 12-month period, per *Exhibit 6, Payment Mechanism* of the PA;
- update the Development Entity's Emergency, Incident, and severe weather damage assessment logs per *Section 22.6.6, Unplanned Maintenance Activities* of these Technical Provisions, including a time-based report of actions and activities performed by the Development Entity;
- describe the completed or programmed upcoming Rehabilitation Work and measures to complete such Work;
- complete materials certification using *PennDOT Form, CS-4171, Certificate of Compliance* for materials incorporated into the Work;
- certify the Work performed meets Development Entity's acceptance criteria.
- for inspections, list BMS number, bridge inspection due date, actual bridge inspection date, if an analysis is being performed and when it will be done, and the 60 day analysis due date; and
- list Maintenance Priority 0's and 1's, identified per *Department Pub 238, Bridge Safety Inspection Manual*, and associated date on which the Plan of Action (POA) was completed, the date the work is planned to be done, and when it is actually done.

22.10.2 Maintenance Annual Report

On an annual basis, the Development Entity shall create a consolidated Maintenance Annual Report. In the Maintenance Annual Report, the Development Entity shall summarize the Development Entity's Maintenance Work performed for the year, and confirm, by signature of the Maintenance Manager, the Development Entity performed its Maintenance Work in compliance with the Contract Documents.

From the date of the first Bridge Completion, the Development Entity shall deliver the Maintenance Annual Report to the Department no later than 30 Days after each calendar year for review and Comment, starting on January 1st following one full year after the date of the first Bridge Completion. The Development Entity shall complete the Maintenance Annual Report in accordance with the requirements set forth in this Section 22. In the Maintenance Annual Report, the Development Entity shall:

- summarize Maintenance Monthly Reports from the preceding year;
- report NBIS ratings for Project (with dates of inspection) and Elements subject to NBIS inspections and provide a statistical summary analysis of the NBIS scores for the Project along with explanations;
- summarize Noncompliance Events and Noncompliance Points accrued for the preceding year per Table A32-1 (D&C Period Noncompliance Events) and Table A32-3 (Maintenance Period Noncompliance Events) of *Attachment 32, Noncompliance Events and Performance Requirements* and the Performance Requirements of these Technical Provisions;
- state adjustments made to the Maintenance Monthly Reports from the preceding year (if any);
- summarize the information requested by the Department (corrected if necessary), by month during the preceding year (if any); and
- incorporate a Rehabilitation Work Report, when applicable, and show how completed work will affect the Handback Work Plan.

22.10.3 Rehabilitation Work Annual Report

As part of the Maintenance Annual Report, the Development Entity shall deliver the Rehabilitation Work Annual Report to the Department no later than 90 Days after each calendar year for the Department review and Comment. In the Rehabilitation Work Report the Development Entity shall, at a minimum:

- summarize the preceding year's completed Rehabilitation Work performed, including the location, the type of Work performed for each Element listed on the Rehabilitation Work Schedule and other component, including the dates of commencement and completion and the final cost (per type of Work);
- provide updates to Record Drawings, as necessary;
- report inventory data updated as a result of the Rehabilitation Work;
- list Rehabilitation Work that was included in the previous year's Rehabilitation Work Schedule, but was not conducted and an explanation of why the Development Entity did not conduct this Rehabilitation Work;

- provide materials certification *PennDOT Form, CS-4171, Certificate of Compliance* for materials incorporated into the Work; and
- certify, by signature of the Maintenance Manager, the Work performed meets Development Entity's acceptance criteria and show how completed work will affect the Handback Work Plan.

22.10.4 Baseline Element Condition Report

The Development Entity shall prepare a Baseline Element Condition Report (BECR) for each Element of the Project and shall submit to the Department for review and Comment as part of the MMP no later than 60 Days prior to NTP3. With respect to the BECR, the Development Entity shall:

- include a record of the condition of each Element;
- associate each photographic record and /or measurement with a location accurate to the nearest 10 feet;
- record the condition of each Element such that there is a minimum of one record for each component or element within which the Element is represented; and
- include sufficient records where the condition of an Element varies to demonstrate the range of conditions and a reference condition for the Element shall be recorded for each component and sub-element.

The Development Entity shall include in the BECR the results of the most recent in-depth or special inspection(s) undertaken by the Department, including the results of the annual survey of pavement condition for the Project, including main lanes, ramps, frontage roads, cross streets, and direct connectors as applicable, which shall be undertaken using automated condition survey equipment.

22.11 Section 22, Maintenance Submittal Requirements

Whenever a Submittal identified in the following *Table 22-2* becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates *Table 22-2* information. The Department will conduct reviews and provide Department Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and *Table 222* and Project Agreement Section 6.3.

Table 22-2. Section 22, Maintenance Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Maintenance Limits	2	15	NTP3	—	—
2	Maintenance Management Plan (MMP)	2	20	NTP3	—	—
3	Maintenance Manual (Part of MMP)	2	15	NTP3	—	—

22. Maintenance

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
4	Maintenance Management Information System (MMIS)	2	15	NTP3	—	—
5	Schedule of Planned Maintenance and Routine Maintenance (Part of MMP)	2	15	NTP3	—	—
6	Maintenance Safety and Security Plan (Part of MMP)	2	10	NTP3	—	—
7	Rehabilitation Work Plan and Rehabilitation Work Schedule (Initial - as part of MMP)	2	15	NTP3	—	—
8	Transition and Coordination Plan (Part of MMP)	2	10	NTP3	—	—
9	Maintenance Monthly Report Format	1	5	The first Bridge Completion	—	—
10	Inspection Personnel Qualifications	2	5	Each Bridge Completion	—	—
11	Baseline Element Condition Report (BECR)	1	15	Construction Work commencement for Submittal related Work	—	—
12	Final Maintenance Limits	3	15	Each Bridge Completion	—	—
13	Maintenance Management Plan Updates	2	10	—	Maintenance Period	—
14	Rehabilitation Work Plan and Rehabilitation Schedule (Annually - During Maintenance Period)	2	10	—	Maintenance Period	—
15	Lane Closures for Rehabilitation Work	1	10	—	Maintenance Period	—
16	NBIS Bridge Inspection Reports	1	10	—	Maintenance Period	—
17	Load Rating (or re-Rating) w/Computations	1	10	—	Maintenance Period	—
18	Underground Drainage System Inspection Report	1	10	—	Maintenance Period	—
19	Damage assessment report	1	10	—	Maintenance Period	—
20	Hazardous Material Release Event Report	1	10	—	Maintenance Period	—
21	Corrective and Preventative Action Plans	2	10	—	Maintenance Period	—

22. Maintenance

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
22	Maintenance Monthly Report	1	5	—	Maintenance Period	—
23	Maintenance Annual Report	1	15	—	Maintenance Period	—
24	Rehabilitation Work Annual Report	1	15	—	Maintenance Period	—
25	Report of Maintenance, Remedial Action or Modification of Post-Construction Stormwater Management (PCSM) Facilities (per Section 5)	1	15	—	Maintenance Period	—
26	Fully Populated MMIS data transferred to Department system(s)	3	20	—	Maintenance Period	—

23 Handback

23.1 General Requirements for Handback

23.1.1 Handback Requirements for Early Handback Elements

Subject to the text in this *Section 23.1.1, Handback Requirements for Early Handback Elements*, and upon Department notice of a Bridge's respective Bridge Completion, the Department will assume maintenance responsibility for such Bridge's Early Handback Elements.

The Development Entity shall transfer responsibility for Maintenance Work of the Early Handback Elements at each Bridge Site to the Department upon the respective Bridge Site's Bridge Completion or at such times and as specified in this Section 23.1.1.

The Development Entity shall coordinate with the Department to establish an early handback schedule to perform an orderly joint inspection process before transfer of maintenance responsibilities of Early Handback Elements to the Department. Using the results of the inspection(s), the Development Entity shall provide a final Baseline Element Condition Report (BECR) using the requirements for maintenance reports described in *Section 22.10, Reporting Requirements* of these Technical Provisions.

Prior to each Bridge Completion, the Development Entity shall confirm those Elements at the respective Bridge Site listed as Development Entity responsibilities in Table A31-1 (Construction Period Maintenance Responsibilities) of *Attachment 31, Maintenance Responsibilities* of these Technical Provisions meet the requirements of subsection (a) of the definition of Performance Requirements. Provided the Performance Requirements are met, and upon achieving Bridge Completion for such Bridge, the Department and Development Entity will assume their respective responsibilities for the Elements included under Table A31-2 (Maintenance Period Maintenance Responsibilities) of *Attachment 31, Maintenance Responsibilities* of these Technical Provisions.

As a condition precedent to achieving Bridge Completion, pavement at such Bridge shall meet the Performance Requirements and the requirements defined in *Section 22.7, Performance Requirements*. Provided these conditions are met, the Department will assume maintenance responsibilities for pavement upon the date of such Bridge's Bridge Completion.

Prior to each Bridge Completion, and prior to transfer of maintenance responsibilities of Early Handback Elements, the Development Entity shall provide materials certification using the electronic version of form *CS-4171, Certificate of Compliance*, for materials incorporated into the Work and certification the Work performed meets Development Entity's acceptance criteria.

The Development Entity shall develop as part of the Handback Work Plan (described in *Section 23.5, Handback Work Plan* of these Technical Provisions), for each Bridge, a plan to transition the Early Handback Elements described in this Section 23.1.1 that will be transferred to the Department for maintenance responsibility upon each Bridge Completion. This section of the Handback Work Plan shall follow the same procedures and processes set forth in *Section 23.5, Handback Work Plan* of these Technical Provisions. The Development Entity shall obtain Department acceptance of a Bridge's Early Handback Elements transition plan of the Handback Work Plan as a condition precedent to Bridge Completion of such Bridge.

The Development Entity shall perform Maintenance During Construction as necessary to ensure the Early Handback Elements meet the requirements of subsection (a) of the definition of Performance Requirements until such date when maintenance responsibilities are transferred to the Department.

23.1.2 Handback Requirements

The Development Entity shall ensure each Element meets the minimum Handback Requirements in this Section 23 including, without limitations, the Performance Requirements, the Residual Life at Handback provided in *Table 23-1, Useful and Residual Life Requirements* and the requirements in *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions at the end of the Term.

For cast in place decks, the Development Entity shall provide a latex modified concrete (LMC) overlay or polyester polymer concrete (PPC) overlay to the deck two years prior to the end of the Term.

For precast decks or modular deck units with closure pours, the Development Entity shall provide a LMC overlay or PPC overlay two years prior to the end of the Term. The Development Entity shall provide 0.25-inch over placement of ultra high performance concrete (UHPC) and the beam deck modules, then scarify the entire deck before placing LMC or PPC overlay. Scarification is needed for proper bond of overlay. Closure pours shall be made using one of the following methods: UHPC with mild reinforcement and exposed aggregate finish or conventional grout with post tensioning. The beam/girder haunch shall be cast with an UHPC and exposed aggregate finish at the longitudinal closure pour. The beam/girder haunch and shear pockets at other beams/girders shall be cast with either an UHPC concrete or an epoxy grout. The Development Entity shall confirm that mechanical texturing is provided for LMC and PPC overlays.

At the end of the Term, the Development Entity shall provide materials certification using the electronic version of form *CS-4171, Certificate of Compliance*, for materials incorporated into the Work and certification the Work performed meets Development Entity's acceptance criteria.

23.2 Project Standards

Project Standards applicable to the Work are included within this document, *Attachment 1, Project Standards* of these Technical Provisions.

23.3 Bridge-Specific Requirements

Bridge-Specific Requirements are included in *Attachments 2 through 10, Bridge-Specific Requirements* of these Technical Provisions.

23.4 [Reserved]

23.5 Handback Work Plan

As part of the PMP, the Development Entity shall prepare a Handback Work Plan expanding upon the information the submitted with the Package Proposal. The Development Entity shall implement, manage, and update the accepted Handback Work Plan in accordance with the PMP requirements. The Handback Work Plan shall demonstrate how the Maintenance Work ensures the Elements will meet the requirements of these Technical Provisions in *Section 23.1.1, Handback Requirements for Early Handback Elements* at each Bridge Completion and *Section 23.1.2, Handback Requirements* at the end of the Term. The

Development Entity shall submit and update the Handback Work Plan in coordination with the initial submittal and annual updates to the MMP.

The Development Entity shall incorporate new inspection data obtained prior to each update. Each update of the Handback Work Plan shall include a progress report on the Maintenance Work, including Rehabilitation Work, performed to meet the requirements of this Section 23.

The Handback Work Plan shall contain the details necessary to meet the Handback Requirements in this *Section 23* and for the calculation of the amount of deposits necessary for the Handback Requirements Reserve Account as set forth in the Section 10.13.4 and Exhibit 18 of the *Project Agreement*.

The Handback Work Plan shall rely on and fully utilize the Maintenance Management Information System (MMIS) and comply with the requirements of *Section 22.8.1, Maintenance Management Information System* of these Technical Provisions.

The Development Entity shall coordinate the development of the Handback Work Plan with the Department, as further detailed in this *Section 23.5, Handback Work Plan*.

The Development Entity shall include the following, at a minimum, in the Handback Work Plan:

- procedures and schedule for the assessment by the Development Entity of the Elements' conditions and performances per the Performance Requirements, the Residual Life at Handback provided in *Table 23-1, Useful and Residual Life Requirements*, and the requirements in *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions to determine the Maintenance Work necessary to meet the Handback Requirements;
- calculation methodology to determine Residual Life of each Element provided in *Table 23-1, Useful and Residual Life Requirements* at the end of the Term;
- program and schedule of Maintenance Work to ensure the requirements of the Performance Requirements, the Residual Life at Handback provided in *Table 23-1, Useful and Residual Life Requirements*, and the requirements in *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions are met at the end of the Term;
- program and schedule of phased joint inspections of Bridges to verify each Element meets the requirements of the Performance Requirements, the Residual Life at Handback provided in *Table 23-1, Useful and Residual Life Requirements*, and the requirements in *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions as of the Termination Date and plan for the coordination of such joint inspections with the Department as per *Section 23.5.2, Inspection during the Handback Period*;
- procedures and data necessary to support the Section 10.13.4 and Exhibit 18 requirements of the *Project Agreement* (including without limitations the calculation of the amount to be deposited into the Handback Requirements Reserve Account per Exhibit 18 of the *Project Agreement*), and to demonstrate how the Handback Requirements Reserve Account will be used to fund Maintenance Work to meet the requirements of this Section 23;
- plan for the phased transition of maintenance responsibilities for each Bridge to the Department upon satisfaction of the acceptance criteria; and

- information required under *Section 23.5.7, Annual Updates of the Handback Work Plan* of these Technical Provisions.

23.5.1 Residual Life Methodology

As part of the Handback Work Plan, the Development Entity shall develop and prepare a Residual Life Methodology for each Element in the categories specified in *Table 23-1, Useful and Residual Life Requirements*. The Development Entity shall utilize applicable current industry standards, manufacturer's life expectancy, and asset histories in addition to criteria listed in the Performance Requirements and *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions to determine the condition, performance, and the Residual Life for each Element.

23.5.2 Inspection during the Handback Period

The Development Entity shall conduct Residual Life Inspections during the Handback Period to inspect Elements and verify the requirements of the Performance Requirements, the Residual Life at Handback provided in *Table 23-1, Useful and Residual Life Requirements*, and the requirements in *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions are met at the end of the Term. The Development Entity shall schedule, coordinate, and facilitate joint inspections of the Development Entity and the Department requiring concurrence of the Department on the results and interpretation of such inspections including resolutions to Nonconforming Work.

The Development Entity shall develop a schedule of inspections as part of the Handback Work Plan. At a minimum, the inspections shall include those described in *Sections 23.5.2.1 through 23.5.2.3*. The schedule for such proposed inspections shall be subject to the Department's review and Comment. The Development Entity shall notify the Department 30 Days prior to an inspection during the Handback Period.

The Development Entity shall deliver to the Department, within 10 Days after it is created, not to exceed 30 Days after the inspection, the results and output data arising from an inspection, testing and interpretation and conclusion thereof.

The Development Entity shall use the same procedures and methodologies for inspection and determination of Rehabilitation Work used throughout the Term during the Handback Period. The test and inspection procedures detailed in the Handback Work Plan shall indicate particular reference standards, or other information used to support the testing, inspection, and asset evaluation process, including updates to the Department's standards occurring during the Term.

For the purpose of meeting the Handback Requirements under this Section 23, the NBIS rating requirements set forth in *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions shall be based on NBIS inspections performed pursuant to *Section 22.9, Inspections* of these Technical Provisions. Such inspection for handback will occur within this period regardless of the regularly scheduled inspection cycle. Such inspections shall be performed jointly with the Department.

23.5.2.1 Preliminary Handback Inspection

Upon commencement of the Handback Period, the Development Entity shall perform a preliminary handback condition inspection for the Elements included in the Maintenance Performance Requirements,

Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements, and Table 23-1, Useful and Residual Life Requirements of these Technical Provisions.

Within 30 Days following performance of the preliminary handback condition inspection, the Development Entity shall submit a preliminary handback condition report that presents the findings of the inspection, including Residual Life test results, IQF testing results and findings, the Development Entity's calculation of Residual Life at the end of the Term for the Elements in *Table 23-1, Useful and Residual Life Requirements*, and the Development Entity's calculation of the handback work cost.

23.5.2.2 Intermediate Handback Inspection

The Development Entity shall perform an intermediate handback condition inspection of the Elements in the Maintenance Performance Requirements, *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements, and Table 23-1, Useful and Residual Life Requirements* of these Technical Provisions between 18 and 24 months prior to the end of the Term whether or not the Development Entity has undertaken Rehabilitation Work in the period of time since the preliminary handback inspection.

The Development Entity shall inspect underground drainage systems that are connected to downspouts on structures with a video camera and include in the intermediate handback condition report described below. The Development Entity shall perform necessary repairs to meet the performance requirements in *Table A32-4 (Maintenance Performance Requirements During the Maintenance Period) of Attachment 32, Noncompliance Events and Performance Requirements* of these Technical Provisions.

Within 30 Days following performance of the intermediate inspection, the Development Entity shall submit an intermediate handback condition report that presents a description of the Rehabilitation Work performed, including costs, since the preliminary handback inspection, the findings of the inspection, including Residual Life test results, IQF testing results and findings, the Development Entity's calculation of Residual Life at the end of the Term for the Elements in *Table 23-1, Useful and Residual Life Requirements*, and the Development Entity's calculation of the handback work cost.

23.5.2.3 Final Handback Inspection

The Development Entity shall perform a final handback condition inspection of the Elements in the Maintenance Performance Requirements *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements, and Table 23-1, Useful and Residual Life Requirements* of these Technical Provisions between 30 and 60 Days prior to the end of the Term, or such date as mutually agreed to between the Department and Development Entity. The inspection shall be performed whether or not the Development Entity has undertaken Rehabilitation Work for a particular Element in the period since the preliminary and intermediate handback inspections.

Within 30 Days following performance of this inspection, the Development Entity shall submit a final handback condition report that presents a description of the Rehabilitation Work performed, including e costs, since the intermediate handback inspection, the findings of the inspection, including Residual Life test results, IQF testing results and findings, the Development Entity's calculation of Residual Life at the end of the Term for the Elements in *Table 23-1, Useful and Residual Life Requirements*. The Development Entity shall provide calculations and document in the final handback report handback Work remaining to be performed and its associated handback work costs.

23.5.3 Assessment of Conditions, Performance, and Residual Life

The Development Entity shall detail in the Handback Work Plan the Work, schedule, processes and procedures, methods and tests to be used as part of the condition and performance assessments, the acceptance criteria, the acceptance measures or limits to be satisfied, and the conditions and data to be used to verify each Element functions as intended, meets the criteria set forth in the Performance Requirements, *Table 23-1, Useful and Residual Life Requirements*, and *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions, and complies with the applicable codes, standards, and Governmental Approvals set forth in the Contract Documents at the end of the Term.

Using the methodology established in *Section 23.5.1, Residual Life Methodology* of these Technical Provisions, the Development Entity shall determine the Residual Life for the categories identified in *Table 23-1, Useful and Residual Life Requirements* together with additional categories required for the Development Entity's Released for Construction Design Documents configuration and assets in place at the time of the evaluation.

Table 23-1. Useful and Residual Life Requirements

Element Category	Useful Life (Total Life)*	Residual Life at Handback
STRUCTURES (NON-BRIDGE ELEMENTS)		
Reinforced Concrete	70	35
Precast	80	45
ANCILLARY		
Earthwork Slopes	100	65
Guiderail (attached to structure)	40	5
Concrete Barrier (attached to structure)	70	35
Overhead Sign Structures	100	65
Traffic Signal Housings and Mountings	50	15
Fence	40	5
Curbs	70	35
Light Poles	40	5
High-Mast Lighting Poles	50	15
Noise Walls	100	65
Retaining Walls	100	65

23.5.4 Rehabilitation Work during the Handback Period

The Development Entity shall detail in the Handback Work Plan the Development Entity's approach to Maintenance Work, including Rehabilitation Work and areas under remedial Work, during the Handback Period so each Element meets the Performance Requirements, Residual Life requirements as specified in *Table 23-1, Useful and Residual Life Requirements*, and *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions, based upon the Development Entity's Released for Construction Design Documents configuration and assets in place at the time of the Handback Work Plan's preparation. The Development Entity shall coordinate with the Department the scheduling of Rehabilitation Work required under the Handback Work Plan. Rehabilitation Work identified

as part of the Handback Work Plan shall be planned and scheduled according to the requirements in *Section 22.8.4, Rehabilitation Work Plan* of these Technical Provisions.

23.5.5 [Reserved]

23.5.6 Execution of the Handback Work Plan

The Development Entity shall implement the Handback Work Plan upon commencement of the Handback Period, or such earlier time as described in the Handback Work Plan.

23.5.7 Annual Updates of the Handback Work Plan

The Development Entity shall update the Handback Work Plan at a minimum annually as part of the Project Management Plan updates. Upon commencement of the Handback Period, no later than 30 Days after commencement of each Handback Year, the Development Entity, upon consultation with the Department, shall update the Handback Work Plan as needed to:

- include a progress report evaluating the progress and effectiveness of the Maintenance Work, including Rehabilitation Work, performed in the prior Handback Year to meet the requirements of this Section 23 as described in the Handback Work Plan submitted for the prior Handback Year;
- include the results of inspections performed during the prior Handback Year;
- update the schedule of Maintenance Work, including the schedule of Rehabilitation Work, as necessary to meet the requirements of this Section 23;
- provide actual costs for the Work performed in the previous Handback Year and estimated cost and schedule of implementation of the remaining Maintenance Work, including Rehabilitation Work;
- provide updates to the calculation of Residual Life and updates on the condition and performance of the Elements with respect to the criteria set forth in the Performance Requirements, *Table 23-1, Useful and Residual Life Requirements*, and *Section 22.7.3, National Bridge Inspection Standards Bridge Rating Requirements* of these Technical Provisions; and
- provide additional data required to meet the Section 10.13.4 (Handback Requirements Reserve Account) and Exhibit 18 requirements of the Project Agreement.

23.6 Section 23, Handback Submittal Requirements

Whenever a Submittal identified in the following Table 23-2 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table 23-2 information. The Department will conduct reviews and provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table 23-2.

Table 23-2. Section 23, Handback Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1	Materials certification using form CS-4171 (Certificate of Compliance)	As part of the Rehabilitation Work Annual Report, Refer to Table 22-2, <i>Section 22, Maintenance</i> Submittal Requirements				
2	NBIS Bridge Inspection Reports	Refer to Table 22-2, <i>Section 22, Maintenance</i> Submittal Requirements				
3	Handback Work Plan (HWP)	2	20	NTP3 and each Bridge Completion, in accordance with Section 23.1.1 of these Technical Provisions		—
4	Annual Handback Work Plan updates	3	20	Handback	Construction and Maintenance Periods	—
5	Final Baseline Elements Condition Report	1	15	Each Bridge Completion	—	—
6	Preliminary Handback Condition Report	1	15	Handback	Maintenance Period	—
7	Intermediate Handback Condition Report	1	15	Handback	Maintenance Period	—
8	Final Handback Condition Report	1	15	Handback	Maintenance Period	—

Attachment 1

Project Standards

This document establishes the Project Standards. The Project Standards include the following:

- all Department publications and forms provided on the Departments webpage: [Forms, Publications and Maps \(penndot.gov\)](#) with the exception of Section 100 (General Provisions) of *Department Pub 408, Highway Construction Specifications*, which is specifically excluded; and
- documents identified in Table A1-1 below.

Table A1-1. Applicable Non-Department Publications

Title
23 CFR 771
23 CFR 771.111(h)
23 CFR 772
23 CFR 774
23 CFR Part 646 Railroads
29 CFR Chapter XVII, part 1910
29 CFR Chapter XVII, Part 1926 and (Public Law 91-596)
44 CFR Parts 60-65
49 CFR Part 222 Use of Locomotive Horns at Public Highway-Rail Grade Crossings
49 CFR Part 229 Railroad Locomotive Safety Standards
49 CFR Part 26
AACE International Recommended Practice No. 29R-03
AACE International Recommended Practice No. 45R-08
AACE International Recommended Practice No. 52R-06, Time Impact Analysis – as Applied in Construction, AACE International 2006
AASHTO A Guide for Transportation Landscape and Environmental Design
AASHTO A Policy on Design Standards – Interstate System
AASHTO A Policy on Geometric Design of Highways and Streets
AASHTO Bridge Aesthetics Sourcebook: Practical Ideas for Short- and Medium Span Bridges
AASHTO Guide Design Specifications for Temporary Works, 2017 2 nd Edition
AASHTO Guide for Design of Pavement Structures (1993)
AASHTO Guide Specifications for Design and Construction of Segmental Concrete Bridges, 2nd Edition, with 2003 Interim Revisions
AASHTO LRFD Bridge Design Specifications, 9 th Edition
AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals
AASHTO Manual for Bridge Element Inspection (MBEI)
AASHTO Manual for Bridge Evaluation (MBE)
AASHTO Roadside Design Guide
AASHTO Roadway Lighting Design Guide
AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals
AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing
FHWA Accessible Shared Streets: Notable Practices and Considerations for Accommodating Pedestrians with Vision Disabilities
Agricultural Area Security Law, Pennsylvania Act 1981-43
American National Standards Institute and the International Safety Equipment Association (ANSI/ISEA) Standard 107
2010 ADA Standards for Accessible Design

Title
Americans with Disabilities Act (ADA) Accessibility Guidelines
AMTRAK Construction Manual
AMTRAK Third Party Resources
ANSI A300 (Part 1) Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices
ANSI A300 (Part 2) Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices - Part 2 – Fertilization
ANSI A300 (Part 3) Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices - Part 3 - Tree Support Systems
ANSI Z133.1, Safety Requirements for Pruning Trimming, Repair, Maintaining and Removing Trees and for Cutting Brush
ANSI Z60.1 American Standard for Nursery Stock
ASTM Book of Standards, Section 4: Construction
ASTM E 1527, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process"
FHWA Bikeway Selection Guide
Bureau of Reclamation. SRH-2D Sediment Transport Modeling User's Manual, Version 3.3 (June 2020).
Chapter 102, Title 25 (Pennsylvania Clean Streams Law)
Clean Air Act and Amendments and PA Act 120
Clean Streams Law, 35 P.S. §§ 691.1
Contiguous Community Matching
CSX Guide for Contractor Safety and Compliance
Department Strike-Off-Letters
Department policy letter titled Road Condition Reporting System Requirements
FHWA Designing Sidewalk and Trails for Access
Emergency Detour Route for Limited Access Freeways
Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations"
Federal Aviation Administration's (FAA) 14 CFR Part 107 Small Unmanned Aircraft Systems
Federal Construction Safety Act (Public Law 91-54)
Federal Highway Administration, Bridge Inspector's Reference Manual (BIRM)
Federal Highway Administration, Manual on Uniform Traffic Control Devices (MUTCD)
Federal Highway Administration. Highway Noise Barrier Design Handbook
Federal Highway Administration. Highway Traffic Noise: Analysis and Abatement Guidance
Federal Highway Administration. Report Number FHWA HEP-06-015, "FHWA Construction Noise Handbook," August 2006.
Federal Highway Administration. Report Number FHWA-HEP-18-065, "Noise Measurement Handbook – Final Report," June 2018.
Federal Highway Administration. Traffic Noise Model Version 2.5 User's Guide
FHWA Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Design Guidance, Hydraulic Engineering Circular No. 23 (HEC-23)
FHWA Culvert Design for Aquatic Organism Passage, 1 st Edition. Hydraulic Engineering Circular No 26. (HEC-26)
FHWA Debris Control Structures, Evaluation and Countermeasures, 3 rd Edition. Hydraulic Engineering Circular No. 9. (HEC-9)
FHWA Design of Bridge Deck Drainage, Hydraulic Engineering Circular No. 21 (HEC-21)

Title
FHWA Design of Roadside Channels with Flexible Linings, 3 rd Edition. Hydraulic Engineering Circular No. 15. (HEC-15)
FHWA Evaluating Scour at Bridges, Hydraulic Engineering Circular No 18, 5 th edition (HEC-18)
FHWA Form 4260: Section 508 Information and Communication Technology (ICT) Conformance Criteria
FHWA Highways in the Coastal Environment - 3 rd edition, Hydraulic Engineering Circular No. 23 (HEC-25)
FHWA Highways in the River Environment – Floodplains, Extreme Events, Risk and Resilience, Hydraulic Engineering Circular No 17, 2 nd edition. (HEC-17)
FHWA Hydraulic Design of Energy Dissipators for Culverts and Channels, Hydraulic Engineering Circular No 14, third edition (HEC-14)
FHWA Publication No FHWA-HIF-12-026 Hydraulic Design of Highway Culverts, 3 rd Edition. Hydraulic Design Series Number 5.
FHWA Publication No FHWA-HIR-19-061 Two-Dimensional Hydraulic Modeling for Highways in the River Environment, latest edition.
FHWA Publication No. FHWA-HIF-12-018 Hydraulic Design of Safe Bridges, April 2012. Hydraulic Design Series Number 7
FHWA Recording and Coding Guide for Structure Inventory and Appraisal of the Nation's Bridges
FHWA Roadway Construction Noise Model (FHWA RCNM) User's Guide
FHWA Stream Stability at Highway Structures, 4 th Edition. Hydraulic Engineering Circular No. 20. (HEC-20)
FHWA Tech Brief, Publication # FHWA-HIF-19-060, Scour Considerations within AASHTO LRFD Design Specifications
FHWA Urban Drainage Design Manual, 3 rd Edition. Hydraulic Engineering Circular No 22. (HEC-22)
Flood Insurance Rate Map (FIRM)
Floodway Analysis and Mapping
Forensic Schedule Analysis, AACE International 2011
FHWA Geotechnical Engineering Circular (GEC) No. 4 - Ground Anchors and Anchored Systems
AASHTO Guide for the Development of Bicycle Facilities
AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
PennDOT Hazardous Walking Route Engineering and Traffic Study (TE-111)
Transportation Research Board, Highway Capacity Manual, 6 th Edition
Hortus Third: A Concise Dictionary of Plants Cultivated in the United States and Canada (L.H. Bailey Hortorium 1976)
Hydraulics: Two-Dimensional Analysis
ICT Final Standards and Guidelines (508 Refresh) at 36 CFR Part 1194
Illumination Guidelines for Nighttime Highway Work
ISO 14001
ISO 9001
Manual for Railway Engineering and Communications & Signal Manual of Recommended Practices
Manual of Practice for Professional Land Surveyors in the Commonwealth of Pennsylvania as adopted by the Pennsylvania Society of Land Surveyors
FHWA Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways
PennDOT Midblock Crosswalk Engineering Study (TE-113)
MT-2 Requests
National Bridge Inspection Standards and Highway Bridge Replacement and Rehabilitation Program (23 CFR 650 Subparts C and D).
National Electrical Code
NSRC Public Projects Manual
NSRC Specifications for Design

Title
Office of Highway Policy Information from Federal Highway Administration https://www.fhwa.dot.gov/policyinformation/tmguid/tmg_2013/vehicle-types.cfm
OSHA 29 CFR 1910.120 (HAZWOPER Training)
PA Code Title 25 Pennsylvania Code Section 123.1, Prohibition of Fugitive Emissions
PA Code Title 25, Chapter 102 Erosion and Sediment Control and USEPA Clean Water Act Section 404 National Pollutant Discharge Elimination System
PA Code Title 25, Chapter 105 and Chapter 106 and USACE Clean Water Act Section 401/404. A PA Code Title 25, Chapter 105 Water Obstruction and Encroachment
PA Code Title 25, Chapter 105 and Chapter 106 and USACE Clean Water Act Section 401/404. 25 PA Code Section 105 Dam Safety and Waterway Management
PADEP's 'Erosion and Sediment Pollution Control Program Manual' Document Number 363-2134-008
PADEP's 'Pennsylvania Stormwater Best Management Practices Manual' Document Number 363-0300-002
Pennsylvania Fish and Boat Commission Aids to Navigation Policy Manual
Pennsylvania Fish and Boat Commission Guidelines for Aids to Navigation (ATON) Plans
PennDOT Pedestrian Needs Accommodation at Signalized Intersections Checklist (TE-672)
PennDOT Traffic Signal Unified Command and Control Integration Guidelines
Pennsylvania Department of Environmental Protection, Bureau of Waste Management, Management of Fill Policy
Pennsylvania State History Code
Pennsylvania's Storm Water Management Act (P.L. 864, No. 167)
Profile Baseline Guidance
PUC, Public Utility Code, Act of July 1, 1978
Quality Management Systems — Requirements
Riverine Mapping and Floodplain Boundaries Guidance
Scheduling Claims Protection Methods, AACE International 2009
PennDOT School Zone Speed Limit Engineering and Traffic Study (TE-112)
Section 106 of the National Historic Preservation Act
Section 1917-A of the Administrative Code, 71 P.S. § 510-17
Section 4(f) of the US Department of Transportation Act, 23 CFR 774
Section 508 of the Rehabilitation Act
FHWA Separated Bike Lane Planning and Design Guide
Shallow Flooding Analyses and Mapping
FHWA General Engineering Circular (GEC) No. 7 - Soil Nail Walls
Solid Waste Management Act, 35 P.S. §§ 6018.101
Specification for Pipeline Occupancy of the Wheeling and Lake Erie Railway Company Right of Way/Property and Tracks (specification for underground occupancy).
Specifications for Wire, Conduit and Cable Occupations for the Wheeling and Lake Erie Railway Company Right of way/Property and Tracks (Specification for Overhead Occupancy)
Specifications for Working on RBMN Right of Way
Spotted Lanternfly (SPL) Order of Quarantine and Treatment
Synchro Studio (Latest Version) Synchro plus SimTraffic User Manual
FHWA Traffic Analysis and Intersection Considerations to Inform Bikeway Selection
Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software
Traffic Signal Clearance Calculations
Underground Utility Line Protection Law

Attachment 1. Project Standards

Title
United States Bureau of Mines (USBM), Report of Investigations (RI) 8507, Structure Response and Damage Produced by Ground Vibration from Surface Mine Blasting
USDA Plant Hardiness Planting Zone Map
USDA Natural Resources Conservation Service (NRCS) Plants Database
USGS Scientific Investigations Report 2008-5102, Regression Equations for Estimating Flood Flows at Selected Recurrence Intervals for Ungaged Streams in Pennsylvania.
USGS Water Resources Investigations Report 00-4189, Techniques for Estimating Magnitude and Frequency of Peak Flows for Pennsylvania Streams.
Utility Relocation Management System
Vehicle Code Title 75 PA. C.S.

Attachment 2
Bridge-Specific Requirements – Lenhartsville
Execution Version: November 29, 2022

Table of Contents

2	Bridge-Specific Requirements – Lenhartsville	1
2.1	Introduction	1
2.2	General	1
2.3	Work Management and Administration	1
2.4	Public Information and Communication.....	1
2.5	Environmental	1
2.6	Noise	1
2.7	Utilities.....	1
2.8	Right of Way	1
2.9	Geotechnical and Pavement.....	2
2.10	Land Surveying.....	2
2.11	Roadways and Grading.....	2
2.12	Bicycle and Pedestrian Facilities	2
2.13	Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control.....	3
2.14	Structures	3
2.15	Railroad Coordination	3
2.16	Context Sensitive Design, Aesthetics, and Landscaping	3
2.17	Traffic Analysis.....	3
2.18	Signing, Pavement Marking, Signalization, and Lighting	3
2.19	Intelligent Transportation System	3
2.20	Maintenance and Protection of Traffic.....	4
2.21	[Reserved].....	9
2.22	Maintenance Work	9
2.23	Handback	10
2.24	[Reserved].....	10
2.25	Bridge-Specific Submittal Requirements	10

Tables

Table A2-1.	Mainline Design Criteria.....	2
Table A2-2.	Ramp Design Criteria.....	2
Table A2-3.	Maintenance and Protection of Traffic Restrictions	5
Table A2-4.	Holiday Restrictions.....	9
Table A2-5.	Lane Closure Rental Fees:	9
Table A2-6.	Submittal Requirements	10

2 Bridge-Specific Requirements – Lenhartsville

The Development Entity shall be responsible for performance of the Work in compliance with the requirements set forth within this section inclusive of applicable referenced material. Without limiting any other requirement of the Contract Documents, including the Technical Provisions, the Development Entity shall design and construct the I-78 Lenhartsville Bridge to meet the requirements of this Attachment.

2.1 Introduction

There are no applicable Bridge-Specific Requirements in this Section.

2.2 General

There are no applicable Bridge-Specific Requirements in this Section.

2.3 Work Management and Administration

There are no applicable Bridge-Specific Requirements in this Section.

2.4 Public Information and Communication

There are no applicable Bridge-Specific Requirements in this Section.

2.5 Environmental

The Provided Environmental Approvals for this Bridge are as follows:

- Categorical Exclusion Re-evaluation.

If relocation of the stream running parallel to I-78 and with a confluence with Maiden Creek is necessary, the Development Entity shall develop and submit to the Department for acceptance a stream relocation plan that includes excavation, stockpiling, and handling of existing streambed substrate, furnishing of borrow substrate, and placement of the streambed substrate within the bed of the proposed stream channel to achieve the proposed depth and grade. The Development Entity shall use the substrate from the existing channel for the proposed channel. If insufficient substrate is available from the existing channel, the Development Entity shall propose a suitable streambed substrate within the stream relocation plan.

The Development Entity shall develop an amended soil mix in the Berks Nature conservation easement area for impacted soils using a mixture of topsoil, compost, and sand and shall submit the proposed amended soil mix to the Department for acceptance.

2.6 Noise

There are no applicable Bridge-Specific Requirements in this Section.

2.7 Utilities

There are no applicable Bridge-Specific Requirements in this Section.

2.8 Right of Way

There are no applicable Bridge-Specific Requirements in this Section.

2.9 Geotechnical and Pavement

There are no applicable Bridge-Specific Requirements in this Section.

2.10 Land Surveying

There are no applicable Bridge-Specific Requirements in this Section.

2.11 Roadways and Grading

At a minimum, and without limiting the other requirements of the Contract Documents, the Development Entity shall design and construct the roadways in accordance with the design criteria identified in Table A2-1 and Table A2-2.

Table A2-1. Mainline Design Criteria

	I-78 EB/WB	SR 143
Design Criteria	New/ Reconstruction	New/ Reconstruction
Area System (urban/rural)	Rural	Rural
Functional Classification	Limited Access Freeway	Major Collector
Topography	Rolling	Rolling
Roadway Typology	Rural Interstate	Community Collector, Rural
Design Speed (mph)	70	40 northbound, 50 southbound
Number Lanes Each Direction	2	
Lane Width (Ft.)	12	11
LT. Shoulder Width (Ft.)	10	N/A
RT. Shoulder Width (Ft.)	12	5
Design Vehicle	N/A	

Table A2-2. Ramp Design Criteria

	Ramp			
Ramp	A	B	C	D
Mainline Speed	70	70	70	70
Ramp Design Speed	35	20	20	35
Design Width of Pavement	Case I-C	Case I-B	Case I-B	Case I-C
Lane Width	15	16	16	15
Outside Shoulder	10	10	10	10
Inside Shoulder	4	4	4	4

2.12 Bicycle and Pedestrian Facilities

There are no applicable Bridge-Specific Requirements in this Section.

2.13 Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

There are no applicable Bridge-Specific Requirements in this Section.

2.14 Structures

The Development Entity shall design and construct the Interstate bridge structures to be able to always maintain two active lanes on each structure during future redecking. Furthermore, the Development Entity shall design and construct the bridge structures to be able to complete future redecking in two construction stages.

2.15 Railroad Coordination

There are no applicable Bridge-Specific Requirements in this Section.

2.16 Context Sensitive Design, Aesthetics, and Landscaping

There are no applicable Bridge-Specific Requirements in this Section.

2.17 Traffic Analysis

There are no applicable Bridge-Specific Requirements in this Section.

2.18 Signing, Pavement Marking, Signalization, and Lighting

The Development Entity shall design and construct intermediate reference markers throughout the Bridge's construction limits, spaced at 0.1-mile, on breakaway steel posts, distance marker supports, or bridge attachments posts in accordance with Project Standards.

The Development Entity shall provide recessed pavement markings for the broken white lines throughout the Bridge Limits. The adjacent Section 12M Highway project will not be installing recessed pavement markings in the areas where the Section 12M project and the Work overlap. The Development Entity shall coordinate with the adjacent Section 12M project to ensure recessed pavement markings are provided throughout the Bridge Site.

The Development Entity shall provide temporary lighting from dusk to dawn at crossover and merge areas, including 250' on approaches to such crossovers and merge areas. The lighting level is to be between 1.0 FC and 1.5 FC with a 4:1 UR with a target lighting design average of 1.2 FC ERL with a 4:1 UR and <.3/1 glare ratio.

2.19 Intelligent Transportation System

The Development Entity shall design and construct the relocation of the existing CCTV camera and pole on the Bridge Site to maintain a similar viewshed as the existing camera.

The Development Entity shall design and construct one 4-inch minimum diameter communications conduit (suitable to accommodate four 1.25-inch PVC inner ducts) and one 2-inch diameter power conduit for future Intelligent Transportation System (ITS) work, at a minimum, on each new bridge structure, extending beyond the bridge approach and into the shoulder area. The future ITS conduits are to be placed between the fascia beam and first interior beam of the superstructure in accordance with the Project Standards.

2.20 Maintenance and Protection of Traffic

The Development Entity shall develop and submit to the Department a plan for acceptance for furnishing, installing, relocating, operating, and maintaining a Real-Time Work Zone Traffic Monitoring System (RTWZTMS) throughout the corridor. The RTWZTMS plan shall include items for additional message boards with communication devices.

The Development Entity shall design and construct the Work in accordance with the Maintenance and Protection of Traffic (MPT) restrictions identified in Table A2-3.

Table A2-3. Maintenance and Protection of Traffic Restrictions

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS	Holiday Restrictions. Lane Closures may not occur during the following time periods:		See Table A2-4 below
	Interstate	Number of Lanes	The Development Entity shall maintain the existing number of lanes in each direction of travel on Interstates, with the exceptions listed under the provisions, below. Submit a FREEVAL analysis for District review and approval if the approved TCP concept is changed that would warrant a FREEVAL.
		Temporary Cross Section minimum requirements for 1 Lane Tangent Section	13' min lane, 14' preferred due to winter maintenance.
		Temporary Cross Section minimum requirements for 2 Lanes Tangent Section	2-12' lanes.
		Complete Bi-Directional Closure (Supplemented with Detour)	Complete bi-directional closures are not permitted. Full detour of Interstate is prohibited.
		Complete Directional Closure (Supplemented with Detour)	Complete directional closures are not permitted. Full detour of Interstate is prohibited.
		Interstate 15-Minute Full Rolling Stoppage	<p>15-Minute rolling stoppages are not permitted at the following times:</p> <ul style="list-style-type: none"> ▪ Everyday: 6:00 a.m. - 9:00 p.m. <p>The Development Entity shall not perform a subsequent 15-minute closure until traffic has returned to "normal" pre-stoppage flow. Rolling stoppages may be bi-directional.</p> <p>Rolling closures could be used for beam delivery or demo.</p> <p>Bi-direction can be allowed for safety of adjacent traffic.</p>

Attachment 2. Bridge-Specific Requirements – Lenhartsville

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)		Interstate Multilane Closure (non-full closure) - Including the adjacent shoulder closure	Not applicable
		Interstate Single Lane Closures - Including the adjacent shoulder closure	Short-term lane closures are not permitted at the following times: <ul style="list-style-type: none"> Monday - Sunday: 6:00 a.m. - 9:00 p.m. Off-peak single lane closures only.
			Long-term lane closures are not permitted, with the exception that a single eastbound (preferred) or westbound lane may be closed Sunday 10:00 p.m. - Friday 6:00 a.m. for a maximum of 2 weeks. Eastbound and westbound shall not be closed at the same time.
			These 2 weeks of lane closures may only occur once during the duration of the project.
			Development Entity shall coordinate with the Department and neighboring projects to minimize impact on the traveling public.
		Interstate Single (Right or Left) Shoulder Closures	Short-term shoulder closures are permitted anytime. Design criteria, including sight distance, shall be met, if applicable
			Long-term shoulder closures are permitted anytime. Design criteria, including sight distance, shall be met, if applicable
		Interstate Dual (Right and Left) Shoulder Closure	Short-term shoulder closures are permitted anytime. Design criteria, including sight distance, shall be met, if applicable
			Long-term shoulder closures are permitted anytime. Design criteria, including sight distance, shall be met, if applicable
		Additional Event Restrictions	Annual Taste of Hamburger Festival in Hamburg. Typically a single day, Development Entity shall coordinate with the Borough of Hamburg to avoid short-term closures during the event.
	Ramps	Number of Lanes	The Development Entity shall maintain the existing number of lanes on ramps, with the exceptions listed under the allowable closures, below.

Attachment 2. Bridge-Specific Requirements – Lenhartsville

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)		Ramp Full Closures (Supplemented with Detour)	<p>Long-term full closures of Ramp C and Ramp D are permitted only during Stage 3, for no longer than one (1) twenty-one (21) calendar day period.</p> <p>Long-term full closures of Ramp A and Ramp B are permitted only during Stage 4, for no longer than one (1) twenty-one (21) calendar day period.</p> <p>All four ramps are prohibited to be closed at the same time. No other combinations are permitted.</p> <p>During other stages, full closures are permitted at the following times: Everyday 9:00 PM - 6:00 AM w/ an approved detour plan.</p>
		Ramp Lane Closure (non-full closure) - Including the adjacent shoulder closure	<p>Short-term lane closures are permitted at the following times:</p> <ul style="list-style-type: none"> ▪ Everyday: 9:00 p.m. - 6:00 a.m. w/ an approved traffic control plan.
		Ramp Single Lane and Shoulder Closure (For Multilane Ramps)	Not applicable
	Non-Interstate Roadways (state and local roadways)	Ramp Shoulder Closure	<p>Short-term shoulder closures are permitted at any time.</p> <p>Long-term shoulder closures are permitted at any time.</p>
		Additional Event / Special Restrictions	Annual Taste of Hamburger Festival in Hamburg. Typically a single day, Development Entity shall coordinate with the Borough of Hamburg to avoid short-term closures during the event.
		Number of Lanes	The Development Entity shall maintain the existing number of lanes on other roadways, with the exceptions listed under the allowable closures, below.
		Non-Interstate Roadway Full Closure (Supplemented with Detour)	<p>Full closures are permitted at the following times: Everyday 9:00 p.m. - 6:00 a.m. w/ an approved detour plan.</p>
		Non-Interstate Roadway Multilane Closure	▪ N/A
			N/A

Attachment 2. Bridge-Specific Requirements – Lenhartsville

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
		Non-Interstate Roadway Single Lane Closure	Short-term lane closures are permitted with approved TCP Long-term lane closures are permitted with approved TCP
		Non-Interstate Roadway Shoulder Closure	Short-term shoulder closures are permitted. Design criteria, including sight distance, shall be met. Long-term shoulder closures are permitted. Design criteria, including sight distance, shall be met.
		Additional Event /Special Restrictions	Annual Taste of Hamburger Festival in Hamburg. Typically, a single day, Development Entity shall coordinate with the Borough of Hamburg to avoid short-term closures during the event.
BRIDGE MPT RESTRICTIONS (cont'd)	Regional/Local Coordination		Notify the TMC at least 15 minutes prior to placement of traffic control devices. Contact Emergency services and appropriate municipal officials, including police, fire, ambulance, schools and postal service at least two weeks prior to the start of any operations affecting the flow of traffic. Maintain access to existing driveways at all times. If short-term operations will affect access to driveways, provide minimum 72-hour notice to the Property owner. To accommodate the scheduling of an appropriate NBIS Inspection, notify the District 5 Bridge Inspection Unit at least 14 calendar days prior to the opening of any bridge, superstructure, deck, culvert, or portion thereof, to vehicular traffic.
	Temporary Pavement Marking Material		The Development Entity shall use water borne paint and beads material for temporary pavement markings.

Table A2-4. Holiday Restrictions

Holiday	Restriction Begins	Restriction Ends
Easter	Thursday 6:00 a.m.	Tuesday 9:00 p.m.
Memorial Day	Thursday 5:00 a.m.	Tuesday 9:00 p.m.
Independence Day (Sunday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Monday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Tuesday)	Friday 6:00 a.m.	Wednesday 9:00 a.m.
Independence Day (Wednesday)	Tuesday 6:00 a.m.	Thursday 9:00 a.m.
Independence Day (Thursday)	Wednesday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Friday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Saturday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Labor Day	Friday 12:00 a.m.	Tuesday 9:00 p.m.
Columbus Day	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Thanksgiving Day	Tuesday 5:00 a.m.	Tuesday 9:00 a.m.
Christmas Day and New Year's Day Combined	Previous weekday before Christmas Eve at 6:00 a.m.	Following weekday after New Year's Day at 9:00 p.m.

Table A2-5. Lane Closure Rental Fees:**I-78 Lenhartsville 5-0 Berks County**

Roadway Type	Closure Type	Values = \$/Lane/Hour Lane Rental
Interstate	Shoulder closure	\$1,000.00
	Of 2 lanes total, 1 lane closed (\$/hr/lane)	\$5,000.00
	Of 3 or more lanes total, 1 lane closed (\$/hr/lane)	—
	Of 3 or more lanes total, 2 lanes closed same direction (\$/hr/lane)	—
	Ramp Closure (\$/hr/lane)	\$2,300.00
Non-Interstate	SR 0737	\$900.00
	Old Route 22	\$500.00
	SR 0143	\$500.00

2.21 [Reserved]**2.22 Maintenance Work**

There are no applicable Bridge-Specific Requirements in this Section.

2.23 Handback

There are no applicable Bridge-Specific Requirements in this Section.

2.24 [Reserved]**2.25 Bridge-Specific Submittal Requirements**

Whenever a Submittal identified in the following Table A2-6 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of the Technical Provisions and incorporates the information of Table A2-6 information. The Department will conduct reviews and may provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table A2-6.

Table A2-6. Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1.	Stream relocation plan	3	15	Construction Work commencement for Submittal related Work	—	—
2.	Amended soil mix design	3	10	Construction Work commencement for Submittal related Work	—	—
3.	Real-Time Work Zone Traffic Monitoring System plan	3	10	Construction Work commencement for Submittal related Work	—	—

Attachment 3

[Reserved]

Attachment 4

Bridge-Specific Requirements – Canoe Creek

Execution Version: November 29, 2022

Table of Contents

4	Bridge-Specific Requirements – Canoe Creek.....	1
4.1	Introduction	1
4.2	General	1
4.3	Work Management and Administration	1
4.4	Public Information and Communication.....	1
4.5	Environmental	1
4.6	Noise	1
4.7	Utilities.....	1
4.8	Right of Way	2
4.9	Geotechnical and Pavement.....	2
4.10	Land Surveying.....	2
4.11	Roadways and Grading.....	2
4.12	Bicycle and Pedestrian Facilities	3
4.13	Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control.....	3
4.14	Structures	3
4.15	Railroad Coordination	4
4.16	Context Sensitive Design, Aesthetics, and Landscaping	4
4.17	Traffic Analysis.....	4
4.18	Signing, Pavement Marking, Signalization, and Lighting	4
4.19	Intelligent Transportation System	4
4.20	Maintenance and Protection of Traffic.....	5
4.21	[Reserved].....	10
4.22	Maintenance Work	10
4.23	Handback	11
4.24	[Reserved].....	11
4.25	Bridge-Specific Submittal Requirements	11

Tables

Table A4-1.	Mainline Design Criteria.....	2
Table A4-2.	Table Ramp Design Criteria	2
Table A4-3.	Maintenance and Protection of Traffic Restrictions	6
Table A4-4.	Holiday Restrictions.....	10
Table A4-5.	Lane Closure Rental Fees	10
Table A4-6.	Submittal Requirements.....	11

4 Bridge-Specific Requirements – Canoe Creek

The Development Entity shall be responsible for performance of the Work in compliance with the requirements set forth within this Section inclusive of applicable referenced material. Without limiting any other requirement of the Contract Documents, including the Technical Provisions, the Development Entity shall design and construct the I-80 Canoe Creek Bridge to meet the requirements of this Attachment.

4.1 Introduction

There are no applicable Bridge-Specific Requirements in this Section.

4.2 General

There are no applicable Bridge-Specific Requirements in this Section.

4.3 Work Management and Administration

There are no applicable Bridge-Specific Requirements in this Section.

4.4 Public Information and Communication

There are no applicable Bridge-Specific Requirements in this Section.

4.5 Environmental

The Provided Environmental Approvals for this Bridge are as follows:

- Categorical Exclusion Re-evaluation
- Section 105 / CH . 404 Waterway Permit
- CH. 102 / NPDES Permit.

The Development Entity shall develop and submit to the Department for acceptance a plan for protection of and access to the documented cultural resources associated with the Tippecanoe Furnace site, and immediately surrounding areas, located near the intersection of SR 4005 and Thompson Hill Road.

In the event that the Development Entity proposes changes that result in wetland impacts that exceed the compensatory mitigation provided by the Department within the Provided Environmental Approvals, the Development Entity shall mitigate those additional wetland impacts in accordance with applicable Environmental Law and as negotiated with the U.S. Army Corps of Engineers (USACE) and Department of Environmental Protection (DEP).

4.6 Noise

There are no applicable Bridge-Specific Requirements in this Section.

4.7 Utilities

There are no applicable Bridge-Specific Requirements in this Section.

4.8 Right of Way

There are no applicable Bridge-Specific Requirements in this Section.

4.9 Geotechnical and Pavement

There are no applicable Bridge-Specific Requirements in this Section.

The Development Entity may dispose of acid producing rock within the Department's Right-of-Way. The Development Entity shall not dispose of Acid Producing Rock within any Right-of-Way which is to be vacated upon completion of the project. The Development Entity shall provide a Predetermined Amount for offsite disposal of Acid Producing Rock.

4.10 Land Surveying

There are no applicable Bridge-Specific Requirements in this Section.

4.11 Roadways and Grading

At a minimum, and without limiting the other requirements of the Contract Documents, the Development Entity shall design and construct the roadways in accordance with the design criteria identified in Table A4-1 and Table A4-2.

Table A4-1. Mainline Design Criteria

	I-80 EB/WB
Design Criteria	New/Reconstruction
Area System (urban/rural)	Rural
Functional Classification	Limited Access Freeway
Topography	Rolling
Roadway Typology	Rural Interstate
Design Speed (mph)	70
Number Lanes Each Direction	2
Lane Width (Ft.)	12
LT. Shoulder Width (Ft.)	8, 4 w/barrier
RT. Shoulder Width (Ft.)	12
Design Vehicle	N/A

Table A4-2. Table Ramp Design Criteria

	Ramp
Ramp	Weigh Station.
Mainline Speed	70
Ramp Design Speed	65/55/40
Design Width of Pavement	Case II, C

Lane Width	14
Outside Shoulder	8
Inside Shoulder	4

4.12 Bicycle and Pedestrian Facilities

There are no applicable Bridge-Specific Requirements in this Section.

4.13 Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

There are no applicable Bridge-Specific Requirements in this Section.

4.14 Structures

The Development Entity shall design and construct two independent superstructures for the eastbound and westbound directions.

The Development Entity shall provide a dual deck protective system for proposed bridge decks consisting of a 1" integral concrete wearing surface and epoxy coated rebar in accordance with DM-4.

The Development Entity shall provide sulfate resistant self-consolidating cement concrete in caissons for soldier pile walls, unless otherwise accepted by the Department.

The Development Entity shall provide equal girder spacing on girder bridges, unless otherwise accepted by the Department.

The Development Entity shall provide consistent girder plate sizes within a cross section for girder bridges, unless otherwise accepted by the Department.

The Development Entity shall not use adhesive anchors for new bridge construction.

The Development Entity shall provide bridge piers that provide a positive visual aesthetic, reduce cantilevers, and minimize cracking. In lieu of large hammerhead piers, the Development Entity shall design and construct tulip-shaped piers where possible and shall submit the proposed pier shape to the Department for acceptance with the Bridge Design Documents submissions.

The Development Entity shall design and construct the Interstate bridge structures to be able to always maintain two active lanes in each direction on each structure during future redecking. Furthermore, the Development Entity shall design and construct the bridge structures to be able to complete future redecking in two construction stages for each structure. The minimum curb to curb including lanes and shoulders during any redecking stage shall be at least 25'.

Toothdam expansion joints are not permitted on bridge structures.

The Development Entity shall design and construct all bridges to have 5 or more girders and ensure that the future redecking requirements are met.

The Development Entity shall not use grouted rock or grouted sandbags for culvert floors unless otherwise accepted by the Department.

The Development Entity shall design the Interstate bridges to accommodate future loading due to protective fencing, meeting or exceeding the fencing requirements in BC-701M (Protective Fence) of *Department Pub 219M, Standards for Bridge Protection*.

The Development Entity shall provide barrier protective fence on both the outside and median bridge barriers.

The Development Entity shall install signs on the outside shoulders of the proposed SR 0080 eastbound and westbound bridges. The wording on the signs shall read: “If you are in a crisis, please call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255) or text ‘PA’ to 741741”. As part of the Bridge Design Documents submissions the Development Entity shall submit to the Department for acceptance a plan for the quantity, and location of such signs.

The Development Entity shall rehabilitate Thompson Hill Culvert to provide a minimum condition rating of 7.

4.15 Railroad Coordination

There are no applicable Bridge-Specific Requirements in this Section.

4.16 Context Sensitive Design, Aesthetics, and Landscaping

There are no applicable Bridge-Specific Requirements in this Section.

4.17 Traffic Analysis

There are no applicable Bridge-Specific Requirements in this Section.

4.18 Signing, Pavement Marking, Signalization, and Lighting

The Development Entity shall design and construct type B guide rail mounted delineators in addition to type O and type P barrier mounted delineators throughout the Bridge Site.

4.19 Intelligent Transportation System

The Development Entity shall design and construct one 4-inch minimum diameter communications conduit (suitable to accommodate four 1.25-inch PVC inner ducts) and one 2-inch diameter power conduit for future Intelligent Transportation System (ITS) work, at a minimum, on each new bridge structure, extending beyond the bridge approach and into the shoulder area. The future ITS conduits are to be placed between the fascia beam and first interior beam of the superstructure in accordance with the Project Standards.

The Development Entity shall maintain continuous, uninterrupted operation of the RWIS weather station located at the existing abutment 2 end of the I-80 Canoe Creek bridges throughout construction. If the RWIS is to be moved during construction, the Development Entity shall ensure that required components of the RWIS are properly reinstalled with no more than 24 hours of equipment out of service. Coordinate out of service timing with the Department. The Development Entity shall coordinate with the RWIS manufacturer as needed.

The Development Entity shall design and construct the relocation of the existing CCTV camera and pole on the Bridge Site to maintain a similar viewshed as the existing camera.

The Development Entity shall provide conduit within the median for future ITS; coordinate with the Department and RTMC at District 2 and District 11. Coordinate with the Department on location within the median. Location should be consistent throughout corridor. Provide markers as required. Place an underground junction box on each end of the Interstate bridge.

4.20 Maintenance and Protection of Traffic

The Development Entity shall coordinate closures of the eastbound and/or westbound weigh stations throughout construction with the Pennsylvania State Police and the Department Maintenance Unit. The Development Entity shall coordinate with the Pennsylvania State Police and the Department Maintenance Unit regarding weigh station functionality and access requirements. Access to the maintenance area accessed from the westbound weigh station shall be maintained at all times.

The Development Entity must maintain access to the Department Maintenance Facility on I-80 WB near Milepost 56 at all times. Coordinate with Department Maintenance as required for any changes to access during construction.

Pennsylvania State Police must have access to the WB or EB weigh stations during construction. Coordinate with Pennsylvania State Police as required when access is restricted to the weigh station.

The Development Entity shall design and construct the Work in accordance with the Maintenance and Protection of Traffic (MPT) restrictions identified in Table A4-3.

A predetermined amount of \$80,000.00 should be included for repairing detour routes in accordance with SOL 495-21-04.

Table A4-3. Maintenance and Protection of Traffic Restrictions

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS	Holiday Restrictions. Lane Closures shall not occur during the following time periods:		See Table A4-4 below.
	Interstate	Number of Lanes	The Development Entity shall maintain the existing number of lanes in each direction of travel on Interstates, with the exceptions listed under the provisions, below.
		Temporary Cross Section minimum requirements for 1 Lane Tangent Section	The Development Entity shall meet the TCP requirements as approved by the Department during the PDA phase. The Development Entity shall maintain a minimum lane width of 13'..
		Temporary Cross Section minimum requirements for 2 Lanes Tangent Section	The Development Entity shall meet the TCP requirements as approved by the Department during the PDA phase. 4' paved shoulder, 2x12' lanes, 4' paved shoulder for crossovers (temporary road). 2x12' min lanes on mainline bridge. 2 x 12' min lanes, or match existing width on existing pavement, or 24' min. width for two lanes. Shoulders on the I-80 Bridges are not required, but provide if width is available to aid in winter operations unless otherwise approved by the Department.
		Complete Bi-Directional Closure (Supplemented with Detour)	Development Entity shall not be permitted to implement complete bi-directional closures.
		Complete Directional Closure (Supplemented with Detour)	Development Entity shall not be permitted to implement complete directional closures.
		Interstate 15-Minute Full Rolling Stoppage	15-Minute rolling stoppages shall not be permitted at the following times: <ul style="list-style-type: none"> ▪ Every day: 5:00 a.m. - 11:00 p.m. The Development Entity shall not perform a subsequent 15-minute closure until traffic has returned to "normal" pre-stoppage flow. Additionally, due to safety concerns of the traveling public specifically on I-80: rolling stoppages shall not be permitted on the day before, on, and the day after a holiday. Rolling stoppages shall be weather permitting. Development Entity shall not implement stoppages during rain, snow, or fog. rolling stoppages shall be on dry roads.

Attachment 4. Bridge-Specific Requirements – Canoe Creek

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
		Interstate Multilane Closure (non-full closure) - Including the adjacent shoulder closure	Not Applicable.
BRIDGE MPT RESTRICTIONS (cont'd)		Interstate Single Lane Closures - Including the adjacent shoulder closure	Use only short-term lane closures. Development Entity shall provide Pennsylvania State Police to monitor traffic queues when single lane restrictions are required. Only nighttime short-term lane closures from 9 p.m. to 6 a.m. shall be permitted. Long-term lane closures shall not be permitted.
		Interstate Single (Right or Left) Shoulder Closures	Department will permit Interstate single (right or left) short-term shoulder closures anytime.
		Interstate Dual (Right and Left) Shoulder Closure	Department will permit Interstate dual (right and left) short-term shoulder closures anytime.
		Additional Event Restrictions	Not applicable.
	Ramps	Number of Lanes	Not applicable.
		Ramp Full Closures (Supplemented with Detour)	Not applicable.
		Interstate Multilane Closure (non-full closure) - Including the adjacent shoulder closure	Not applicable.
		Ramp Single Lane and Shoulder Closure (For Multilane Ramps)	Not applicable.
			Not applicable.
		Ramp Shoulder Closure	Not applicable
		Additional Event / Special Restrictions	Not applicable.

Attachment 4. Bridge-Specific Requirements – Canoe Creek

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)	Non-Interstate Roadways (state and local roadways)	Number of Lanes	The Development Entity shall maintain the existing number of lanes on other roadways, with the exceptions listed under the allowable closures, below. SR 4005 and Thompson Hill Road shall remain open to traffic with the existing lanes/shoulders unrestricted.
		Non-Interstate Roadway Full Closure (Supplemented with Detour)	<p>Full closure of SR 4005 shall not be permitted except as noted below: Thompson Hill Road must remain open at all times.</p> <p>Development Entity shall develop a detour plan, obtain Department acceptance, and implement a detour of SR 4005 for erection and demolition with Lane Closure Rental Fees and the following stipulations:</p> <ul style="list-style-type: none"> ▪ Limited to 14 consecutive Calendar Days per closure ▪ Shall not exceed more than 6 detour events for duration of Construction Work. ▪ Shall include repair detour routes in accordance with SOL 495-21-04.
		Non-Interstate Roadway Multi- Lane Closure	Not applicable.
		Non-Interstate Roadway Single Lane Closure	<p>Short-term lane closures shall be permitted for SR 4005 and Thompson Hill Road:</p> <p>Development Entity shall maintain a minimum single lane of traffic (signalized or flagged) at all times for short-term events.</p> <p>Long-term lane closures shall be permitted with approved Traffic Control Plan.</p>

Attachment 4. Bridge-Specific Requirements – Canoe Creek

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)	Non-Interstate Roadways (state and local roadways) (cont'd)	Non-Interstate Roadway Shoulder Closure	Department will permit short-term closures at any time. Department will permit long-term closures at any time.
		Additional Event /Special Restrictions	Development Entity shall provide pre and post construction survey for Thompson Hill Road and shall repair Thompson Hill Road for damages related to Construction Work. Development Entity shall include repair detour routes in accordance with SOL 495-21-04.
	Regional/Local Coordination		Development Entity shall: <ul style="list-style-type: none"> ▪ Notify the Department at least thirty (30) minutes prior to placement of traffic control devices. ▪ Obtain Department acceptance for closures prior to implementing any closures; ▪ Contact and coordinate detours with local Emergency services including, but not limited to, Knox Volunteer Fire Company, Knox Borough Police Department, and Pennsylvania State Police, Clarion Barracks; and ▪ Contact and coordinate detours with local school district(s) for facilitation of services during any planned detours.
	Temporary Pavement Marking Material		The Development Entity shall place all final pavement markings on the wearing course prior to opening the roadway to normal flow of traffic. Development Entity shall not place temporary pavement marking paint on the wearing course. If temporary lines are needed on the final wearing course, Development Entity shall provide temporary wet reflective tape from an accepted <i>Department Pub 35, Qualified Products List for Construction (Bulletin 15)</i> provider and in accordance with the TC-8600 and TC-8700 Standards.

Table A4-4. Holiday Restrictions

Holiday	Restriction Begins	Restriction Ends
Easter	Thursday 6:00 a.m.	Tuesday 9:00 p.m.
Memorial Day	Thursday 5:00 a.m.	Tuesday 9:00 p.m.
Independence Day (Sunday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Monday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Tuesday)	Friday 6:00 a.m.	Wednesday 9:00 a.m.
Independence Day (Wednesday)	Tuesday 6:00 a.m.	Thursday 9:00 a.m.
Independence Day (Thursday)	Wednesday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Friday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Saturday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Labor Day	Friday 12:00 a.m.	Tuesday 9:00 p.m.
Columbus Day	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Thanksgiving Day	Tuesday 5:00 a.m.	Tuesday 9:00 a.m.
Christmas Day and New Year's Day Combined	Previous weekday before Christmas Eve at 6:00 a.m.	Following weekday after New Year's Day at 9:00 P.M.

Table A4-5. Lane Closure Rental Fees
I-80 Canoe Creek 10-0 Clarion County

Roadway Type	Closure Type	Values = \$/Lane/Hour Lane Rental
Interstate	Shoulder closure	\$700.00
	Of 2 lanes total, 1 lane closed (\$/hr/lane)	\$3,700.00
	Of 3 or more lanes total, 1 lane closed (\$/hr/lane)	—
	Of 3 or more lanes total, 2 lanes closed same direction (\$/hr/lane)	—
	Ramp closure (\$/hr/lane)	\$2,300.00
Non-Interstate		
	SR 0208	\$800.00
	SR 0338	\$600.00
	SR 3007	\$500.00

4.21 [Reserved]**4.22 Maintenance Work**

There are no applicable Bridge-Specific Requirements in this Section.

4.23 Handback

There are no applicable Bridge-Specific Requirements in this Section.

4.24 [Reserved]**4.25 Bridge-Specific Submittal Requirements**

Whenever a Submittal identified in the following Table A4-6 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of the Technical Provisions and incorporates Table A4-6 information. The Department will conduct reviews and may provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of the Technical Provisions and Table A4-6.

Table A4-6. Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1.	Plan for protection of and access to the documented cultural resources associated with the Tippecanoe Furnace site.	2	10	Construction Work commencement for Submittal related Work	—	—

Attachment 5
Bridge-Specific Requirements – Nescopeck
Execution Version: November 29, 2022

Table of Contents

5	Bridge-Specific Requirements – Nescopeck	1
5.1	Introduction	1
5.2	General	1
5.3	Work Management and Administration	1
5.4	Public Information and Communication.....	1
5.5	Environmental	1
5.6	Noise.....	1
5.7	Utilities.....	1
5.8	Right of Way	1
5.9	Geotechnical and Pavement.....	1
5.10	Land Surveying.....	1
5.11	Roadways and Grading.....	1
5.12	Bicycle and Pedestrian Facilities	2
5.13	Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control.....	2
5.14	Structure.....	2
5.15	Railroad Coordination	3
5.16	Context Sensitive Design, Aesthetics, and Landscaping	3
5.17	Traffic Analysis.....	3
5.18	Signing, Pavement Marking, Signalization, and Lighting	3
5.19	Intelligent Transportation System	3
5.20	Maintenance and Protection of Traffic.....	4
5.21	[Reserved].....	8
5.22	Maintenance Work	8
5.23	Handback	9
5.24	[Reserved].....	9
5.25	Bridge-Specific Submittal Requirements	9

Tables

Table A5-1.	Mainline Design Criteria.....	2
Table A5-2.	Ramp Design Criteria.....	2
Table A5-3.	MPT Restrictions	5
Table A5-4.	Holiday Restrictions.....	8
Table A5-5.	Lane Closure Rental Fees	8

5 Bridge-Specific Requirements – Nescopeck

The Development Entity shall be responsible for performance of the Work in compliance with the requirements set forth within this Section inclusive of applicable referenced material. Without limiting any other requirement of the Contract Documents, including the Technical Provisions, the Development Entity shall design and construct the I-80 Nescopeck Bridge to meet the requirements of this Attachment.

5.1 Introduction

There are no applicable Bridge-Specific Requirements in this Section.

5.2 General

There are no applicable Bridge-Specific Requirements in this Section.

5.3 Work Management and Administration

There are no applicable Bridge-Specific Requirements in this Section.

5.4 Public Information and Communication

There are no applicable Bridge-Specific Requirements in this Section.

5.5 Environmental

The Provided Environmental Approvals for this Bridge are as follows:

- Categorical Exclusion.

5.6 Noise

There are no applicable Bridge-Specific Requirements in this Section.

5.7 Utilities

There are no applicable Bridge-Specific Requirements in this Section.

5.8 Right of Way

There are no applicable Bridge-Specific Requirements in this Section.

5.9 Geotechnical and Pavement

There are no applicable Bridge-Specific Requirements in this Section.

5.10 Land Surveying

There are no applicable Bridge-Specific Requirements in this Section.

5.11 Roadways and Grading

At a minimum, and without limiting the other requirements of the Contract Documents, the Development Entity shall design and construct the roadways in accordance with the design criteria identified in Table A5-1 and Table A5-2.

Table A5-1. Mainline Design Criteria

	I-80 EB	I-80 WB	SR 3016
Design Criteria	New/ Reconstruction	New/ Reconstruction	New/ Reconstruction
Area System (urban/rural)	Rural	Rural	Rural
Functional Classification	Limited Access Freeway	Limited Access Freeway	Local Road
Topography	Rolling	Rolling	Rolling
Roadway Typology	Rural Interstate	Rural Interstate	Local Road, Rural
Design Speed (mph)	70	70	35
Number Lanes Each Direction	2	2	1
Lane Width (Ft.)	12	12	10
LT. Shoulder Width (Ft.)	8	8	N/A
RT. Shoulder Width (Ft.)	12	12	2
Design Vehicle	N/A	N/A	

Table A5-2. Ramp Design Criteria

	Ramp
Ramp	N/A
Mainline Speed	N/A
Ramp Design Speed	N/A
Design Width of Pavement	N/A
Lane Width	N/A
Outside Shoulder	N/A
Inside Shoulder	N/A

5.12 Bicycle and Pedestrian Facilities

There are no applicable Bridge-Specific Requirements in this Section.

5.13 Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

The Development Entity shall not place permanent stormwater BMPs in the median area.

5.14 Structure

The Development Entity shall design and construct the Interstate bridge structures to be able to accommodate future redecking. Furthermore, the Development Entity shall design and construct the bridge structures to be able to complete future redecking with a maximum of one construction joint per bridge. The minimum curb-curb width during redecking shall be 24’.

For bridge decks and approach slabs, the Development Entity shall provide a Latex Modified Concrete (LMC) overlay with a 1.5-inch minimum thickness or a Polyester Polymer Concrete (PPC) overlay with a 1.25-inch minimum thickness.

The Development Entity shall apply a penetrating sealer protective coating to the top face and traffic face of proposed reinforced concrete bridge barriers and moment slab barriers along SR 3016.

The Development Entity shall apply an epoxy resin protective coating for concrete surfaces to the outside face of barriers, deck overhang, and fascia side and bottom of fascia superstructure beams, as applicable. The Development Entity shall provide epoxy resin matching federal color standard, Color FS 26521.

The Development Entity shall apply an epoxy resin protective coating for concrete surfaces to the outside face of the barrier and coping along the top of the retaining wall between SR 3016 and I-80 eastbound. The Development Entity shall provide epoxy resin matching federal color standard, Color FS 26521.

The Development Entity shall provide vitrified clay liner plates to the proposed piers extending from the tops of footings to a minimum of 1'-6" above the normal water surface elevation.

5.15 Railroad Coordination

There are no applicable Bridge-Specific Requirements in this Section.

5.16 Context Sensitive Design, Aesthetics, and Landscaping

There are no applicable Bridge-Specific Requirements in this Section.

5.17 Traffic Analysis

There are no applicable Bridge-Specific Requirements in this Section.

5.18 Signing, Pavement Marking, Signalization, and Lighting

There are no applicable Bridge-Specific Requirements in this Section.

5.19 Intelligent Transportation System

The Development Entity shall design and construct one 4-inch minimum diameter communications conduit (suitable to accommodate four 1.25-inch PVC inner ducts) and one 2-inch diameter power conduit for future Intelligent Transportation System (ITS) work, at a minimum, on each new bridge structure, extending beyond the bridge approach and into the shoulder area. The future ITS conduits are to be placed between the fascia beam and the first interior beam of the superstructure in accordance with the Project Standards.. If the existing Department-owned roadway weather information system (RWIS) located near the existing I-80 eastbound bridge is impacted by proposed construction activities, the Development Entity shall relocate the RWIS at the northwest bridge corner between I-80 eastbound and SR 3016, unless otherwise accepted by the Department. The Development Entity shall ensure that the relocated RWIS is located such that no sensors are placed in the proposed roadway pavement.

The Development Entity shall design and construct an ITS camera at approximately I-80 eastbound Station 597+00. offset 100' to the right. The Development Entity shall ensure that the viewshed would allow the camera to look both (1) northbound and westbound across the new bridges and (2) look east to the Interstate.

The ITS pole shall be high enough to provide adequate line of sight over trees and to be able to look to the east.

5.20 Maintenance and Protection of Traffic

The Development Entity shall design and construct the Work in accordance with the Maintenance and Protection of Traffic (MPT) restrictions identified in Table A5-3.

Table A5-3. MPT Restrictions

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS	Holiday Restrictions. Lane Closures may not occur during the following time periods:		See Table A5-4 below.
	Interstate	Number of Lanes	The Development Entity shall maintain the existing number of lanes in each direction of travel on Interstates, with the exceptions listed under the provisions, below.
		Temporary Cross Section minimum requirements for 1 Lane Tangent Section	2' shoulder, 1x13' lanes, 2' shoulder unless shown otherwise approved by the Department. The Development Entity shall maintain a minimum lane width of 13'.
		Temporary Cross Section minimum requirements for 2 Lanes Tangent Section	The Development Entity shall meet the TCP requirements as approved by the Department during the PDA phase. The Development Entity shall maintain 2-12' lanes, for crossovers and minimum 2-12' lanes on mainline approaches and bridges unless shown otherwise in the RIDs.
		Complete Bi-Directional Closure (Supplemented with Detour)	Complete bi-directional closures are not permitted
		Complete Directional Closure (Supplemented with Detour)	Complete directional closures are not permitted
		Interstate 15-Minute Full Rolling Stoppage	15-Minute rolling stoppages are not permitted at the following times: <ul style="list-style-type: none"> ▪ Everyday: 5:00 a.m. - 10:00 p.m. The Development Entity shall not perform a subsequent 15-minute closure until traffic has returned to "normal" pre-stoppage flow.
		Interstate Multilane Closure (non-full closure) - Including the adjacent shoulder closure	Short term lane closures are not permitted at the following times: <ul style="list-style-type: none"> ▪ Monday - Friday: 2:00 p.m. - 6:00 p.m. ▪ Friday 6:00 p.m. through Sunday 11:59 p.m. The Development Entity shall collect traffic data and perform FREEVAL analysis to further refine restrictions for Department acceptance.

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)			Long term lane closures are not permitted.
		Interstate Single Lane Closures - Including the adjacent shoulder closure	<p>Short term lane closures are not permitted at the following times:</p> <ul style="list-style-type: none"> Monday - Friday: 2:00 p.m. - 6:00 p.m. and Friday 6:00 p.m. through Sunday 11:59 p.m. <p>The Development Entity shall collect traffic data and perform FREEVAL analysis to further refine restrictions for Department acceptance.</p> <p>Long term lane closures are not permitted.</p>
		Interstate Single (Right or Left) Shoulder Closures	<p>Short term shoulder closures are permitted anytime</p> <p>Long term shoulder closures are permitted anytime.</p>
		Interstate Dual (Right and Left) Shoulder Closure	<p>Short term shoulder closures are permitted any time.</p> <p>Long term shoulder closures are permitted any time.</p>
		Additional Event Restrictions	None.
	Ramps	Number of Lanes	The Development Entity shall maintain the existing number of lanes on ramps, with the exceptions listed under the allowable closures, below.
		Ramp Full Closures (Supplemented with Detour)	<p>Full closures are not permitted at the following times:</p> <ul style="list-style-type: none"> 5:00 a.m. Monday through 9:00 p.m. Friday
		Ramp Multilane Closure (non-full closure) - Including the adjacent shoulder closure	<p>Short term lane closures are permitted at any time.</p> <p>Long term lane closures are permitted at any time.</p>
		Ramp Single Lane and Shoulder Closure (For Multilane Ramps)	<p>Short term lane and shoulder closures are permitted at any time.</p> <p>Long term lane and shoulder closures are permitted at any time.</p>
		Ramp Shoulder Closure	<p>Short term shoulder closures are permitted at any time.</p> <p>Long term shoulder closures are permitted at any time.</p>
		Additional Event / Special Restrictions	Not applicable.

Attachment 5. Bridge-Specific Requirements – Nescopeck

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)	Non-Interstate Roadways (state and local roadways)	Number of Lanes	The Development Entity shall maintain the existing number of lanes on other roadways, with the exceptions listed under the allowable closures, below.
		Non-Interstate Roadway Full Closure (Supplemented with Detour)	The detour of SR 3016 (Tank Road) shall not be in place over winter months. The Department will allow the detour to be in place only between April 1 and November 30.
		Non-Interstate Roadway Multilane Closure	No time restriction required Long term lane closures are permitted.
		Non-Interstate Roadway Single Lane Closure (For multilane Other Roadways)	No time restriction required Long term lane closures are permitted.
		Non-Interstate Roadway Shoulder Closure	Short term shoulder closures are permitted at any time. Long term shoulder closures are permitted at any time.
		Additional Event /Special Restrictions	None.
	Regional/Local Coordination		Notify the Department at least 30 minutes prior to placement of traffic control devices. Coordinate with county or municipal traffic and Emergency management. Receive the Department acceptance for closures prior to implementing any closures.
	Temporary Pavement Marking Material		The Development Entity shall use water borne paint and beads material for temporary pavement markings.

Table A5-4. Holiday Restrictions

Holiday	Restriction Begins	Restriction Ends
Easter	Thursday 6:00 a.m.	Tuesday 9:00 p.m.
Memorial Day	Thursday 5:00 a.m.	Tuesday 9:00 p.m.
Independence Day (Sunday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Monday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Tuesday)	Friday 6:00 a.m.	Wednesday 9:00 a.m.
Independence Day (Wednesday)	Tuesday 6:00 a.m.	Thursday 9:00 a.m.
Independence Day (Thursday)	Wednesday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Friday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Saturday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Labor Day	Friday 12:00 a.m.	Tuesday 9:00 p.m.
Columbus Day	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Thanksgiving Day	Tuesday 5:00 a.m.	Tuesday 9:00 a.m.
Christmas Day and New Year's Day Combined	Previous weekday before Christmas Eve at 6:00 a.m.	Following weekday after New Year's Day at 9:00 P.M.

Table A5-5. Lane Closure Rental Fees**I-80 Nescopeck 4-0 Luzerne County**

Roadway Type	Closure Type	Values = \$/Lane/Hour Lane Rental
Interstate	Shoulder closure	\$900.00
	Of 2 lanes total, 1 lane closed (\$/hr/lane)	\$4,500.00
	Of 3 or more lanes total, 1 lane closed (\$/hr/lane)	—
	Of 3 or more lanes total, 2 lanes closed same direction (\$/hr/lane)	—
	Ramp closure (\$/hr/lane)	\$2,300.00
Non-Interstate	SR 0339	\$700.00
	SR 0093	\$1,600.00
	US-11	\$3,000.00

5.21 [Reserved]**5.22 Maintenance Work**

There are no applicable Bridge-Specific Requirements in this Section.

5.23 Handback

There are no applicable Bridge-Specific Requirements in this Section.

5.24 [Reserved]

5.25 Bridge-Specific Submittal Requirements

There are no applicable Bridge-Specific Requirements in this Section.

Attachment 6
Bridge-Specific Requirements – North Fork
Execution Version: November 29, 2022

Table of Contents

6	Bridge-Specific Requirements – North Fork	1
6.1	Introduction	1
6.2	General	1
6.3	Work Management and Administration	1
6.4	Public Information and Communication.....	1
6.5	Environmental	1
6.6	Noise.....	2
6.7	Utilities.....	2
6.8	Right of Way	2
6.9	Geotechnical and Pavement.....	3
6.10	Land Surveying.....	3
6.11	Roadways and Grading.....	3
6.12	Bicycle and Pedestrian Facilities	4
6.13	Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control.....	4
6.14	Structures	5
6.15	Railroad Coordination	6
6.16	Context Sensitive Design, Aesthetics, and Landscaping	6
6.17	Traffic Analysis.....	6
6.18	Signing, Pavement Marking, Signalization, and Lighting	6
6.19	Intelligent Transportation System	6
6.20	Maintenance and Protection of Traffic.....	8
6.21	[Reserved].....	16
6.22	Maintenance Work	16
6.23	Handback	17
6.24	[Reserved].....	17
6.25	Bridge-Specific Submittal Requirements	17

Tables

Table A6-1.	Mainline Design Criteria.....	3
Table A6-2.	Ramp Design Criteria.....	3
Table A6-3.	MPT Restrictions	9
Table A6-4.	Holiday Restrictions.....	16
Table A6-5.	Lane Closure Rental Fees	16
Table A6-6.	Submittal Requirements.....	17

6 Bridge-Specific Requirements – North Fork

The Development Entity shall be responsible for performance of the Work in compliance with the requirements set forth within this Section inclusive of applicable referenced material. Without limiting any other requirement of the Contract Documents, including the Technical Provisions, the Development Entity shall design and construct the I-80 North Fork Bridge to meet the requirements of this Attachment.

6.1 Introduction

There are no applicable Bridge-Specific Requirements in this Section.

6.2 General

The Development Entity shall coordinate designs and construction with the I-80 Canoe Creek Bridge.

6.3 Work Management and Administration

There are no applicable Bridge-Specific Requirements in this Section.

6.4 Public Information and Communication

There are no applicable Bridge-Specific Requirements in this Section.

6.5 Environmental

The Provided Environmental Approvals for this Bridge are as follows:

- Categorical Exclusion.

The Development Entity shall coordinate with the Department to support obtaining National Park Service acceptance on the replacement lands prior to construction as per the Section 6(f) Requirements. The Department will coordinate with National Park Service on obtaining the approval for the replacement lands since the Department is acquiring the Right-of-Way for the project.

The Development Entity shall avoid impacts to the Stonewall Spring (36JE0201) site at SR 0080 STA 377+00 LT and the Haugh (36JE0082) site at SR 0080 STA 415+50 RT, in accordance with Section 106 requirements. The Development Entity shall, at a minimum:

- install fence around the Stonewall Spring and Haugh archaeological sites to ensure avoidance during construction;
- place a steel plate over the open well at the Stonewall Spring site to mitigate any safety concerns and protect the resource; and
- ensure no borrow/waste or staging areas are placed in these areas.

The Development Entity shall design and construct minimization/mitigation measures for permanent and temporary impacts to Walter Dick Memorial Park including but not limited to:

- minimize impacts to mature trees as much as practicable;

- restore any vegetation removed or otherwise impacted by construction activities within Walter Dick Memorial Park to pre-construction conditions;
- as necessary, relocate the recreational trails that may be impacted by construction;
- coordinate with Brookville Borough regarding the proposed temporary construction easements throughout construction; and
- minimize temporary and permanent impacts to Walter Dick Memorial Park in accordance with Section 4(f) laws and regulations. When impacts to the park cannot be avoided, additional minimization/mitigation measures may need to be incorporated into the Work as appropriate.

In the event that the Development Entity proposes changes that result in wetland impacts that exceed the compensatory mitigation provided by the Department within the Provided Environmental Approvals, the Development Entity shall mitigate those additional wetland impacts in accordance with applicable Environmental Law and as negotiated with the U.S. Army Corps of Engineers (USACE) and Department of Environmental Protection (DEP).

6.6 Noise

Based on a preliminary noise analysis report, sound barrier walls may be required from approximately STA 346+85 eastbound to STA 380+30 eastbound and approximately STA 346+67 westbound to STA 374+94 westbound. The Development Entity shall perform proper noise analyses and design and detail the sound barrier walls for the Work, if needed. The Development Entity shall follow the following aesthetic requirements for sound barriers, at a minimum:

- If applicable, the Highway side of the sound barrier walls will be Ashlar Stone Gray and the Property owner side will be Ashlar Stone Tan;
- If applicable, a smoky brown panel and matte finish are required for any acrylic panels on the eastbound and westbound bridges over SR 4003; and
- If applicable, the Development Entity is required to submit the final panel colors and types to the Department for review and acceptance prior to fabrication of the sound barrier walls and panels.

6.7 Utilities

There are no applicable Bridge-Specific Requirements in this Section.

6.8 Right of Way

The Development Entity shall be aware that there is a proposed utility corridor for Brookville Municipal Authority from STA 371+47 to STA 377+08 RT along SR 0080 eastbound. The proposed utility corridor will occupy the area of Highway Right of way outside of the SR 0080 limited access Right of Way. There will not be any service connections within the proposed utility corridor. The Development Entity shall install new fencing at the freeway Right of Way line and along the outside of the proposed utility corridor. The Development Entity shall coordinate with the Brookville Municipal Authority as needed. Contact information for the Brookville Municipal Authority is: Brookville Municipal Authority, 30 Darrah Street, Brookville, PA 15825, Attn: Clyde Bullers, Phone: (814) 849-7941.

6.9 Geotechnical and Pavement

For the I-80 North Fork Bridges over North Fork Redbank Creek and Water Plant Road, a Structure Foundation Memo will be prepared for the foundations.

The Development Entity may dispose of acid producing rock within the Department's Right-of-Way. The Development Entity shall not dispose of Acid Producing Rock within any Right-of-Way which is to be vacated upon completion of the project. The Development Entity shall provide a Predetermined Amount for offsite disposal of Acid Producing Rock.

6.10 Land Surveying

There are no applicable Bridge-Specific Requirements in this Section.

6.11 Roadways and Grading

At a minimum, and without limiting the other requirements of the Contract Documents, the Development Entity shall design and construct the roadways in accordance with the design criteria identified in Table A6-1 and Table A6-2.

Table A6-1. Mainline Design Criteria

	I-80 EB/WB	SR 4003	SR 4005
Design Criteria	New/ Reconstruction	New/ Reconstruction	New/ Reconstruction
Area System (urban/rural)	Rural	Rural	Rural
Functional Classification	Limited Access Freeway	Major Collector	Major Collector
Topography	Rolling	Rolling	Rolling
Roadway Typology	Rural Interstate	Neighborhood Collector, Suburban Neighborhood	Community Collector, Rural
Design Speed (mph)	70	35	55
Number Lanes Each Direction	2	1	1
Lane Width (Ft.)	12	10	11
LT. Shoulder Width (Ft.)	8, 4 w/barrier	N/A	N/A
RT. Shoulder Width (Ft.)	12	4	4
Design Vehicle	N/A		

Table A6-2. Ramp Design Criteria

	Ramp
Ramp	N/A
Mainline Speed	N/A
Ramp Design Speed	N/A
Design Width of Pavement	N/A
Lane Width	N/A

Outside Shoulder	N/A
Inside Shoulder	N/A

6.12 Bicycle and Pedestrian Facilities

SR 4003 Jenks Street has a sidewalk and pedestrian traffic which does not have to be maintained during construction as stated in the Technical Provisions due to the previous coordination with the Brookville Area School District. Coordination with the Brookville Area School District and the transportation company is required during final design and construction of the project. The school district will provide busing of the school students who live south of I-80 during the construction of SR 4003 Jenks Street and the I-80 EB and WB bridges over SR 4003.

6.13 Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

If necessary, the Development Entity shall design and construct temporary causeways in accordance with the following site-specific restrictions and requirements, at a minimum:

- Causeway design shall require a HEC-RAS analysis for temporary conditions and will need to be submitted to the Department for their review and acceptance;
- The design of the causeway shall be in conformance with criteria provided in the waterway permit guidance;
- If Flood flows that could wash out the causeway are forecast, remove the causeway or portion of the causeway as necessary to avoid a wash out prior to the forecasted flows;
- If the causeway location is anticipated to be within the Brookville Municipal Authority drinking water supply, precaution shall be taken to avoid spills of construction materials;
- Minimize disturbance to the waterway;
- Use only clean material for the temporary causeway; do not use any material containing silt, soil, or other erodible or fine material; and
- Impacts to the embankment of the existing dam shall be avoided.

The Development Entity shall verify the limits of the drinking supply source with the Brookville Municipal Authority prior to beginning Work and shall design and construct the temporary and proposed drainage in accordance with the following site-specific requirements, at a minimum:

- Runoff from the proposed road and bridge Drainage System is not permitted to enter the Brookville Municipal Authority drinking supply reservoir; and
- Proposed roadway and bridge drainage must be discharged to the downstream side of the dam.

The downspout for the I-80 EB and WB Bridges over Water Plant Road and North Fork Redbank Creek can exceed the 15 ft maximum requirement from Technical Provision Section 14.3.10 Drainage Systems. Since the North Fork Redbank Creek is a high-quality stream and this drainage requires special treatment prior to discharging if discharged upstream of the dam into North Fork Redbank Creek.

6.14 Structures

The Development Entity shall design and construct independent superstructures for the eastbound and westbound directions.

The Development Entity shall design and construct the Interstate bridge structures to be able to always maintain two active lanes in each direction on each structure during future redecking. Furthermore, the Development Entity shall design and construct the bridge structures to be able to complete future redecking in two construction stages for each structure. The minimum curb to curb including lanes and shoulders during any redecking stage shall be at least 24’.

The Development Entity shall provide bridge piers that provide a positive visual aesthetic, reduce cantilevers, and minimize cracking. In lieu of large hammerhead piers, the Development Entity shall design and construct tulip-shaped piers where possible and shall submit the proposed pier shape to the Department for acceptance with the initial Final Structures Plans submission.

The use of weathering steel or painted steel girders is not allowed on the SR 0080 eastbound bridge over SR 4003 (Jenks Street), the SR 0080 westbound bridge over SR 4003 (Jenks Street), or the SR 4005 bridge over SR 0080 eastbound and westbound.

The use of painted steel girders is not allowed on the SR 0080 eastbound and westbound North Fork bridges over North Fork Redbank Creek and Water Plant Road.

Blasting is not permitted for the removal of existing bridges.

The Development Entity shall provide a dual deck protective system for the proposed bridge decks for both the SR 0080 eastbound and westbound bridges over SR 4003 (Jenks Street) consisting of a 1" polyester polymer concrete (PPC) overlay and epoxy coated rebar in accordance with DM-4.

The Development Entity shall not use adhesive anchors for new bridge construction.

The Development Entity shall not use pneumatic hammers heavier than the nominal thirty (30) pound class on the North Park Culvert (Culvert No. 2).

The Development Entity shall provide equal girder spacing on girder bridges, unless otherwise accepted by the Department.

The Development Entity shall provide consistent girder plate sizes within a cross section for girder bridges, unless otherwise accepted by the Department.

The Development Entity shall not use slip form barriers.

The Development Entity shall design the Interstate bridges to accommodate future loading due to protective fencing, meeting or exceeding the fencing requirements in BC-701M (Protective Fence) of *Department Pub 219M, Bridge Construction Standards*.

The Development Entity shall provide barrier protective fence on both the outside and median bridge barriers.

The Development Entity shall install signs on the outside shoulders of the proposed SR 0080 eastbound and westbound bridges. The wording on the signs shall read: “If you are in a crisis, please call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255) or text ‘PA’ to 741741”. As part of the initial Final Structures Plans submission the Development Entity shall submit to the Department for acceptance a plan for the quantity, and location of such signs.

Toothdam expansion joints are not permitted on bridge structures.

The Development Entity shall not use grouted rock or grouted sandbags for culvert floors unless otherwise accepted by the Department.

The Development Entity shall design and construct all bridges to have 5 or more girders and ensure that the future redecking requirements are met.

The Development Entity shall rehabilitate North Park Culvert (Culvert No. 2) to provide a minimum condition rating of 7.

The 32” f-shape concrete barrier shown on BD-601M can be utilized for the SR 4005 bridge over SR 0080. If there are any revisions to the proposed 32” f-shape concrete barrier, please submit the revisions to the Department for review.

6.15 Railroad Coordination

There are no applicable Bridge-Specific Requirements in this Section.

6.16 Context Sensitive Design, Aesthetics, and Landscaping

There are no applicable Bridge-Specific Requirements in this Section.

6.17 Traffic Analysis

There are no applicable Bridge-Specific Requirements in this Section.

6.18 Signing, Pavement Marking, Signalization, and Lighting

There are existing solar-powered sequential chevron signs located along SR 0080 eastbound at approximately existing Segment 0794 Offset 0330 to approximately existing Segment 0794 Offset 1075, at mile marker 79.6. The Development Entity shall carefully remove these signs to minimize impacts to chevron signs and solar-powered components and shall return the signs to the Department’s Jefferson County Maintenance Building at 205 Witherow Street, Punxsutawney, PA 15767 (Phone: (814) 938-6300).

The Development Entity shall provide Type B guide rail mounted delineators in addition to Type O and Type P barrier mounted delineators throughout the Bridge Site.

6.19 Intelligent Transportation System

The Development Entity shall design and construct one 4-inch minimum diameter communications conduit (suitable to accommodate four 1.25-inch PVC inner ducts) and one 2-inch diameter power conduit for future Intelligent Transportation System (ITS) work, at a minimum, on each new bridge structure, extending beyond the bridge approach and into the shoulder area. The future ITS conduits are to be placed between the fascia beam and first interior beam of the superstructure in accordance with the Project Standards.

The Development Entity shall design and construct new Closed-Circuit Television (CCTV) cameras near the SR 0080 eastbound and westbound bridges over North Fork Redbank Creek and Water Plant Road, in accordance with of Section 1210 (Closed Circuit Television Camera) of *Department Pub 408, Highway Construction Specifications* and *Department Pub 647, Intelligent Transportation Systems Standard Drawings, ITS-1200 Series*; one camera is to be installed on the eastern side of the bridge structures, and one camera is to be installed on the western side of the bridge structures. The Development Entity shall perform a viewshed survey using drone technology at the proposed camera locations and supply video footage to the Department to coordinate the correct locations of the camera poles. The Department requires 50-foot-high poles for the camera installations. The Development Entity shall ensure power sources are provided from each side of the SR 0080 bridges over North Fork Redbank Creek. The Development Entity shall not use power conductors to extend across these bridges.

The Development Entity shall design and construct new conduit and fiber optic cable along the Bridge Site from STA 332+93 eastbound to STA 450+25 eastbound and STA 334+62 westbound to STA 450+50 westbound in accordance with Section 1204 (ITS Communications) of *Department Pub 408, Highway Construction Specifications* and *Department Pub 647, Intelligent Transportation Systems Standard Drawings, ITS-1200 Series*. The Development Entity shall install conduit and junction boxes along the roadside median area as necessary; the Development Entity shall optimize the locations of these facilities to avoid existing and proposed drainage features and utilities. The Development Entity shall design and construct the conduit runs so that they traverse to connect with the proposed conduit between the fascia and first interior beam; the Development Entity shall not propose aerial conduit or conduit attached to the exterior of the proposed structure.

The Development Entity shall design and construct the removal and re-installation of the continuous automatic vehicle classifier (CAVC) site located approximately at STA 350+75 westbound. The Development Entity shall coordinate with the Department to determine the specific location and any special instructions for the re-installation of the CAVC Site; the Development Entity shall comply with such special instructions from the Department.

The Development Entity shall carefully remove the existing Dynamic Message Sign (DMS) and attached CCTV equipment, located at approximate STA 351+20, and transport the removed equipment to the designated Department facility. The Development Entity shall exercise caution and ensure no damage to the equipment during removal and transportation of such DMS and CCTV equipment. Additionally, the Development Entity shall perform the following requirements:

- The Development Entity shall design and construct a new DMS in accordance with Section 1230 (Dynamic Message Signs) of *Department Pub 408, Highway Construction Specifications*. The Development Entity will be responsible for coordination of the location of the proposed DMS with the Department and the Regional Traffic Management Center (RTMC) manager;
- The Development Entity shall design and perform the re-installation of the removed CCTV camera on the proposed DMS in coordination with the Department and the RTMC manager;
- The Development Entity shall coordinate all Work through the Department and the RTMC manager. The Development Entity shall not proceed with the removal of the wireless radio equipment at any location without the acceptance of the RTMC manager or their designated representative; and

- The Development Entity shall return all removed equipment to the Department's Jefferson County Maintenance Building located at 205 Witherow Street, Punxsutawney, PA 15767.

6.20 Maintenance and Protection of Traffic

The Development Entity shall provide a monitoring system for both SR 0080 eastbound and SR 0080 westbound to ensure that advanced queue detection data is provided to the Department throughout construction.

The Development Entity shall maintain Emergency access (12-foot-lane minimum) along SR 4003 (Jenks Street) at all times, unless otherwise coordinated and approved by the local municipality and impacted third-parties. SR 4003 can be detoured for pedestrians and bicycles during construction. Coordination with the Brookville Area School District is required for the school students that walk to school along SR 4003. The Brookville Area School District will provide busing for the school students during the construction project.

The Development Entity shall design and construct the SR 4005 Richardsville Road bridge to be able to rehabilitate the superstructure while maintaining at least one 12-foot lane of alternating traffic using temporary signals at each end of the bridge at all times and during future superstructure renewals and maintenance.

The Development Entity shall design and construct the Work in accordance with the Maintenance and Protection of Traffic (MPT) restrictions identified in Table A6-3.

Table A6-3. MPT Restrictions

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS	Holiday Restrictions. Lane Closures may not occur during the following time periods:		See Table A6-4 below.
	Interstate	Number of Lanes	The Development Entity shall maintain the existing number of lanes in each direction of travel on Interstates, with the exceptions listed under the provisions, below. North Fork bridges shall maintain 2 lanes of traffic in each direction utilizing crossovers.
		Temporary Cross Section minimum requirements for 1 Lane Tangent Section	The Development Entity shall meet the TCP requirements as approved by the Department during the PDA phase. The Development Entity shall maintain a minimum lane width of 13'.
		Temporary Cross Section minimum requirements for 2 Lanes Tangent Section	The Development Entity shall meet the TCP requirements as approved by the Department during the PDA phase. 4' paved shoulder, 2x12' lanes, 4' paved shoulder on crossovers (temporary road). 2x 12' min lanes, or 24' min for 2 lanes, on mainline bridges. 2 x 12' min lanes, 24' min width for two lanes, or match existing on existing pavement on mainline approaches.
		Complete Bi-Directional Closure (Supplemented with Detour)	Development Entity shall not be permitted to implement complete bi-directional closures.
		Complete Directional Closure (Supplemented with Detour)	Development Entity shall not be permitted to implement complete directional closures.

Attachment 6. Bridge-Specific Requirements – North Fork

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)	Interstate (cont'd)	Interstate 15-Minute Full Rolling Stoppage	<p>15-Minute rolling stoppages shall not be permitted at the following times:</p> <ul style="list-style-type: none"> ▪ Every day: 5:00 a.m. - 11:00 p.m. <p>The Development Entity shall not perform a subsequent 15-minute closure until traffic has returned to “normal” pre-stoppage flow.</p> <p>Additionally, due to safety concerns of the traveling public specifically on I-80: rolling stoppages shall not be permitted on the day before, on, and the day after a holiday.</p> <p>Rolling stoppages shall be weather permitting.</p> <p>Development Entity shall not implement stoppages during rain, snow, or fog. Rolling stoppages shall be on dry roads.</p>
		Interstate Multilane Closure (non-full closure) - Including the adjacent shoulder closure	Not Applicable
		Interstate Single Lane Closures - Including the adjacent shoulder closure	<p>Short-term lane closures are permitted during night-time only 9 PM to 6:00 AM</p> <p>Development Entity shall provide Pennsylvania State Police to monitor traffic queues when single lane restrictions are required.</p> <p>Long-term lane closures shall not be permitted.</p>
		Interstate Single (Right or Left) Shoulder Closures	<p>Department will permit Interstate single (right or left) short-term shoulder closures anytime.</p> <p>Department will permit Interstate single (right or left) long-term shoulder closures anytime.</p>

Attachment 6. Bridge-Specific Requirements – North Fork

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)		Interstate Dual (Right and Left) Shoulder Closure	Department will permit Interstate dual (right and left) short-term shoulder closures anytime. Department will permit Interstate dual (right and left) long-term shoulder closures anytime.
		Additional Event Restrictions	Not applicable.
	Ramps	Number of Lanes	Not Applicable.
		Ramp Full Closures (Supplemented with Detour)	Not Applicable.
		Interstate Multilane Closure (non-full closure) - Including the adjacent shoulder closure	Not Applicable.
		Ramp Single Lane and Shoulder Closure (For Multilane Ramps)	Not Applicable.
		Ramp Shoulder Closure	Not Applicable.
		Additional Event / Special Restrictions	Not Applicable.
	Non-Interstate Roadways (state and local roadways)	Number of Lanes	The Development Entity shall maintain the existing number of lanes on other roadways, with the exceptions listed under the allowable closures, below.
		Non-Interstate Roadway Full Closure (Supplemented with Detour)	Development Entity shall develop a detour plan and obtain Department acceptance for SR 4003 and SR 4005 detours. When detour is not active, lane restrictions for SR 4003 shall not be permitted between 9 a.m. and 3 p.m. Brookville school access for Emergency services shall be maintained during duration of the Construction Work, including while detour is active. SR 4003 (Jenks Street) long-term full closure with signed detour route: Development Entity shall provide access along SR 4003 (Jenks Street) during construction for Emergency vehicle use only and only during an Emergency event. Development Entity shall provide and maintain a

Attachment 6. Bridge-Specific Requirements – North Fork

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
			<p>traversable pathway for Emergency vehicles to travel through the Work area for an Emergency event.</p> <p>Development Entity shall install temporary fencing and gates along SR 4003 (Jenks Street) with type III barricades and road closed signs.</p> <p>Gates shall be easily opened, and type III barricades shall be easily moved by manpower requiring no use of construction machinery.</p> <p>The Department will allow Emergency vehicle access along SR 4003 (Jenks Street) to be restricted during construction activities that include existing bridge beam removal, demolition of the existing bridge piers, and proposed bridge beam erection, in addition to some periods of the SR 4003 (Jenks Street) reconstruction near the vicinity of the SR 0080 overpass bridges.</p> <p>Development Entity shall coordinate with the Brookville Area school district, police, fire, and Emergency medical services prior to these activities. These activities shall be limited to nighttime operations.</p> <p>For times when the SR 4003 (Jenks Street) Emergency access is restricted, temporary staging of fire, police and Emergency medical services personnel shall be required at the Brookville Area school district campus.</p> <p>The Department and the Development Entity will coordinate with the Brookville Area school district to determine a location for fire, police, and Emergency medical services staging.</p> <p>At the pre-construction conference, the Development Entity shall submit a Work schedule including dates that construction activities involving restriction to SR 4003 (Jenks Street) Emergency access is anticipated.</p>

Attachment 6. Bridge-Specific Requirements – North Fork

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)	Non-Interstate Roadways (state and local roadways)	Non-Interstate Roadway Multilane Closure	N/A
		Non-Interstate Roadway Single Lane Closure	<p>Short-term lane closures on SR 4003 shall not be permitted at the following times:</p> <ul style="list-style-type: none"> ▪ Monday - Friday: 6:00 AM. - 9:00 a.m. ▪ Monday - Friday: 2:00 p.m. - 6:00 PM. ▪ Maintain at least one lane <p>Short-term lane closures on SR 4005 are permitted. Maintain at least one lane at all times.</p> <p>Long-term lane closures on SR 4003 shall not be permitted.</p> <p>Long-term lane closures on SR 4005 are permitted. Maintain at least one lane at all times.</p>
		Non-Interstate Roadway Shoulder Closure	<p>Department will permit short-term closures at any time.</p> <p>Department will permit long-term closures at any time.</p>

Attachment 6. Bridge-Specific Requirements – North Fork

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
		Additional Event /Special Restrictions	<p>Development Entity shall include repair detour routes in accordance with SOL 495-21-04.</p> <p>Development Entity shall develop a detour plan, obtain Department acceptance , and implement a long-term full closure with a signed detour route for SR 4003 (Jenks Street) and SR 4005 (Richardsville Road).</p> <p>Once the Development Entity removes the detours, the following restrictions shall apply:</p> <p>Short-term and long-term lane closures shall not be permitted during the following timeframes:</p> <ul style="list-style-type: none"> ▪ Hazen Flea Market (1st Sunday of each month, May through October) ▪ Laurel Festival (3rd week in June) ▪ Jefferson County Fair (3rd week in July) <p>Brookville High School Graduation (Development Entity shall coordinate with Brookville Area school district).</p>

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)	Regional/Local Coordination		<p>Development Entity shall provide at least 14 calendar Days' advance notice to affected municipalities, respective Emergency services, local school districts, the Pennsylvania State Police, District Community Relations Coordinator, District 10-0 Permit Office, the Jefferson County Maintenance Manager, and the Airport Management Office prior to beginning any Work or imposing any traffic restrictions.</p> <p>The Development Entity shall report to the RTMC any road closure, lane closure, or lane restriction over 15 minutes to ensure the Road Conditions Reporting System (RCRS) data is entered when lane restrictions or closures are in place. Information that shall be required at time of call: County, nearest town, SR, nearest roads to location, the beginning time, expected ending time, detour route (if applicable), contact name, and phone number.</p> <p>For the duration of the Construction Work, the Development Entity shall coordinate with the Brookville Area school district.</p> <p>Notify the Department at least 30 minutes prior to placement of traffic control devices.</p>
	Temporary Pavement Marking Material		<p>The Development Entity shall place all final pavement markings on the wearing course prior to opening the roadway to normal flow traffic.</p> <p>Development Entity shall not place temporary pavement marking paint on the wearing course.</p> <p>If temporary lines are needed on the final wearing course, Development Entity shall provide temporary wet reflective tape from an approved <i>Department Pub 35, Qualified Products List for Construction, Bulletin 15</i> provider and in accordance with the TC-8600 and TC-8700 Standards.</p>

Table A6-4. Holiday Restrictions

Holiday	Restriction Begins	Restriction Ends
Easter	Thursday 6:00 a.m.	Tuesday 9:00 p.m.
Memorial Day	Thursday 5:00 a.m.	Tuesday 9:00 p.m.
Independence Day (Sunday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Monday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Tuesday)	Friday 6:00 a.m.	Wednesday 9:00 a.m.
Independence Day (Wednesday)	Tuesday 6:00 a.m.	Thursday 9:00 a.m.
Independence Day (Thursday)	Wednesday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Friday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Saturday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Labor Day	Friday 12:00 a.m.	Tuesday 9:00 p.m.
Columbus Day	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Thanksgiving Day	Tuesday 5:00 a.m.	Tuesday 9:00 a.m.
Christmas Day and New Year's Day Combined	Previous weekday before Christmas Eve at 6:00 a.m.	Following weekday after New Year's Day at 9:00 p.m.

Table A6-5. Lane Closure Rental Fees**I-80 North Fork 10-0 Jefferson County**

Roadway Type	Closure Type	Values = \$/Lane/Hour Lane Rental
Interstate	Shoulder closure	\$700.00
	Of 2 lanes total, 1 lane closed (\$/hr/lane)	\$3,700.00
	Of 3 or more lanes total, 1 lane closed (\$/hr/lane)	—
	Of 3 or more lanes total, 2 lanes closed same direction (\$/hr/lane)	—
	Ramp closure (\$/hr/lane)	\$2,300.00
Non-Interstate	SR 0028	\$700.00
	SR 0322	\$1,400.00
	SR 0036	\$1,600.00

6.21 [Reserved]**6.22 Maintenance Work**

There are no applicable Bridge-Specific Requirements in this Section.

6.23 Handback

There are no applicable Bridge-Specific Requirements in this Section.

6.24 [Reserved]

6.25 Bridge-Specific Submittal Requirements

Whenever a Submittal identified in the following Table A6-6 becomes necessary for the Work, the Development Entity shall prepare and submit it to the Department. The Development Entity shall ensure that each Submittal is identified within the Submittal Packaging Requirements Database described in *Section 3.5.1, Submittal Packaging Plan* of these Technical Provisions and incorporates Table A6-6 information. The Department will conduct reviews and may provide review Comments in accordance with *Section 3.5, Submittal Review and Oversight* of these Technical Provisions and Table A6-6.

Table A6-6. Submittal Requirements

Item	Submittal	Submittal Type	Time Period for Department Review (Business Days)	Disposition as a Condition to	Submittal during the	Notes
1.	Sound barrier walls colors and types	3	15	Construction Work commencement for Submittal related Work	—	—

Attachment 7
Bridge-Specific Requirements – Lehigh
Execution Version: November 29, 2022

Table of Contents

7	Bridge-Specific Requirements – White Haven	1
7.1	Introduction	1
7.2	General	1
7.3	Work Management and Administration	1
7.4	Public Information and Communication.....	1
7.5	Environmental	1
7.6	Noise.....	1
7.7	Utilities.....	1
7.8	Right of Way	1
7.9	Geotechnical and Pavement.....	1
7.10	Land Surveying.....	2
7.11	Roadways and Grading.....	2
7.12	Bicycle and Pedestrian Facilities	2
7.13	Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control.....	3
7.14	Structures	3
7.15	Railroad Coordination	3
7.16	Context Sensitive Design, Aesthetics, and Landscaping	3
7.17	Traffic Analysis.....	3
7.18	Signing, Pavement Marking, Signalization, and Lighting	3
7.19	Intelligent Transportation System	3
7.20	Maintenance and Protection of Traffic.....	3
7.21	[Reserved].....	9
7.22	Maintenance Work	9
7.23	Handback	9
7.24	[Reserved].....	10
7.25	Bridge-Specific Submittal Requirements	10

Tables

Table A7-1.	Mainline Design Criteria.....	2
Table A7-2.	Ramp Design Criteria.....	2
Table A7-3.	MPT Restrictions	4
Table A7-4.	Holiday Restrictions.....	9
Table A7-5.	Lane Closure Rental Fees	9

7 Bridge-Specific Requirements – White Haven

The Development Entity shall be responsible for performance of the Work in compliance with the requirements set forth within this Section inclusive of applicable referenced material. Without limiting any other requirement of the Contract Documents, including the Technical Provisions, the Development Entity shall design and construct the I-80 White Haven Bridge to meet the requirements of this Attachment.

7.1 Introduction

There are no applicable Bridge-Specific Requirements in this Section.

7.2 General

There are no applicable Bridge-Specific Requirements in this Section.

7.3 Work Management and Administration

There are no applicable Bridge-Specific Requirements in this Section.

7.4 Public Information and Communication

There are no applicable Bridge-Specific Requirements in this Section.

7.5 Environmental

The Provided Environmental Approvals for this Bridge are as follows:

- Categorical Exclusion.

The Development Entity shall coordinate with the Department to support obtaining National Park Service acceptance on the replacement lands prior to construction as per the Section 6(f) Requirements.

Coordination with the Department of Conservation and Natural Resources should go through the Department's District environmental unit.

7.6 Noise

There are no applicable Bridge-Specific Requirements in this Section.

7.7 Utilities

There are no applicable Bridge-Specific Requirements in this Section.

7.8 Right of Way

The Development Entity shall maintain access to residential and commercial properties at all times, including but not limited to the properties currently or recently owned by Little Washington Wastewater Company, Shadowscape, Ltd., and Riverside Holdings, LLC.

7.9 Geotechnical and Pavement

There are no applicable Bridge-Specific Requirements in this Section.

7.10 Land Surveying

There are no applicable Bridge-Specific Requirements in this Section.

7.11 Roadways and Grading

At a minimum, and without limiting the other requirements of the Contract Documents, the Development Entity shall design and construct the roadways in accordance with the design criteria identified in Table A7-1 and Table A7-2.

Table A7-1. Mainline Design Criteria

	I-80 EB/WB
Design Criteria	New/ Reconstruction
Area System (urban/rural)	Rural
Functional Classification	Interstates/Freeways
Topography	Rolling
Roadway Typology	Limited Access Freeway, Rural Interstate
Design Speed (mph)	70
Number Lanes Each Direction	2
Lane Width (Ft.)	12
LT. Shoulder Width (Ft.)	8, 4 w/median barrier
RT. Shoulder Width (Ft.)	12
Design Vehicle	N/A

Table A7-2. Ramp Design Criteria

	Ramp	
Ramp	B	C
Mainline Speed		70 mph
Ramp Design Speed	60/50/35 mph	60/50/40 mph
Design Width of Pavement	28 feet	28 feet
Lane Width	14 feet	14 feet
Outside Shoulder	10 feet	10 feet
Inside Shoulder	4 feet Paved	4 feet Paved

7.12 Bicycle and Pedestrian Facilities

The Development Entity shall maintain bicycle and pedestrian facilities within Lehigh Gorge State Park in accordance with the Environmental Commitment and Mitigation Tracking System (ECMTS).

7.13 Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

There are no applicable Bridge-Specific Requirements in this Section.

7.14 Structures

The Development Entity shall provide equal girder spacing on girder bridges, unless otherwise accepted by the Department.

The Development Entity shall provide consistent girder plate sizes within a cross section for girder bridges, unless otherwise accepted by the Department.

Repair the Culvert carrying Tributary of Lehigh River (BMS No. 13-0080-2730-0300) to provide a minimum condition rating of 7.

The Development Entity shall design and construct the interstate bridge structures to be able to accommodate future redecking. Furthermore, the Development Entity shall design and construct the bridge structures to be able to complete future redecking with a maximum of one construction joint per bridge. The minimum curb-curb width during redecking shall be 24’.

7.15 Railroad Coordination

The Development Entity shall coordinate with Reading Blue Mountain & Northern (RBM&N) Railroad.

7.16 Context Sensitive Design, Aesthetics, and Landscaping

There are no applicable Bridge-Specific Requirements in this Section.

7.17 Traffic Analysis

There are no applicable Bridge-Specific Requirements in this Section.

7.18 Signing, Pavement Marking, Signalization, and Lighting

There are no applicable Bridge-Specific Requirements in this Section.

7.19 Intelligent Transportation System

The Development Entity shall design and construct one 4-inch minimum diameter communications conduit (suitable to accommodate four 1.25-inch PVC inner ducts) and one 2-inch diameter power conduit for future Intelligent Transportation System (ITS) work, at a minimum, on each new bridge structure, extending beyond the bridge approach and into the shoulder area. The future ITS conduits are to be placed between the fascia beam and first interior beam of the superstructure in accordance with the Project Standards.

7.20 Maintenance and Protection of Traffic

The Development Entity shall design and construct the Work in accordance with the Maintenance and Protection of Traffic (MPT) restrictions identified in Table A7-3.

Table A7-3. MPT Restrictions

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS	Holiday Restrictions. Lane Closures may not occur during the following time periods:		See Table A7-4 below.
	Interstate	Number of Lanes	The Development Entity shall maintain 2 lanes (2' shoulder, 1x12' lanes, 2' shoulder) in each direction of travel on Interstates utilizing crossovers, with the exceptions listed under the provisions, below.
		Temporary Cross Section minimum requirements for 1 Lane Tangent Section	The Development Entity shall meet the TCP requirements as approved by the Department during the PDA phase. One lane 1' shoulder, 1x12' lanes, 1' shoulder for only permitted as accepted by the Department. The Development Entity shall maintain a minimum lane width of 13'.
		Temporary Cross Section minimum requirements for 2 Lanes Tangent Section	The Development Entity shall meet the TCP requirements as approved by the Department during the PDA phase. 4' shoulder, 2x12' lanes, 4' shoulder unless shown otherwise approved by the Department. Temporary high speed crossover to be minimum 4' shoulders on both sides of the 2-12' lanes.
		Complete Bi-Directional Closure (Supplemented with Detour)	Complete bi-directional closures are not permitted. Full detour of Interstate is prohibited.
		Complete Directional Closure (Supplemented with Detour)	Complete directional closures are not permitted. Full detour of Interstate is prohibited.
		Interstate 15-Minute Full Rolling Stoppage	15-Minute rolling stoppages are not permitted at the following times: ▪ Every day: 6:00 a.m. - 9:00 p.m. The Development Entity shall not perform a subsequent 15-minute closure until traffic has returned to "normal" pre-stoppage flow. Rolling stoppages may be bi-directional. Rolling closures could be used for beam delivery or demo. Bi-direction can be allowed for safety of adjacent traffic.

Attachment 7. Bridge-Specific Requirements – White Haven

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)		Interstate Multilane Closure (non-full closure) - Including the adjacent shoulder closure	Not Applicable.
		Interstate Single Lane Closures - Including the adjacent shoulder closure	Short-term lane closures are not permitted at the following times: <ul style="list-style-type: none">Monday - Thursday: 6:00 a.m. - 9:00 p.m.Friday - Sunday: 6:00 a.m. - 10:00 p.m. Off-peak single-lane closures shall be off-peak only.
			Long-term closures are not permitted, with the exception that a single eastbound lane may be closed Sunday 10:00 p.m. - Friday 6:00 a.m. for a maximum of two weeks. These 2 weeks of lane closures may only occur once during the duration of the project. Development Entity shall coordinate with the Department and neighboring projects to minimize impact on the traveling public.
		Interstate Single (Right or Left) Shoulder Closures	Short-term shoulder closures are permitted anytime. Design criteria, including sight distance, shall be met. 4' shoulders shall be maintained on temporary cross-overs.
	Long-term shoulder closures are permitted anytime. Design criteria, including sight distance, shall be met. 4' shoulders shall be maintained on cross-overs.		
	Interstate Dual (Right and Left) Shoulder Closure	Short-term shoulder closures are permitted anytime. Design criteria, including sight distance, shall be met. 4' shoulders shall be maintained on temporary cross-overs.	
		Long-term shoulder closures are permitted anytime. Design criteria, including sight distance, shall be met. 4' shoulders shall be maintained on temporary cross-overs.	
	Additional Event Restrictions	Monday, June 19, 2023, at 6:00 a.m. to Monday, June 26, 2023, at 12:00 a.m. (Pocono Raceway Weekend).	

Attachment 7. Bridge-Specific Requirements – White Haven

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
			Development Entity shall confirm future dates with the event organizers and the Department.
BRIDGE MPT RESTRICTIONS (cont'd)	Ramps	Number of Lanes	The Development Entity shall maintain the existing number of lanes on ramps, with the exceptions accepted by the Department.
		Ramp Full Closures (Supplemented with Detour)	Full closures are not permitted at Ramp A (I-80 westbound on-ramp from SR 940), Ramp D (I-80 eastbound off-ramp to SR 940), or at any ramps at the SR 534 interchange. Full closures are not permitted at Ramp C (I-80 eastbound on-ramp from SR 940) except as accepted by the Department. Full closures are not permitted at Ramp B (I-80 westbound off-ramp to SR 940) except as accepted by the Department.
		Ramp Multilane Closure (non-full closure) - Including the adjacent shoulder closure	Not applicable.
		Ramp Single Lane and Shoulder Closure (For Multilane Ramps)	Not applicable.
		Ramp Shoulder Closure	Short-term closures are permitted. Design criteria, including sight distance, shall be met. Long-term closures are permitted. Design criteria, including sight distance, shall be met.
		Additional Event / Special Restrictions	None.

Attachment 7. Bridge-Specific Requirements – White Haven

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)	Non-Interstate Roadways (state and local roadways)	Number of Lanes	The Development Entity shall maintain the existing number of lanes on other roadways, with the exceptions listed under the allowable closures, below. Long-term single-lane closures will be permitted along SR 940 as previously approved by PennDOT during the PDA phase.
		Non-Interstate Roadway Full Closure (Supplemented with Detour)	Full closure and detour of SR 1005 (River Road) is permitted in the area of I-80 for the duration of construction. Maintain access to residential and commercial properties at all times. Maintain school bus access, including turnaround area(s), if needed. Full closure of other roadways is not permitted. Full closure and detour of SR 1005 (River Road) and PA Bicycle Route L permitted for the duration of Construction Work.
		Non-Interstate Roadway Single Lane Closure (for Two Lane Other Roadways)	Short-term lane closures are not permitted on SR 940 at the following times: <ul style="list-style-type: none"> Friday - Sunday: 6:00 a.m. - 9:00 p.m. Maintain access to residential and commercial properties at all times. Long-term single-lane closures are permitted on SR 940 with use of a temporary signal, for construction in East Side Borough. Maintain access to residential and commercial properties at all times.
		Non-Interstate Roadway Multilane Closure	Short-term lane closures are not permitted. Long-term lane closures are not permitted on SR940
		Non-Interstate Roadway Single Lane Closure (For multilane Other Roadways)	Short-term lane closures are not permitted at the following times: <ul style="list-style-type: none"> Friday - Sunday: 6:00 a.m. - 9:00 p.m. Long-term single-lane closures will be subject to Department acceptance.
		Non-Interstate Roadway Shoulder Closure	Short-term shoulder closures are permitted. Design criteria, including sight distance, shall be met. Long-term shoulder closures are permitted. Design criteria, including sight distance, shall be met.

Attachment 7. Bridge-Specific Requirements – White Haven

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
		Additional Event /Special Restrictions	None.
BRIDGE MPT RESTRICTIONS (cont'd)	Regional/Local Coordination		<p>Notify the TMC at least 15 minutes prior to placement of traffic control devices.</p> <p>Coordinate with county or municipal traffic and Emergency management, including but not limited to, local fire companies and Emergency medical services, local police departments, and applicable PA State Police barracks.</p> <p>Coordinate with local school district(s) for facilitation of services during any planned detours.</p> <p>Receive the Department's acceptance for closures prior to implementing any closures.</p>
	Temporary Pavement Marking Material		The Development Entity shall use water borne paint and beads material for temporary pavement markings.

Table A7-4. Holiday Restrictions

Holiday	Restriction Begins	Restriction Ends
Easter	Thursday 6:00 a.m.	Tuesday 9:00 p.m.
Memorial Day	Thursday 5:00 a.m.	Tuesday 9:00 p.m.
Independence Day (Sunday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Monday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Tuesday)	Friday 6:00 a.m.	Wednesday 9:00 a.m.
Independence Day (Wednesday)	Tuesday 6:00 a.m.	Thursday 9:00 a.m.
Independence Day (Thursday)	Wednesday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Friday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Saturday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Labor Day	Friday 12:00 a.m.	Tuesday 9:00 p.m.
Columbus Day	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Thanksgiving Day	Tuesday 5:00 a.m.	Tuesday 9:00 a.m.
Christmas Day and New Year's Day Combined	Previous weekday before Christmas Eve at 6:00 a.m.	Following weekday after New Year's Day at 9:00 P.M.

Table A7-5. Lane Closure Rental Fees
I-80 White Haven 5-0 Carbon County

Roadway Type	Closure Type	Values = \$/Lane/Hour Lane Rental
Interstate	Shoulder closure	\$700.00
	Of 2 lanes total, 1 lane closed (\$/hr/lane)	\$3,300.00
	Of 3 or more lanes total, 1 lane closed (\$/hr/lane)	—
	Of 3 or more lanes total, 2 lanes closed same direction (\$/hr/lane)	—
	Ramp Closure (\$/hr/lane)	\$2,300.00
Non-Interstate	SR 0534	\$500.00
	SR 0940	\$800.00

7.21 [Reserved]**7.22 Maintenance Work**

There are no applicable Bridge-Specific Requirements in this Section.

7.23 Handback

There are no applicable Bridge-Specific Requirements in this Section.

7.24 [Reserved]

7.25 Bridge-Specific Submittal Requirements

There are no applicable Bridge-Specific Requirements in this Section.

Attachment 8
Bridge-Specific Requirements – Susquehanna
Execution Version: November 29, 2022

Table of Contents

8	Bridge-Specific Requirements – Susquehanna	1
8.1	Introduction	1
8.2	General	1
8.3	Work Management and Administration	1
8.4	Public Information and Communication.....	1
8.5	Environmental	1
8.6	Noise	1
8.7	Utilities.....	1
8.8	Right of Way	1
8.9	Geotechnical and Pavement.....	1
8.10	Land Surveying.....	1
8.11	Roadways and Grading.....	1
8.12	Bicycle and Pedestrian Facilities	2
8.13	Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control.....	2
8.14	Structures	2
8.15	Railroad Coordination	3
8.16	Context Sensitive Design, Aesthetics, and Landscaping	3
8.17	Traffic Analysis.....	3
8.18	Signing, Pavement Marking, Signalization, and Lighting	3
8.19	Intelligent Transportation System	3
8.20	Maintenance and Protection of Traffic.....	3
8.21	[Reserved].....	7
8.22	Maintenance Work	7
8.23	Handback	7
8.24	[Reserved].....	8
8.25	Bridge-Specific Submittal Requirements	8

Tables

Table A8-1.	Mainline Design Criteria.....	2
Table A8-2.	Ramp Design Criteria.....	2
Table A8-3.	MPT Restrictions	4
Table A8-4.	Holiday Restrictions.....	7
Table A8-5.	Lane Closure Rental Fees	7

8 Bridge-Specific Requirements – Susquehanna

The Development Entity shall be responsible for performance of the Work in compliance with the requirements set forth within this Section inclusive of applicable referenced material. Without limiting any other requirement of the Contract Documents, including the Technical Provisions, the Development Entity shall design and construct the I-81 Susquehanna Bridge to meet the requirements of this Attachment.

8.1 Introduction

There are no applicable Bridge-Specific Requirements in this Section.

8.2 General

There are no applicable Bridge-Specific Requirements in this Section.

8.3 Work Management and Administration

There are no applicable Bridge-Specific Requirements in this Section.

8.4 Public Information and Communication

There are no applicable Bridge-Specific Requirements in this Section.

8.5 Environmental

The Provided Environmental Approvals for this Bridge are as follows:

- Categorical Exclusion Re-evaluation.

8.6 Noise

There are no applicable Bridge-Specific Requirements in this Section.

8.7 Utilities

There are no applicable Bridge-Specific Requirements in this Section.

8.8 Right of Way

The Development Entity shall protect trees that are to remain on Parcel 14 (Fred Shiptoski) with orange fencing.

8.9 Geotechnical and Pavement

There are no applicable Bridge-Specific Requirements in this Section.

8.10 Land Surveying

There are no applicable Bridge-Specific Requirements in this Section.

8.11 Roadways and Grading

At a minimum, and without limiting the other requirements of the Contract Documents, the Development Entity shall design and construct the roadways in accordance with the design criteria identified in Table A8-1 and Table A8-2.

Table A8-1. Mainline Design Criteria

	I-81 NB/SB
Design Criteria	New/ Reconstruction
Area System (urban/rural)	Rural
Functional Classification	Limited Access Freeway
Topography	Rolling
Roadway Typology	Rural Interstate
Design Speed (mph)	70
Number Lanes Each Direction	2
Lane Width (Ft.)	12
LT. Shoulder Width (Ft.)	8
RT. Shoulder Width (Ft.)	12'
Design Vehicle	N/A

Table A8-2. Ramp Design Criteria

	Ramp
Ramp	*
Mainline Speed	*
Ramp Design Speed	*
Design Width of Pavement	*
Lane Width	*
Outside Shoulder	*
Inside Shoulder	*

*The Development Entity's design shall follow requirements of the Project Standards.

8.12 Bicycle and Pedestrian Facilities

There are no applicable Bridge-Specific Requirements in this Section.

8.13 Hydrology and Hydraulics, Drainage / Stormwater Management, and Erosion and Sediment Control

The freeboard requirements in Section 13.6.6 of the Technical Provisions are not applicable for this Bridge site. The Development Entity shall maintain minimum design requirements established and approved by the Department during the PDA phase.

8.14 Structures

The Development Entity shall design and construct the Interstate bridge structures to be able to always maintain two active lanes on each structure during future redecking. Furthermore, the Development Entity

shall design and construct the bridge structures to be able to complete future redecking in two construction stages.

The Development Entity shall design and construct a new culvert in replace of the existing culvert (BRKEY 32159, MPMS 89710) that crosses US 11, directly north of the intersection of US 11 / US 171.

The Development Entity shall provide sidewalk protective fence on both bridge barriers of the Randolph Road over I-81 bridge.

8.15 Railroad Coordination

There are no applicable Bridge-Specific Requirements in this Section.

8.16 Context Sensitive Design, Aesthetics, and Landscaping

There are no applicable Bridge-Specific Requirements in this Section.

8.17 Traffic Analysis

There are no applicable Bridge-Specific Requirements in this Section.

8.18 Signing, Pavement Marking, Signalization, and Lighting

There are no applicable Bridge-Specific Requirements in this Section.

8.19 Intelligent Transportation System

The Development Entity shall design and construct one 4-inch minimum diameter communications conduit (suitable to accommodate four 1.25-inch PVC inner ducts) and one 2-inch diameter power conduit for future Intelligent Transportation System (ITS) work, at a minimum, on each new bridge structure, extending beyond the bridge approach and into the shoulder area. The future ITS conduits are to be placed between the fascia beam and first interior beam of the superstructure in accordance with the Project Standards.

8.20 Maintenance and Protection of Traffic

Development Entity shall maintain through traffic on Harmony Road at all times, unless otherwise accepted by the Department; coordinate with the New Milford Borough and New Milford Township at least 10 Business Days prior to commencing Work on Harmony Road for the bridge replacements.

The Development Entity shall design and construct the Work in accordance with the Maintenance and Protection of Traffic (MPT) restrictions identified in Table A8-3.

Table A8-3. MPT Restrictions

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS	Holiday Restrictions. Lane Closures may not occur during the following time periods:		See Table A8-4 below.
	Interstate	Number of Lanes	The Development Entity shall maintain the existing number of lanes in each direction of travel on Interstates, with the exceptions listed under the provisions, below.
		Temporary Cross Section minimum requirements for 1 Lane Tangent Section	The Development Entity shall meet the TCP requirements as approved by the Department during the PDA phase. The Development Entity shall maintain a minimum lane width of 13'..
		Temporary Cross Section minimum requirements for 2 Lanes Tangent Section	The Development Entity shall meet the TCP requirements as approved by the Department during the PDA phase. 11' lane min on I-81 Bridge over Susquehanna River. 12' Min lane width on I-81 roadway approaches
		Complete Bi-Directional Closure (Supplemented with Detour)	Complete bi-directional closures are not permitted at the following times: <ul style="list-style-type: none"> 5:00 a.m. Monday through 9:00 p.m. Friday Only permitted for demo and beam erection
		Complete Directional Closure (Supplemented with Detour)	Complete directional closures are not permitted at the following times: <ul style="list-style-type: none"> 5:00 a.m. Monday through 9:00 p.m. Friday Only permitted for demo and beam erection
		Interstate 15-Minute Full Rolling Stoppage	15-Minute rolling stoppages are not permitted at the following times: <ul style="list-style-type: none"> Every day: 5:00 a.m. - 10:00 p.m. The Development Entity shall not perform a subsequent 15-minute closure until traffic has returned to "normal" pre-stoppage flow.
		Interstate Multilane Closure (non-full closure) - Including the adjacent shoulder closure	Short-term lane closures are not permitted at the following times: <ul style="list-style-type: none"> Monday - Friday: 5:00 a.m. - 10:00 p.m. Long-term lane closures are not permitted.

Attachment 8. Bridge-Specific Requirements – Susquehanna

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
BRIDGE MPT RESTRICTIONS (cont'd)		Interstate Single Lane Closures - Including the adjacent shoulder closure	Short-term lane closures are not permitted at the following times: <ul style="list-style-type: none"> Monday - Friday: 6:00 AM. - 6:00 PM. Long-term lane closures are not permitted.
		Interstate Single (Right or Left) Shoulder Closures	Short-term shoulder closures are permitted anytime. Long-term shoulder closures are permitted anytime.
		Interstate Dual (Right and Left) Shoulder Closure	Short-term shoulder closures are permitted anytime. Long-term shoulder closures are permitted anytime.
		Additional Event Restrictions	None.
	Ramps	Number of Lanes	The Development Entity shall maintain the existing number of lanes on ramps, with the exceptions listed under the allowable closures, below.
		Ramp Full Closures (Supplemented with Detour)	Full closures are not permitted at the following times unless detours or temporary provisions are made for ramp traffic in an approved TCP: <ul style="list-style-type: none"> 5:00 a.m. Monday through 9:00 p.m. Friday Nightly closures are permitted
		Interstate Multilane Closure (non-full closure) - Including the adjacent shoulder closure	Short-term lane closures are permitted Long-term lane closures are permitted.
		Ramp Single Lane and Shoulder Closure	No time restriction is needed for lane/shoulder closures on ramps Long-term lane and shoulder closures on ramps are permitted.
		Ramp Shoulder Closure	Short-term shoulder closures are permitted at any time. Long-term shoulder closures are permitted at any time.
		Additional Event / Special Restrictions	None.
	Non-Interstate Roadways (state	Number of Lanes	The Development Entity shall maintain the existing number of lanes on other roadways, with the exceptions listed under the allowable closures, below.

Attachment 8. Bridge-Specific Requirements – Susquehanna

	Topic	Subtopic	Development Entity shall adhere to the following stipulations during the Construction Period:
	and local roadways)	Non-Interstate Roadway Full Closure (Supplemented with Detour)	Full closures are permitted as necessary with approved detour plan
		Non-Interstate Roadway Multilane Closure	No time restrictions Long-term lane closures are permitted with approved detour plan
		Non-Interstate Roadway Single Lane Closure (For multilane Other Roadways)	Short-term lane closures are permitted Long-term lane closures are permitted.
		Non-Interstate Roadway Shoulder Closure	Short-term shoulder closures are permitted at any time. Long-term shoulder closures are permitted at any time.
		Additional Event /Special Restrictions	None.
BRIDGE MPT RESTRICTIONS (cont'd)	Regional/Local Coordination		Notify the Department at least 30 minutes prior to placement of traffic control devices.
	Temporary Pavement Marking Material		The Development Entity shall use water-borne paint and beads material for temporary pavement markings. Due to the longevity of the project, more robust pavement markings, such as epoxy should be considered..

Table A8-4. Holiday Restrictions

Holiday	Restriction Begins	Restriction Ends
Easter	Thursday 6:00 a.m.	Tuesday 9:00 p.m.
Memorial Day	Thursday 5:00 a.m.	Tuesday 9:00 p.m.
Independence Day (Sunday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Monday)	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Independence Day (Tuesday)	Friday 6:00 a.m.	Wednesday 9:00 a.m.
Independence Day (Wednesday)	Tuesday 6:00 a.m.	Thursday 9:00 a.m.
Independence Day (Thursday)	Wednesday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Friday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Independence Day (Saturday)	Thursday 6:00 a.m.	Monday 9:00 a.m.
Labor Day	Friday 12:00 a.m.	Tuesday 9:00 p.m.
Columbus Day	Friday 6:00 a.m.	Tuesday 9:00 a.m.
Thanksgiving Day	Tuesday 5:00 a.m.	Tuesday 9:00 a.m.
Christmas Day and New Year's Day Combined	Previous weekday before Christmas Eve at 6:00 a.m.	Following weekday after New Year's Day at 9:00 p.m.

Table A8-5. Lane Closure Rental Fees**I-81 Susquehanna 4-0 Susquehanna County**

Roadway Type	Closure Type	Values = \$/Lane/Hour Lane Rental
Interstate	Shoulder closure	\$600.00
	Of 2 lanes total, 1 lane closed (\$/hr/lane)	\$3,200.00
	Of 3 or more lanes total, 1 lane closed (\$/hr/lane)	—
	Of 3 or more lanes total, 2 lanes closed same direction (\$/hr/lane)	—
	Ramp closure (\$/hr/lane)	\$2,300.00
Non-Interstate	SR 0171	\$1,300.00
	US 11	\$1,300.00
	SR 0492	\$900.00

8.21 [Reserved]**8.22 Maintenance Work**

There are no applicable Bridge-Specific Requirements in this Section.

8.23 Handback

There are no applicable Bridge-Specific Requirements in this Section.

8.24 [Reserved]

8.25 Bridge-Specific Submittal Requirements

There are no applicable Bridge-Specific Requirements in this Section.

Attachment 9

[Reserved]

Attachment 10

[Reserved]

Attachment 11

District 4 Standard Special Provisions

SPECIAL PROVISIONS

Special Provision: **G4010B - REQUIRED NOTIFICATIONS**

Item(s) Associated:

Header:

REQUIRED NOTIFICATIONS

Provision Body:

Provide the following notification to the Inspector-in-Charge of the following:

- Start of physical work – four calendar days
- Width, height, or weight restrictions to any roadway – ten working days (excluding State holidays). This information should be on the form M-937R.
- Removal of width, height, or weight restrictions to any roadway – immediately upon removal. This information should be on the form M-937RO.
- Start of any operation affecting traffic (lane closures, total closures, etc.) -- four calendar days with a confirmation the morning of the operation.

You will not be permitted to close or restrict any roadway until ten working days (excluding State holidays) after such notification is received by the District Permits Unit.

No time extensions will be granted for failure to submit the required notices.

Also, directly notify local residents, school districts, local and county emergency management agencies (EMAs) of work that impacts those entities at the start of the project and again no less than four calendar days in advance of such work. Provide documentation of such notifications to the Inspector-in-Charge.

Regardless of these provisions, provide notification to any entities that are affected by your operations sufficiently ahead of the operations to allow those entities to adjust their operations accordingly.

Project Specific Details:

Special Provision: 00 - c ENVIRONMENTAL MONITOR FOR CONSTRUCTION

Item(s) Associated:

Header:

ENVIRONMENTAL MONITOR FOR CONSTRUCTION

Provision Body:

Select an individual to fill the position of Environmental Monitor for Construction (EMC). This position is responsible for project environmental compliance including but not limited to; Supervision, installation, maintenance and removal of all erosion and sediment pollution control (E/S) and National Pollution Discharge Elimination System (NPDES) Permit requirements including Post Construction Storm Water Management Plan (PCSMP) devices or best management practices; Supervision, monitoring and compliance of all Chapter 105/Section 404 Permit special conditions including stream mitigation, and the restoration of temporary wetland and stream impacts.

The Environmental Monitor for Construction is to verify and document that all provisions listed in the Environmental Project Requirements Special Provision and environmental project commitments listed in the Environmental Commitments Mitigation Tracking Sheet (ECMTS) Matrix and Construction Tracking Signature Sheet are successfully completed.

This individual is to have a minimum of 10 years of successful progressive experience in heavy highway earthmoving and erosion and sediment pollution control activities. This person cannot be a general laborer, or the construction superintendent assigned to the project. This position is full time. This person cannot have other project related responsibilities. All associated costs are considered incidental to the project.

Submit summary of individuals experience and qualifications to the Department for review and acceptance. If this individual is not acceptable, then resubmit until an acceptable individual is found. No earthwork will be started until an acceptable individual is found. The contractor is responsible for any lost contract time.

Should the individual serving as the Environmental Monitor for Construction not satisfactorily complete all required responsibilities then that person is to be immediately removed from the position. A new qualified individual is to be submitted for review and acceptance. The contractor is responsible for any lost contract time. Failure to satisfactorily staff this position will result in NONCOMPLIANCE BY THE CONTRACTOR in Accordance with Publication 408, Section 108.09. This is a mandatory requirement.

Responsibilities of the Environmental Monitor for Construction:

- Direct the proper installation and maintenance of all TEBSR special provision requirements, E/S, NPDES and PCSMP materials and items of work. Inspect materials and items of work on a daily basis and report finding to Department staff. Stop all contractor operations that are not in compliance. Develop corrective action plan for operations that are not in compliance and be responsible for required follow up actions. The operation(s) can not resume until deficiency(s) are corrected.
- Review the design plans, typical section views and details for erosion and sediment pollution control measures, NPDES Permit and PCSMP Plan requirements.

- Serve as the Contractors main point of contact for the Susquehanna County Conservation District, United States Fish and Wildlife Service (USFWS), and Pennsylvania Game Commission (PGC), Pennsylvania Fish and Boat Commission (PFBC), Pennsylvania Department of Environmental Protection (PADEP), United States Army Corps of Engineers (USACOE) regarding environmental compliance measures for the project.
- Ensure that the contractor is completing construction in the correct sequence with the approved Erosion and Sediment Pollution Control Plan, NPDES Permit and Post Construction Storm water Management Plan.
- Coordinate related items of work with all sub-contractors and utility companies.
- Conduct required NPDES Permit inspections and complete required reporting forms.
- Coordinate all changes for review and acceptance with the Department, USFW, PGC, PFBC, PADEP, USCOE and Susquehanna County Conservation District and prior to implementing construction.
- Prepare typewritten work plans summarizing proposed work activity plans covering 2-week periods of time. Submit information to Departments inspection staff.
- Provide typewritten inspection reports on a bi-monthly basis to the Department, USFW, PGC, PFBC, PADEP, USCOE and the Susquehanna County Conservation District.
- Coordinate, direct, implement, and document the construction, maintenance, repair and proper operation of all erosion and sediment pollution control devices and post construction storm water management plan control measures and facilities.
- Maintain inventory of erosion control materials and have additional erosion control materials available for replacement or readily available for emergency use if necessary.
- The EMC is responsible to supervise all contractor and sub-contractor activities and take necessary action to obtain an approved NPDES Notice of Termination for the project.
- Keep all Department Inspectors informed regarding work progress, inspection date(s), inspection results and any/all corrective actions as required.
- Oversee and direct the construction of the stream mitigation measures per the approved Stream Mitigation Plans. Ensure the proper installation of the in-stream structures, soils lifts and riparian plantings. Inspect materials and items of work on a daily basis and report finding to Department staff. Stop all contractor operations that are not in compliance. Develop corrective action plan for operations that are not in compliance and be responsible for required follow up actions. The operation(s) can not resume until deficiency(s) are corrected.
- Oversee and direct the restoration of temporary impacts to wetlands and streams per the approved Temporary Impact Restoration Plans. Develop and implement a remedial action plan for any areas that do not meet restoration objectives.
- Conduct Chapter 105/Section 404 compliance monitoring, prepare associated monitoring reports, and provide reports to appropriate Agencies.

Attachment 12

[Reserved]

Attachment 13

[Reserved]

Attachment 14

[Reserved]

Attachment 15

District 10 Standard Special Provisions

SPECIAL PROVISIONS

Special Provision: **S4091A - b04131 - SECTION 413.3(h)1.a PLACING**

Item(s) Associated:

Header:

SECTION 413.3(h)1.a PLACING

Provision Body:

Revise the second paragraph of Section 413.3(h)1.a Placing to read as follows:

Use a Material Transfer Vehicle (MTV) as specified in Section 108.05(c)5 on all mainline, shoulders, and ramps for leveling, binder and wearing courses, except scratch courses. An MTV is not required for leveling courses in build-up areas. Any paving pass that is less than 500 feet may be performed without the use of the MTV.

Project Specific Details:

Special Provision: **I4206A - c0205 4205-0200 SELECTED BORROW EXCAVATION, 206 ROCK**

Item(s) Associated:

Header:

ITEM 4205-0200 SELECTED BORROW EXCAVATION, 206 ROCK

Provision Body:

In accordance with Section 205 Borrow Excavation and except as follows:

Section 205.1(c) Selected Borrow Excavation. Add the following:

Replace Publication 408, Section 206.2(a)1.d entirely with the following paragraph:

Excludes all rock types except limestone which may be readily placed in an 18-inch maximum lift thickness. No more than 15 percent by weight may pass No. 4 sieve. The limestone must be blasted and offer resistance to crushing. Individual grains must be evident without aid of magnification, and fines must be limited to rock fines. The rock is to be approved by the District Geotechnical Engineer prior to placement.

Measurement and Payment

Selected Borrow Excavation, 206 Rock – Cubic Yard

Project Specific Details:

Special Provision:

**I806A - c4806-0112 TEMPORARY SHORT-TERM, ROLLED
EROSION CONTROL PRODUCT, TYPE 2C MODIFIED**

Item(s) Associated:

Header:

ITEM 4806-0112 TEMPORARY SHORT-TERM, ROLLED EROSION CONTROL PRODUCT, TYPE 2C MODIFIED

Provision Body:

In accordance with Section 806, modified as follows:

Section 806.2 MATERIAL – Add the following:

(b) The use of synthetic netting is prohibited. Netting must be comprised of an organic jute material.

Project Specific Details:

Special Provision: **I411B - c9000-0001 – REPAIR OF DETOUR ROUTE**

Item(s) Associated:

Header:

ITEM 9000-0001 – REPAIR OF DETOUR ROUTE

Provision Body:

DESCRIPTION – This work is the repair of damage to the roads utilized as detour routes and used by the Contractor for access during construction. Perform repair work in accordance with the applicable sections of Publication 408/2020 as directed. The following routes have been designated by the Department as detour routes or used for construction access for the project: See below for project specific routes.

MATERIAL – Furnish material for repair work that is compatible with the existing roadway, as determined by the Department Representative.

CONSTRUCTION – Repair or reconstruct damaged roadway to the satisfaction of the Department Representative. Prior to construction, and after completion, record the road condition of the detour route by videotaping and voice recording onto a PennDOT accessible cloud-based site or via USB drive/storage device. Ensure that the Department Representative and County Maintenance Manager are present during the initial field view and also during the final field view after project completion. Share all appropriate files with the Department Representative and the County Maintenance Manager before construction begins. The recording is incidental to the item.

Due to the contingent or unpredictable nature of the work being performed, the provisions of Section 110.02(d) are not applicable to this item.

All work performed as repair of roads utilized as detour routes will be paid under this item as follows:

Contract Items

Manual Asphalt Patching - Method A

DESCRIPTION - This work is preparing and patching holes and abrupt depressions 3 inches or less in depth, and deteriorated edges of pavement, and repatching temporarily patches holes using warm asphalt plant mix material placed manually.

MATERIAL -

- Superpave Asphalt Mixture Design - Section 413.2
- Tack Coat Material AET - Section 702
- Sticking Material E-1, E-6, E-8 or AC-20 - Section 702

CONSTRUCTION - In accordance with Sections 413.3(a), 413.3(b) and 413.3(c). Replace the remaining portion of Section 413.3 with the following:

(d) Maintenance and Protection of Traffic. As specified in Section 901 and in accordance with Publication 213, maintain and protect traffic in the temporary area.

(e) Preparation. The outlines of the areas to be cut out and patched will be marked by Department Representative. Each patch will have a minimum area of four square feet. Excavate outlined area to sound, stable material. The use of an approved milling or planning machine will be permitted. Cut all edges vertical.

After removal of the debris, thoroughly clean the area to be patched and the surrounding pavement of all loose and foreign material. Dry by approved means, if necessary.

Tack coat the bottom and vertical surfaces of the area to be patched as specified in Section 460.3(b).

(f) Patching. After the tack coat is cured, place asphalt plant mix material. Compact with a steel wheeled roller or other approved compaction equipment. Ensure that after compaction, the surface of the patch conforms to the grade of the surrounding pavement. Fill all excavated areas prior to the close of each work day.

Holes which extend into the shoulder need not be excavated beyond the edge of roadway. If the existing shoulder has an asphalt base, fill the shoulder portion of the cavity with the asphalt plant mix material in the same manner as the roadway.

For other shoulder types, fill shoulder cavity with suitable material excavated from the pothole. Patch and seal edges with asphalt sealer.

Manual Asphalt Patching - Method B

DESCRIPTION - This work is preparing and patching holes and abrupt depressions over 3 inches in depth, and deteriorated edges of pavement, and repatching temporarily patches holes using warm asphalt plant mix material placed manually.

MATERIAL -

- Superpave Asphalt Mixture Design - Section 413.2
- Tack Coat Material AET - Section 702
- Sealing Material E-1, E-6, E-8 or AC-20 - Section 702

CONSTRUCTION - In accordance with Sections 413.3(a), 413.3(b) and 413.3(c). Replace the remaining portion of Section 413.3 with the following:

(d) Maintenance and Protection of Traffic. As specified in Section 901 and in accordance with Publication 213,

maintain and protect traffic in the temporary area.

(e) Preparation. The outlines of the areas to be cut out and patched will be marked by Department Representative. Each patch will have a minimum area of four square feet. Excavate outlined area to sound, stable material. The use of an approved milling or planning machine will be permitted. Cut all edges vertical.

After removal of the debris, thoroughly clean the area to be patched and the surrounding pavement of all loose and foreign material. Dry by approved means, if necessary.

Tack coat the bottom and vertical surfaces of the area to be patched as specified in Section 460.3(b).

(f) Patching. After the tack coat is cured, place binder material in lifts not to exceed three inches in uncompacted depth. After leveling each lift, compact with an approved mechanical tamper. Place wearing course material in the top most 1-1/2 inches of the patch. Ensure that after compaction, the surface of the patch conforms to the grade of the surrounding pavement. Compact the last lift with a steel wheeled roller or other approved compaction equipment. Fill all excavated areas prior to the close of each work day.

Holes which extend into the shoulder need not be excavated beyond the edge of roadway. If the existing shoulder has a asphalt base, fill the shoulder portion of the cavity with the asphalt plant mix material in the same manner as the roadway.

For other shoulder types, fill shoulder cavity with suitable material excavated from the pothole. Patch and seal edges with asphalt sealer.

MEASUREMENT AND PAYMENT – Dollar

The proposal will include an item and a predetermined amount of money for REPAIR OF DETOUR ROUTE. The contract item will have a unit of measure of DOLLAR, a unit price of \$1.00, and a quantity equal to the predetermined amount.

Due to the contingent or unpredictable nature of the work being performed and/or the incentive or bonus status of the payment being made, the provisions of Section 110.02(d) are not applicable to this item.

Measured and paid for, under the REPAIR OF DETOUR ROUTE item is as follows:

Contract Items: For performance of work identified as having similar items listed in the contract, the contract unit price will be paid.

Non-Contract Items: Items of work not identified in the contract will be paid as follows:

Negotiated Price. At an agreed upon price. This price will be agreed upon with the Department prior to performing the work. When applicable, agreement is also required with the FHWA.

Force Account Work. Section 110.03(d).

Payment for pre-construction survey of the detour route will be incidental to Item 0901-0001, Maintenance and Protection of Traffic During Construction.

Project Specific Details:

List routes here:

Attachment 16

[Reserved]

Attachment 17

[Reserved]

Attachment 18

[Reserved]

Attachment 19

[Reserved]

Attachment 20

Coordination with Government Entities and Third Parties

**Reference Information Document for
PennDOT Pathways Major Bridge P3
Initiative and provided for reference
purposes only – Not For Construction**

v.10.17.2019

EFFECTIVE DATE February 10, 2021
COUNTY Susquehanna
MUNICIPALITY Great Bend Township

AGREEMENT NO. 04T094
FID NO. 16-1148726
SAP VENDOR NO. 747865
MPMS NO. 75917

RAILROAD CONSTRUCTION PHASE REIMBURSEMENT AGREEMENT

THIS RAILROAD CONSTRUCTION PHASE REIMBURSEMENT AGREEMENT ("Agreement") is made by and between the Commonwealth of Pennsylvania, acting through the Department of Transportation, located at 55 Keystone Industrial Park, Dunmore, PA 18511 ("DEPARTMENT")

and

the Central New York Railroad Corporation, a corporation with its principal place of business located at 1 Railroad Avenue, Cooperstown NY. 13326 ("RAILROAD"), collectively referred to hereafter as the "Parties."

W I T N E S S E T H:

WHEREAS, as part of its maintenance responsibility the DEPARTMENT proposes to replace the two bridges with a single structure on State Route 0081, Section 511, in the Township of Great Bend, Susquehanna County in accordance with the DEPARTMENT approved construction plans identified as State Route 0081, Section 511 ("Project");

WHEREAS, the Pennsylvania Public Utility Commission ("PUC") has exclusive jurisdiction over all rail-highway crossings in the Commonwealth of Pennsylvania and this Project is subject to any existing and future orders that may set forth cost allocations, work to be performed, and maintenance responsibilities;

WHEREAS, the tracks of the RAILROAD are located below the grade of the highway at approximately RAILROAD milepost 199.56 having DOT No. 263 859 C;

WHEREAS, the Parties desire to more fully set forth in detail the work, material and labor with respect to the construction work to be performed by the RAILROAD, and the costs thereof, estimated to be Eighty Four Thousand and 00/100 (\$84,143.83) dollars, further described and itemized on Exhibit "A" entitled, "Railroad Force Account Estimate."

NOW, THEREFORE, for and in consideration of the premises, the mutual covenants hereinafter contained and with the intent to be legally bound hereby, the Parties agree as follows:

1. Incorporation of Recitals - The foregoing recitals are hereby incorporated by reference as if fully set forth among the terms and conditions of the Agreement.

2. Construction Work - Construction engineering, administration and protective services will be provided by the RAILROAD for the Project ("Construction Work"). The RAILROAD will perform Construction Work to enable the DEPARTMENT to complete the Project and to not unreasonably delay the DEPARTMENT's construction schedule. The RAILROAD agrees as part of the Construction Work to furnish and maintain any flagmen, watchmen, construction inspectors and/or engineering services that may be deemed necessary to protect and safeguard its RAILROAD facilities and the operations of the RAILROAD during the time the DEPARTMENT, or its contractor, is actively working on or adjacent to the RAILROAD property.

3. Adjustment of Facilities - There will be no adjustment of the RAILROAD's existing facilities as part of the Project.

4. Inspection of Recovered Materials - The DEPARTMENT's inspection of recovered materials will not be required since there will be no adjustment of the RAILROAD's facilities as part of the Project.

5. Cooperation - The Parties will ensure that their contractors cooperate and coordinate their respective schedules in an effort to not delay the completion of the Project.

6. Compliance with Federal and State Statutes - All Construction Work performed pursuant to this Agreement must comply with the Buy America provisions in 23 U.S.C. § 313 and 23 CFR § 635.410 and the Steel Products Procurement Act, 73 P.S. § 1881 et seq.

7. Code of Federal Regulations - The Parties agree that 23 CFR Parts 140 and 646 are incorporated herein by reference as well as in the DEPARTMENT's contract for the Project.

8. Pennsylvania Prevailing Wage Act - Construction Work performed under this Agreement by any worker for any contractor or subcontractor for the RAILROAD may be subject to the Pennsylvania Prevailing Wage Act, Act of August 15, 1961, P.L. 987, as amended, 43 P.S. §§ 165-1 - 165-17; 34 Pa. Code §§ 9.101-9.112. The RAILROAD shall be responsible for

obtaining correct guidance on whether prevailing wages are applicable to the work performed under this Agreement. If prevailing wages are applicable, the RAILROAD shall insure that prevailing wages are included for all covered work in the specification bid proposal used to solicit bids to do the Construction Work and the contracts for the Project. If applicable, all contractors and subcontractors employing workers under this Agreement shall comply with the provisions of the Pennsylvania Prevailing Wage Act and its regulations. This shall include the required contract provisions found in 34 Pa. Code § 9.103. The RAILROAD can obtain prevailing wage rates and information about compliance through the following:

Bureau of Labor Law Compliance
1301 Labor & Industry Building
Seventh & Forster Streets
Harrisburg, PA 17120-0019
717-787-4671

www.dli.pa.gov

(keywords "prevailing wage/apprenticeship" then
"prevailing wage determination request")

The RAILROAD shall be responsible to maintain the documentation, particularly certified payrolls, showing compliance with the Prevailing Wage Act.

9. Reimbursement of Costs - The DEPARTMENT will, subject to provisions of Section eleven (11) hereinafter set forth, initially reimburse the RAILROAD for 100 percent of its actual costs directly involved in the Project, which the RAILROAD estimates at Eighty Four Thousand and 00/100 (\$84,143.83) dollars and is further described on Exhibit "A", which is attached hereto and incorporated herein. It is understood and agreed that the RAILROAD may bill the DEPARTMENT no more frequently than sixty (60) days or upon incurring Five Thousand (\$5,000.00) dollars additional costs, whichever occurs first, for all actual and approved costs within the scope of the Project. Upon receipt of such verification and confirmation, the DEPARTMENT will promptly pay the RAILROAD the entire amount of such periodic billings.

10. Automated Clearing House - The Commonwealth will make payments to the RAILROAD through the Automated Clearing House ("ACH"). Within 10 days of the execution date of the Agreement, the RAILROAD must submit, or must have already submitted, its ACH and electronic addenda information, if desired, to the Commonwealth's Payable Service Center, Vendor Data Management Unit at 717-214-0140 (FAX) or by mail to the Office of Comptroller Operations, Bureau of Payable Service

Center, Payable Service Center, Vendor Data Management Unit, 555 Walnut Street- 9th Floor, Harrisburg, PA 17101 A copy of the ACH enrollment form can be obtained online at:

www.vendorregistration.state.pa.us/cvmu/paper/Forms/ACH-EFTenrollmentform.pdf.

11. Reimbursement and Audit Clause Compliance - The DEPARTMENT's reimbursement to the RAILROAD shall be in accordance with the provisions of Federal Highway Administration's ("FHWA") Federal-Aid Policy Guide (23 CFR) and any supplements and amendments thereto. The DEPARTMENT will reimburse the RAILROAD without delay for all the actual cost of Construction Work, upon receipt by the DEPARTMENT of the RAILROAD billing and confirmation thereof by the DEPARTMENT, which may include, but is not limited to supporting time sheets, material invoices and equipment records of the RAILROAD and/or other documents to substantiate the billing. The RAILROAD shall make its invoices and records available for audit and shall be bound by the terms and conditions of the audit clause attached hereto as Exhibit "B".

12. Insurance - The DEPARTMENT's contractor for the Project will be required to obtain and carry the necessary insurance in accordance with the amounts specified and described on Exhibit "C" and made a part of this Agreement.

13. Inspection and Approval of Work - All materials furnished and work performed under this Agreement will be subject, at all times, to the inspection and approval of the DEPARTMENT, the PUC and the FHWA and/or their duly authorized representatives.

14. PUC Proceedings - The Parties will testify in any proceeding before the PUC in accordance with the terms of this Agreement and will submit this agreement to the PUC with the request it be incorporated into any order issued by the PUC.

15. Compliance with PUC Orders - Should there be any conflict between this Agreement and any order of the PUC, the Parties shall be bound by the lawful orders of the PUC on matters within its jurisdiction or the final determination by any proper Court on an appeal from said order or orders. In the event that the PUC's order or final determination on appeal directs the RAILROAD to bear its own costs for the said construction and/or protective service work for which the DEPARTMENT initially reimbursed the RAILROAD, the RAILROAD shall promptly return such reimbursement to the DEPARTMENT. Further, if sums initially paid to the RAILROAD exceed the

actual cost for the RAILROAD's said construction and/or protective service, the RAILROAD shall promptly return all excess payments to the DEPARTMENT.

16. Federal Funding - This Project is subject to, and contingent upon, the approval for eligibility of federal funds by the FHWA and failure to obtain such approval shall relieve the Parties of their obligations under this Agreement.

17. Right-to-Know Law - The Pennsylvania Right-to-Know Law, 65 P.S. §§ 67.101 - 3104, applies to this Agreement. Therefore, this Agreement is subject to, and the RAILROAD shall comply with, the clause entitled "Contract Provisions - Right to Know Law", attached as Exhibit "D" and made a part of this Agreement. As used in this Agreement, the term "Contractor" refers to the RAILROAD.

18. Cancellation, Abandonment or Revision of Project - In the event, for any reason, the Project shall be canceled, abandoned, or revised, in such a manner that, in the opinion of the DEPARTMENT, the work described in this Agreement should no longer be required, then the only amount that will be payable to the RAILROAD will be the actual and related indirect costs of the work actually completed at the time of notification by the DEPARTMENT of the cancellation, abandonment, or revision, plus any additional expenses incurred by the RAILROAD in restoring its system to normal operation conditions.

19. Amendments and Modifications - No alterations or variations to this Agreement shall be valid unless made in writing and signed by the Parties. Amendments to this Agreement shall be accomplished through a formal written document signed by the Parties with the same formality as the original Agreement. However, if the estimated cost of the services to be performed by the RAILROAD increases, causing the DEPARTMENT's total reimbursement obligation to increase, the Parties must execute a letter of amendment that will include a revised Exhibit "A." The DEPARTMENT cannot pay or reimburse the RAILROAD for the additional costs until the Parties execute the letter of amendment. Adequate funds must be available before the Parties execute the letter of amendment. The letter of amendment is not effective until duly authorized representatives of the RAILROAD, the DEPARTMENT, the Office of Chief Counsel, and the Office of the Comptroller sign and date the letter of amendment. A sample letter of amendment is attached as Exhibit "E" and made a part of this Agreement.

20. Changes to Standard Provisions - If there are changes to any Standard Provisions that need addressed at the time of a letter of amendment, as described in section 19, the Parties can incorporate those revised or

updated Standard Provisions by noting the incorporation and attachment of such Standard Provisions to such letter of amendment. For the purposes of this section, Standard Provisions consist of those provisions or clauses required to be included in Commonwealth Agreements pursuant to federal or state law or Commonwealth Management Directives, including, but not limited to: Right-to-Know Law, Lobbying, and Federal Audit Clause Assurances.

21. Anti-Lobbying Requirement - Public Law 101-121, Section 319, 31 U.S. Code § 1352, prohibits the recipient or any lower tier subrecipients of a federal contract, grant, loan or cooperative agreement from expending federal funds to pay any person for influencing or attempting to influence a federal agency or Congress in connection with the awarding of any federal contract, the making of any federal grant or loan or the entering into of any cooperative agreement. The RAILROAD shall comply with the Lobbying Certification Form attached as Exhibit "F" and made a part of this Agreement, which an authorized official of the RAILROAD has executed and, if applicable, shall complete and submit the Disclosure of Lobbying Activities form included in this exhibit in accordance with its instructions.

22. Titles Not Controlling - Titles of sections are for reference only, and shall not be used to construe the language in this Agreement.

23. Severability - The provisions of this Agreement shall be severable. If any phrase, clause, sentence or provision of this Agreement is declared to be contrary to the Constitution of Pennsylvania or of the United States or of the laws of the Commonwealth the applicability thereof to any government, agency, person or circumstance is held invalid, the validity of the remainder of this Agreement and the applicability thereof to any government, agency, person or circumstance shall not be affected thereby.

24. No Waiver - Either party may elect not to enforce its rights and remedies under this Agreement in the event of a breach by other party of any term or condition of this Agreement. In any event, the failure by either party to enforce its rights and remedies under this Agreement shall not be construed as a waiver of any subsequent breach of the same or any other term or condition of this Agreement.

25. Independence of the Parties - It is understood by and between the Parties that nothing contained herein is intended or shall be construed to, in any respect, create or establish the relationship of partners between the RAILROAD and the DEPARTMENT, or as constituting the DEPARTMENT as the representative or general agent of the RAILROAD for any purpose whatsoever.

26. Assignment - This Agreement may not be assigned by the RAILROAD, either in whole or in part, without the written consent of the DEPARTMENT.

27. No Third-Party Beneficiary Rights - The Parties to this Agreement understand that this Agreement does not create or intend to confer any rights in or on persons or entities not a party to this Agreement.

28. Notices - All notices and reports arising out of, or from, the provisions of this Agreement shall be in writing and given to the Parties at the address provided under this Agreement, either by regular mail, facsimile, e-mail, or delivery in person.

29. Integration and Merger - This Agreement, when executed, approved and delivered, shall constitute the final, complete and exclusive Agreement between the Parties containing all the terms and conditions agreed on by the Parties. All representations, understandings, promises and agreements pertaining to the subject matter of this Agreement made prior to or at the time this Agreement is executed are superseded by this Agreement unless specifically accepted by any other term or provision of this Agreement. There are no conditions precedent to the performance of this Agreement except as expressly set forth herein.

30. Choice of Law - This Agreement shall be governed by and interpreted and enforced in accordance with the laws of the Commonwealth of Pennsylvania (without regard to conflict of law provisions) and the decisions of the Pennsylvania courts. The RAILROAD consents to the jurisdiction of any court of the Commonwealth of Pennsylvania and any federal courts in Pennsylvania, waiving any claim or defense that such forum is not convenient or proper. The RAILROAD agrees that any such court shall have in personam jurisdiction over it and consents to service of process in any manner authorized by Pennsylvania Law.


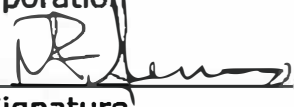
29. Effective Date - This Agreement shall become effective on the date that it is fully executed by the RAILROAD and the DEPARTMENT and all approvals required by the Commonwealth contracting procedures have been obtained, as indicated by the date of the last Commonwealth signature.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the Parties have executed this Agreement to be effective as of the date of the last signature affixed below.

ATTEST:

Central New York Railroad
Corporation

	<u>12/1/2020</u>		<u>12-1-2020</u>
Signature	Date	Signature	Date
<u>CORPORATE SECRETARY.</u>		<u>PRESIDENT</u>	
Title		Title	

[COMMONWEALTH SIGNATURE PAGE FOLLOWS]

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

BY Richard N. Roman, P.E. 12/23/2020
District Executive Date

APPROVED AS TO LEGALITY
AND FORM

Jeffrey M.
BY Spotts Digitally signed by Jeffrey M. Spotts
Date: 2021.01.07 16:50:33 -05'00'
for Chief Counsel Date

PRELIMINARILY APPROVED

Gina M. D'Alfonso 1.5.2021
Senior Counsel in Charge Date

Pamela J. Cross Digitally signed by pcross@pa.gov
DN: cn=pcross@pa.gov
Date: 2021.01.13 16:46:27 -05'00'
BY Deputy General Counsel Date

FUNDS COMMITMENT DOCUMENT

NO. U04T094000

AMOUNT \$84,143.83

David E. Stover Digitally signed by David E. Stover
DN: cn=David E. Stover, o=Office of Attorney General, ou=Legal Review Section, email=dstover@attorneygeneral.gov, c=US
Date: 2021.01.28 09:19:45 -05'00'
BY Deputy Attorney General Date

BY _____
for Comptroller Operations

Prior Preapproved form:
OGC Form No. 18-FA-20.1
Appv'd OAG 3/5/14

FORCE ACCOUNT ESTIMATE
I-81 Overhead Bridge Crossing
Crossing DOT #263 859 C

Great Bend Township, Susquehanna County, PA
MP 199.56 and 199.58

DATE: 4-Feb-21
 BY: RMH

SCOPE OF WORK: Replacement of two I-81 bridges over CNYK Railroad.
 Bridge construction to be completed in 3 stages from 2022 to 2025.
 PennDOT has estimated 246 days of flagging required, assume 8 hr/day
 for 30 days, and 2 hr/day average for remaining days as most days will
 not require CNYK personnel on-site full time.

MATERIAL

None required

QUANTITY UNIT UNIT PRICE TOTAL COST

\$0.00

LABOR

Flagging - Construction Phase - 30 days x 8 hours/day, Foreman	240	HR	\$30.00	\$7,200.00
Flagging - Construction Phase - 216 days x 2 hours/day, Foreman	432	HR	\$30.00	\$12,960.00
Engineering and Administration	45	HR	\$50.00	\$2,250.00

TOTAL DIRECT LABOR				\$22,410.00
FRINGES	58.19%	of direct labor		\$13,040.38
OVERHEAD	58.69%	of DL+fringes		\$20,805.83
FORCE ACCOUNT INSURANCE	16.6032%	of direct labor		\$3,720.78

TOTAL LABOR: \$59,976.98

EQUIPMENT

Flagging - Construction Phase - 30 days x 8 hours/day, Hi-Rail Pickup	240	HR	\$30.00	\$7,200.00
Flagging - Construction Phase - 216 days x 2 hours/day, Hi-Rail Pickup	432	HR	\$30.00	\$12,960.00

TOTAL EQUIPMENT: \$20,160.00

MISCELLANEOUS

5% MISCELLANEOUS: \$4,006.85

TOTAL: \$84,143.83

AUDIT CLAUSE TO BE USED IN AGREEMENTS WITH SUBRECIPIENTS RECEIVING FEDERAL AWARDS FROM THE COMMONWEALTH

The Central New York Railroad Corporation must comply with all applicable federal and state grant requirements including *The Single Audit Act Amendments of 1996*; *2 CFR Part 200 as amended*; and any other applicable law or regulation, and any amendment to such other applicable law or regulation that may be enacted or promulgated by the federal government.

If the Central New York Railroad Corporation is a local government or non-profit organization that expends \$750,000 or more in federal awards during its fiscal year, the New York Susquehanna Western Railway Corporation is required to provide the appropriate single or program specific audit in accordance with the provisions outlined in *2 CFR Part 200.501*.

If the Central New York Railroad Corporation expends total federal awards of less than the threshold established by *2 CFR 200.501*, it is exempt from federal audit requirements for that year, but records must be available for review or audit by appropriate officials (or designees) of the federal agency, pass-through entity, and Government Accountability Office (GAO).

If the Central New York Railroad Corporation is a for-profit entity, it is not subject to the auditing and reporting requirements of *2 CFR Part 200, Subpart F - Audit Requirements (Subpart F)*. However, the pass-through commonwealth agency is responsible for establishing requirements, as necessary, to ensure compliance by for-profit subrecipients. The contract with the for-profit subrecipient should describe applicable compliance requirements and the for-profit subrecipient's compliance responsibility. Methods to ensure compliance for federal awards made to for-profit subrecipients may include pre award audits, monitoring during the contract and post-award audits. The post-award audits may be in the form of a financial audit in accordance with *Government Auditing Standards*, a single audit report or program-specific audit report in accordance with *Subpart F*. However, these post-award audits must be submitted directly to the affected commonwealth agency that provided the funding. Only single audit reports for local governmental and non-profit subrecipients are electronically submitted to the Federal Audit Clearinghouse.

ADDITIONAL POTENTIAL COMPONENTS OF THE SINGLE AUDIT REPORTING PACKAGE

In instances where a federal program-specific audit guide is available, the audit report package for a program-specific audit may be different and should be prepared in accordance with the appropriate audit guide, *Government Auditing Standards*, and *Subpart F*.

Exhibit B

Page 1 of 2

In addition to the requirements of *Subpart F*, commonwealth agencies may require that the single audit reporting packages include additional components in the SEFA, or supplemental schedules, as identified through the respective grant agreement.

SUBMISSION OF THE AUDIT REPORT

The Central New York Railroad Corporation must submit an electronic copy of the audit report package to the Federal Audit Clearinghouse, which shall include the elements outlined in *Subpart F*.

SUBMISSION OF THE FEDERAL AUDIT CLEARINGHOUSE CONFIRMATION

The subrecipients must send a copy of the confirmation from the Federal Audit Clearinghouse to the resource account RA-BOASingleAudit@pa.gov.

AUDIT OVERSIGHT PROVISIONS.

The Central New York Railroad Corporation is responsible for obtaining the necessary audit and securing the services of a certified public accountant or independent governmental auditor.

The commonwealth reserves the right for federal and state agencies or their authorized representatives to perform additional audits of a financial or performance nature, if deemed necessary by commonwealth or federal agencies. Any such additional audit work will rely on work already performed by the Central New York Railroad Corporation's auditor and the costs for any additional work performed by the federal or state agencies will be borne by those agencies at no additional expense to the Central New York Railroad Corporation.

Audit documentation and audit reports must be retained by the Central New York Railroad Corporation's auditor for a minimum of five years from the date of issuance of the audit report, unless the Central New York Railroad Corporation's auditor is notified in writing by the commonwealth, the cognizant federal agency for audit, or the oversight federal agency for audit to extend the retention period. Audit documentation will be made available upon request to authorized representatives of the commonwealth, the cognizant federal agency for audit, the oversight federal agency for audit, the federal funding agency, or the GAO.

Exhibit B

The New York, Susquehanna and Western Railway Corporation
1 Railroad Avenue
Cooperstown, New York 13326

13. INSURANCE REQUIREMENTS

a. In addition to any other forms of insurance or bonds required under the terms of any contract or specifications and except to the extent that any of the requirements of this section are expressly waived or revised in writing by NYS&W, prior to the commencement of any work, contractor, at his own cost and expense, shall maintain insurance of the following kinds and amounts and deliver to NYS&W satisfactory evidence of such insurance as indicated herein:

1. Commercial General Liability Insurance, including contractual liability, personal and advertising injury insurance with a per occurrence limit of not less than

\$5,000,000 and \$10,000,000 in the aggregate for all losses including but not limited to damages, bodily injury, death, property damage and legal fees in any one occurrence and for damage to or destruction of property, including the loss of use thereof, in any one occurrence. Coverage must be purchased on an ISO occurrence Form or the equivalent. If the required minimum limits can only be met when applying an umbrella/excess liability policy, the umbrella/excess liability policy must follow form of the underlying policy and be endorsed to "drop down" to become primary in the event the primary limits are exhausted. NYS&W shall be named as an additional insured under this insurance. Exclusion of work within 50 feet of railroad right of way shall be deleted (Endorsement CG2417). Policy shall contain a waiver of subrogation in favor of NYS&W. The definition of bodily injury should include mental anguish. A per project aggregate limit must be included. Coverage should be primary and non-contributory in favor of NYS&W.

2. Automobile Liability Insurance with a limit of not less than \$5,000,000 combined single limit for bodily injury and/or property damage per occurrence. NYS&W shall be named as an additional insured under this insurance. Exclusion of work within 50 feet of railroad right of way shall be deleted (Endorsement CA2070). Policy shall contain a waiver of subrogation in favor of NYS&W. Coverage should apply to any and all motor vehicles owned, non-owned, used or hired must be covered and mobile equipment must be covered to the extent it may be excluded from the general liability insurance. Coverage should be primary and non-contributory in favor of NYS&W.

3. Workers' Compensation/Employers' Liability and Occupational Disease Insurance with Limits of \$1,000,000 each accident, \$1,000,000 policy limit and \$1,000,000 each employee. Such Policy shall include a waiver of subrogation in favor of NYS&W (if allowable in State).

4. Railroad Protective Liability Insurance. With respect to the operations performed by it or any of its' subcontractors, contractor shall provide Railroad Protective Liability Insurance (ISO-RIMA FORM) in the name of The New York, Susquehanna and Western Railway Corporation, with a limit of not less than \$2,000,000 per occurrence, combined single limit for bodily injury and/or property damage, for damage to or destruction of property, including the loss of use thereof, sudden and accidental pollution and evacuation expenses. Such insurance shall also contain an aggregate of not less than \$6,000,000 for damages arising out of more than one occurrence. NYS&W shall be the Named Insured on the policy.

The insurance specified above shall be carried until the project is satisfactorily

completed and formally accepted by NYS&W. The above indicated insurance coverages shall be effected under standard form policies issued by insurers of financial responsibility that are rated "A" or better by Best's Insurance Reports, "AA" or better by Standard & Poor's Insurance Rating Service and "Aa" or better by Moody's Investors Service. NYS&W reserves the right to reject as inadequate any insurance coverage provided by an insurance company that is rated less than the ratings above by any of the aforementioned rating services. The above indicated insurance coverages shall be enforceable by any legitimate claimant after the termination or cancellation of the project, whether by expiration of time, by operation of law or otherwise, so long as the basis of the claim against the insurance company occurred during

the project and when the insurance was in force. Contractor shall furnish NYS&W with certificates of insurance evidencing the insurance coverages in sections 1, 2, & 3, and shall also furnish the original Railroad Protective Liability Insurance policy referred to in section 4 at least fourteen (14) days prior to commencement of the project. Certificates shall reference NYS&W Project Number assigned to specific project. All hazards to be covered shall include the so-called "XCU" coverage for explosion, collapse, and damage where work is to be done over or under NYS&W property. Policies shall not contain any punitive damages exclusion. All insurance policies shall be endorsed to provide that the insurance company shall give thirty (30) days prior written notice to NYS&W if the policies are to be terminated or if any changes are to be made which shall in any way affect the insurance requirements of the project.

c. Separation of insureds. All policies must contain a separation of insureds provision except workers compensation. Separation of insureds must be indicated on the certificate of insurance.

d. Self Insurance. Contractor is not allowed to self-insure without the prior written consent of NYS&W. If granted by NYS&W, any deductible, self-insured retention or other financial responsibility for claims must be covered directly by contractors in lieu of insurance. Any and all NYS&W liabilities that would otherwise in accordance with the provisions of the Agreement, be covered by contractor's insurance will be covered as if contractor elected not to include a deductible, self-insured retention or other financial responsibility for claims.

e. Independent Associates, Consultants and Subcontractors. If any portion of the services are to be subcontracted by contractor, contractor must require that the independent associates consultant and/or subcontractor provide and maintain the insurance coverages set forth herein, naming NYS&W as an additional insured and requiring that the independent associate, consultant, and/or subcontractor release, defend and indemnify NYS&W to the same extent and under the same terms and conditions as contractor is required to release, defend and indemnify NYS&W herein.

f. No Limits: The fact that insurance (including without limitation, self-insurance) is obtained by contractor will not be deemed to release or diminish the liability of contractor including, without limitation, liability under the indemnity provisions of the agreement. Damages recoverable by NYS&W will not be limited by the amount of the required insurance.

Contract Provisions – Right to Know Law

- a. The Pennsylvania Right-to-Know Law, 65 P.S. §§ 67.101-3104, (“RTKL”) applies to this Contract. For the purpose of these provisions, the term “the Commonwealth” shall refer to the contracting Commonwealth agency.
- b. If the Commonwealth needs the Contractor’s assistance in any matter arising out of the RTKL related to this Contract, it shall notify the Contractor using the legal contact information provided in this Contract. The Contractor, at any time, may designate a different contact for such purpose upon reasonable prior written notice to the Commonwealth.
- c. Upon written notification from the Commonwealth that it requires the Contractor’s assistance in responding to a request under the RTKL for information related to this Contract that may be in the Contractor’s possession, constituting, or alleged to constitute, a public record in accordance with the RTKL (“Requested Information”), the Contractor shall:
 - 1. Provide the Commonwealth, within ten (10) calendar days after receipt of written notification, access to, and copies of, any document or information in the Contractor’s possession arising out of this Contract that the Commonwealth reasonably believes is Requested Information and may be a public record under the RTKL; and
 - 2. Provide such other assistance as the Commonwealth may reasonably request, in order to comply with the RTKL with respect to this Contract.
- d. If the Contractor considers the Requested Information to include a request for a Trade Secret or Confidential Proprietary Information, as those terms are defined by the RTKL, or other information that the Contractor considers exempt from production under the RTKL, the Contractor must notify the Commonwealth and provide, within seven (7) calendar days of receiving the written notification, a written statement signed by a representative of the Contractor explaining why the requested material is exempt from public disclosure under the RTKL.
- e. The Commonwealth will rely upon the written statement from the Contractor in denying a RTKL request for the Requested Information unless the Commonwealth determines that the Requested Information is clearly not protected from disclosure under the RTKL. Should the Commonwealth determine that the Requested Information is clearly not exempt from disclosure, the Contractor shall provide the Requested Information within five (5) business days of receipt of written notification of the Commonwealth’s determination.
- f. If the Contractor fails to provide the Requested Information within the time period required by these provisions, the Contractor shall indemnify and hold the Commonwealth harmless for any damages, penalties, costs, detriment or harm that the Commonwealth may incur as a result of the Contractor’s failure, including any statutory damages assessed against the Commonwealth.

g. The Commonwealth will reimburse the Contractor for any costs associated with complying with these provisions only to the extent allowed under the fee schedule established by the Office of Open Records or as otherwise provided by the RTKL if the fee schedule is inapplicable.

h. The Contractor may file a legal challenge to any Commonwealth decision to release a record to the public with the Office of Open Records, or in the Pennsylvania Courts, however, the Contractor shall indemnify the Commonwealth for any legal expenses incurred by the Commonwealth as a result of such a challenge and shall hold the Commonwealth harmless for any damages, penalties, costs, detriment or harm that the Commonwealth may incur as a result of the Contractor's failure, including any statutory damages assessed against the Commonwealth, regardless of the outcome of such legal challenge. As between the parties, the Contractor agrees to waive all rights or remedies that may be available to it as a result of the Commonwealth's disclosure of Requested Information pursuant to the RTKL.

i. The Contractor's duties relating to the RTKL are continuing duties that survive the expiration of this Contract and shall continue as long as the Contractor has Requested Information in its possession.

SAMPLE LETTER OF AMENDMENT

Date

Railroad Name

ATTN: Contact

Address

City, State Zip

Re: Amendment (Amendment Letter Designation)

Agreement # (Contract Number)

Dear (Mr./Ms. Name),

In accordance with the terms of the above-referenced Agreement, the Department is willing to amend its reimbursement obligation to the Railroad by increasing the estimated cost of the services to be performed by the Railroad from **(current dollar amount)** to **(new dollar amount)**, as shown in the attached Exhibit "___." This amendment will become effective once all required signatures are affixed to this document.

We are requesting your concurrence concerning the amendment of the above-referenced Agreement. If you agree to the amendment, please concur by signing below and dating where indicated. Please attach a resolution or other documentation verifying your authorization to sign this amendment.

Your response is required no later than **(Date)**. Please mail your response to the following address:

PENNDOT
Attn: **Your Name**
Your Organization
Your Address

Since the date of the above-referenced Agreement, some standard provisions and accompanying exhibits have been updated; copies of these updated exhibits are attached and supersede and replace the corresponding exhibit attached to the Original Agreement. **[Remove paragraph if not applicable.]**

On behalf of the above-named Railroad, I agree to the amendment of the above-referenced Agreement. I agree to all terms and conditions included in this Agreement and all previous amendments to it, if any.

Signature _____ Date _____

Indicate Title: ☐ Chairman ☐ President ☐ Vice-President ☐ Commissioner

or ☐ _____ **(Indicate title)**

All terms and conditions of this Agreement and its amendments (if any) not affected by this letter of amendment remain in full force and effect.

This letter of amendment is not effective until it is signed and dated by an Authorized Representative of the Department and the Office of Comptroller Operations. The Department will forward a copy of the fully executed letter of amendment to you for your files.

Sincerely,

Pennsylvania Department of Transportation

FOR DEPARTMENT USE ONLY

Authorized Representative of the Department:

Print Name

Title

Signature

Date

Form and Legality Approval:

for Chief Counsel

Date

Comptroller Operations Approval:

Funds Commitment No. _____

Amount \$ _____

for Comptroller Operations

Date

LOBBYING CERTIFICATION FORM

(applies only if Agreement is Federally Funded)

[Exhibit needs to be printed, completed offline, and then scanned and attached]

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, Disclosure of Lobbying Activities, in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed under *Section 1352, Title 31, U. S. Code*. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for such failure.

SIGNATURE: _____

TITLE: _____

DATE: _____

Exhibit F

DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352

Approved by OMB
0348-0046

(See reverse for public burden disclosure.)

1. Type of Federal Action: <input type="checkbox"/> a. contract <input type="checkbox"/> b. grant <input type="checkbox"/> c. cooperative agreement <input type="checkbox"/> d. loan <input type="checkbox"/> e. loan guarantee <input type="checkbox"/> f. loan insurance		2. Status of Federal Action: <input type="checkbox"/> a. bid/offer/application <input type="checkbox"/> b. initial award <input type="checkbox"/> c. post-award		3. Report Type: <input type="checkbox"/> a. initial filing <input type="checkbox"/> b. material change For Material Change Only: year _____ quarter _____ date of last report _____	
4. Name and Address of Reporting Entity: <input type="checkbox"/> Prime <input type="checkbox"/> Subawardee Tier _____, if known: Congressional District, if known: 4c			5. If Reporting Entity in No. 4 is a Subawardee, Enter Name and Address of Prime: Congressional District, if known:		
6. Federal Department/Agency:			7. Federal Program Name/Description: CFDA Number, if applicable: _____		
8. Federal Action Number, if known:			9. Award Amount, if known: \$		
10. a. Name and Address of Lobbying Registrant (if individual, last name, first name, MI): <i>NONE</i>			b. Individuals Performing Services (including address if different from No. 10a) (last name, first name, MI): <i>NONE</i>		
11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.			Signature: <i>Melanie Boyer</i> Print Name: <i>Melanie Boyer</i> Title: <i>CORPORATE SECRETARY</i> Telephone No.: <i>607-647-2555 x-250</i> Date: <i>12/2/20</i>		
Federal Use Only:					Authorized for Local Reproduction Standard Form LLL (Rev. 7-97)

Exhibit F

INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a followup report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, State and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in item 4 checks "Subawardee," then enter the full name, address, city, State and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, State and zip code of the lobbying registrant under the Lobbying Disclosure Act of 1995 engaged by the reporting entity identified in item 4 to influence the covered Federal action.

(b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).
11. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB Control Number. The valid OMB control number for this information collection is OMB No. 0348-0046. Public reporting burden for this collection of information is estimated to average 10 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, DC 20503.



COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
400 NORTH STREET 2ND FLOOR, HARRISBURG PA 17120

<http://www.puc.pa.gov>

E-filing and E-service only per Emergency Order M-2020-3019262

November 2, 2020

IN REPLY PLEASE
REFER TO OUR FILE

A-2020-3019357

VIA E-service and E-mail Only
TO PARTIES OF RECORD

**Reference Information Document for
PennDOT Pathways Major Bridge P3
Initiative and provided for reference
purposes only – Not For Construction**

Application of the Department of Transportation of the Commonwealth of Pennsylvania for approval to replace the existing public above grade crossing by the construction of a new bridge where State Route 0081 crosses the track owned by Norfolk Southern Railway Company, operated thereon by Central New York Railroad Corporation (DOT# 263 859 C) in Great Bend Borough, Susquehanna County and the allocation of costs incident thereto.

To Whom It May Concern:

By application filed with the Commission on March 25, 2020, Pennsylvania Department of Transportation (Department) seeks Commission approval to replace the existing public above grade crossing by the construction of a new bridge where State Route 0081 crosses the track owned by Norfolk Southern Railway Company, operated thereon by Central New York Railroad Corporation (DOT# 263 859 C) in Great Bend Borough, Susquehanna County.

The existing southbound (SB) bridge is a 3-span, steel I-beam bridge. Built in 1959 and rehabilitated in 1994, the existing SB bridge has a total length of approximately 137.6 feet. The state highway (southbound) on the existing bridge provides two, 12-foot wide traffic lanes, one 7-foot wide (inside/median) shoulder and one 11-foot wide (outside) shoulder for a total width (curb-to-curb) of approximately 42 feet. The minimum vertical clearance provided above top of rail is 24 feet 9 inches. The minimum horizontal (side) clearance provided is 17 feet 10 inches from the centerline of track to the face of the existing bridge pier. The existing northbound (NB) bridge is a 3-span, prestressed spread concrete box beam bridge. Built in 1959 and rehabilitated in 1999, the existing NB bridge has a total length of approximately 137.6 feet. The state highway (northbound) on the existing bridge provides three, 12-foot wide traffic lanes, one 7-foot wide (inside/median) shoulder and one 5-foot wide (outside) shoulder for a total width (curb-to-curb) of approximately 48 feet. The minimum vertical clearance provided above top of

rail is 24 feet 1 inch. The minimum horizontal (side) clearance provided is 18 feet 11 inches from the centerline of track to the face of the existing bridge pier. The ADT for State Route 0081 is 10,066 vehicles with 34 percent trucks. The crossing is located at Segment 2304 and Offset 0904 (Station 2343+78.77) north bound; Segment 2305 and Offset 0920 (Station 2343+89.14) southbound.

Pennsylvania Department of Transportation proposes to replace the existing bridges with a new single structure consisting of a precast concrete arch culvert spanning 48 feet in width (span over the rail track) and 150 feet in length (measured across/beneath both NB and SB lanes of travel). The new arch culvert will be made up of precast arch segments measuring 12 feet in height (rise) built on cast-in-place reinforced concrete pedestals on each side of the structure. The new bridge structure will provide three, 12-foot wide traffic lanes (2 through lanes, 1 exit/on ramp lane), one 10-foot wide (inside) shoulder and one 12-foot wide (outside) shoulder in each direction of travel. Guide rails will be provided along each outside highway shoulder with chain-link protective fencing along the outside culvert wing walls. Each wing wall will also be protected with an 8-inch thick cast-in-place concrete crash wall provided on each end of the structure. The new bridge will provide 23 feet 2.6 inches of minimum vertical clearance above top of rail and provide 16 feet 3.5 inches of horizontal (side) clearance. The vertical alignment of the highway over the bridge consists of a 1.85% ascending grade over the structure, south to north.

Upon receipt of the application, a virtual field (tele) conference was arranged jointly by the Department and a Commission staff engineer and held on September 17, 2020. Representatives of New York, Susquehanna and Western Railway (NYSW) (representing Central New York and Western Railroad Company), Pennoni Associates Inc., PA American Water Co., Borton-Lawson, McTish, Kunkle & Associates and Pennsylvania Department of Transportation were in attendance. Although notified by electronic mail sent September 17, 2020 there were no representatives from Great Bend Borough, Hallstead Borough, Great Bend Township, Susquehanna County, Frontier Communications or Hallstead/Great Bend Sewer Authority in attendance.

Norfolk Southern Railway Company was inadvertently omitted from the parties involved in the virtual meeting (teleconference). Norfolk Southern Railway Company was contacted by the Department on this matter and they expressed no objection to the work proposed.

The Department has determined the following parties are no longer involved in the subject project, and as such they will be removed from the parties of record accordingly: AT&T; Chesapeake Operating Inc.; Claverack Operating Inc. and Northeastern PA Telephone Company.

The Department agrees to furnish all material and perform all work necessary to construct the project. The Department agrees to reimburse the railroad for any alterations to their facilities and providing watchmen, flagmen and inspectors.

The non-carrier public utilities will be directed to alter or relocate their facilities as necessary to construct the project at their initial cost and expense.

In conjunction with the subject crossing alteration project, it may be necessary for the Commission to appropriate certain portions of property to accommodate the project work. The Department has not submitted right-of-way plans to the Commission and the parties of record for consideration in this proceeding. Accordingly, (if property appropriation is required) it will be necessary for the Department to do so prior to the start of construction.

The Commission has established jurisdiction over those portions of the project along SR 0081 between Highway Station 2343+00 and Highway Station 2345+00.

The project will be funded with 90 percent Federal Funds and 10 percent State Funds. The estimated cost of construction of the project is \$4,400,000.

The applicant has certified that a copy of the application has been served on each party in interest and none have advised that it objects to the issuance of a Secretarial Letter, prior to hearing, approving the application.

Upon full consideration of the matter involved, we determine that it is not necessary to schedule a hearing in this proceeding at this time and that issuance of a Secretarial Letter without hearing is proper since the Pennsylvania Department of Transportation has agreed to construct the project, at its sole cost and expense, and none of the parties has expressed any objections to the proposal.

Inasmuch as the parties agree with the proposed improvement project and inasmuch as Pennsylvania Department of Transportation requests a Secretarial Letter as soon as possible to permit initiation of construction of the improvement, the Commission is of the opinion that a Secretarial Letter can be issued approving the application. Upon completion of the project, it may be necessary to schedule a hearing before an administrative law judge to determine the final allocation of costs, if any, incurred by the non-carrier utilities.

The Commission issues this Secretarial Letter in accordance with Section 2702 of the Public Utility Code and finds that the alteration of the crossing is necessary and proper for the service, accommodation, convenience or safety of the public.

The application is approved as herein directed:

1. The caption of the subject proceeding is hereby revised as shown herein.
2. The application of Pennsylvania Department of Transportation for the approval to replace the existing public above grade crossing by the construction of a new bridge where State Route 0081 crosses the track owned by Norfolk Southern Railway Company, operated thereon by Central New York Railroad Corporation (DOT# 263 859 C) in Great Bend Borough, Susquehanna County, be and is hereby approved to the extent provided herein.

3. Pennsylvania Department of Transportation, at its sole cost and expense and prior to the start of construction, prepare and submit to this Commission for approval and to all parties of record for examination, complete detailed construction plans, right-of-way plans and the appropriate property descriptions, if any, that is needed for the proposed crossing alteration project, including highway approaches and the bridge structure.

4. Pennsylvania Department of Transportation, at its sole cost and expense, furnish all material and perform all work required to construct the proposed crossing project generally in accordance with the approved plans and this Secretarial Letter.

5. Pennsylvania Department of Transportation, at its sole cost and expense, furnish all material and do all work necessary to establish and maintain any detours or traffic controls that may be required to properly and safely accommodate highway and pedestrian traffic during the time the project is being constructed.

6. Central New York Railroad Corporation, at the sole cost and expense of the Pennsylvania Department of Transportation, furnish all material and perform all work relating to the railroad's facilities which may be required as incidental to the performance of the proposed work; furnish construction engineering and inspection service if required as a result of the proposed work; and furnish and maintain flagmen and watchmen, as required, to protect its operations during the time the work is being performed across, above and adjacent to its tracks.

7. Any relocation of, changes in or removal of any adjacent structures, equipment or other facilities of any non-carrier public utility company or municipal authority located within the limits of this Commission's jurisdiction, which may be required as incidental to the execution of the crossing project, be made by said public utility company or municipal authority at its initial cost and expense, and in such manner as will not interfere with the construction of the project.

8. Any relocation of, changes in and/or removal of any adjacent structures, equipment or other facilities of any non-carrier public utility company or municipal authority located beyond the limits of the highway, within the Commission's jurisdiction, which may be required as incidental to the execution of the crossing project, be made by said public utility company or municipal authority, and in such a manner as will not interfere with the construction of the project.

9. Pennsylvania Department of Transportation, at its sole cost and expense, furnish all material and do all work necessary to complete the remainder of the crossing project, including the installation of all attendant storm drainage facilities and any other ancillary features of the project, all generally in accordance with the approved plans and this Secretarial Letter.

10. Pennsylvania Department of Transportation cooperate with Central New York Railroad Corporation so that during the construction of the project, the operations and facilities of the railroad company will not be endangered or unnecessarily impeded.

11. Central New York Railroad Corporation cooperate with Pennsylvania Department of Transportation and conduct their operations in the vicinity of the proposed crossings, in a safe manner and under control during the time project is being constructed.

12. All work necessary to complete the alteration of the subject crossing be done in a manner satisfactory to this Commission on or before December 31, 2026, and that on or before said date, Pennsylvania Department of Transportation report to this Commission in writing the date of actual completion of the work.

13. Pennsylvania Department of Transportation, at least thirty (30) days prior to the start of work, notify all parties in interest of the actual date on which work will begin.

14. Pennsylvania Department of Transportation pay all compensation for damages, if any, due to owners of property taken, injured, or destroyed by reason of the construction of the crossing in accordance with this Secretarial Letter.

15. All costs which are to be reimbursed by the Department of Transportation consistent with this Order, shall be reimbursed pursuant to the provisions of 23 C. F. R. Parts 140 and 646. The aforesaid Federal reimbursement shall not supersede, delay or, in any manner, postpone the effect of any paragraph contained in this or any related Secretarial Letter or Order.

16. This Secretarial Letter is without prejudice to the right of any party to recover part or all of any costs incurred by said party in compliance with the provisions of this Secretarial Letter, in accordance with any lawful agreement between it and any other party.

17. Upon completion of the construction of the proposed project, Central New York Railroad Corporation, at its sole cost and expense, furnish all material and perform all work necessary thereafter to maintain the railroad tracks, wire lines, and any other railroad facilities, existing or altered, located within the limits of the project.

18. Upon completion of the construction of the proposed project, Pennsylvania Department of Transportation, at its sole cost and expense, furnish all material and perform all work necessary thereafter to maintain the new bridge (substructure, superstructure, protective fence and roadway pavement) and the remainder of the improvement including the highway approaches, roadway surface, drainage facilities, snow and ice removal and any other ancillary features of the improvement constructed in accordance with the provisions of this Secretarial letter.

19. Upon completion of the construction of the proposed project, each non-carrier public utility company and municipal authority, at its sole cost and expense, furnish all material and perform all work necessary thereafter to maintain its respective facilities, existing or altered, located within the limits of the improvement.

20. Upon completion of the work herein directed, and upon a written request by any party hereto, this proceeding be scheduled for a hearing at a time and a place assigned by this Commission, upon due notice to all parties, to receive evidence relative to the allocation of initial costs incurred, if any, by the non-carrier public utility companies and municipal authorities, and any other matters relevant to this proceeding.

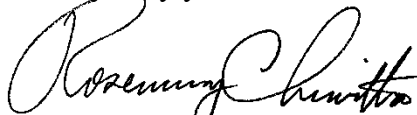
The Parties are reminded that failure to comply with this or any Order or Secretarial Letter in this proceeding may result in an enforcement action seeking civil penalties and/or other sanctions pursuant to 66 Pa. C.S. § 3301.

All parties are being served via email due to the COVID-19 Emergency Closure. Please note that during this period of Disaster Emergency, the Commission shall only accept e-filings in lieu of paper filings, for all documents. Thus, all parties are to open and use e-filing accounts to file documents and accept service during the pandemic emergency in accordance with the Commission's Emergency Order at M-2020-3019262.

If you are dissatisfied with the resolution of this matter, you may, as set forth in 52 Pa. Code §§ 1.31 and 5.44, file a Petition for Reconsideration from Staff Action (Petition) with the Commission within twenty (20) days of the date of this letter. The Petition shall be submitted by e-filing said petition within twenty (20) days, or if no timely request is made, the action will be deemed to be a final action of the Commission.

The Petition MUST include: (1) a written statement (divided into numbered paragraphs) outlining the reasons for the request; (2) the case docket number (it is provided for you at the top right hand corner of this letter); (3) the party on whose behalf the petition is made; (4) a Certificate of Service on the other parties of record; and (5) a Verification with original signature in accordance with 52 Pa. Code § 1.36.

Very truly yours,

A handwritten signature in black ink, appearing to read "Rosemary Chiavetta", written in a cursive style.

Rosemary Chiavetta
Secretary

**Reference Information Document for
PennDOT Pathways Major Bridge P3
Initiative and provided for reference
purposes only – Not For Construction**

v.5.6.2020

EFFECTIVE DATE	_____	AGREEMENT NO.	04T093
COUNTY	Luzerne	FID NO.	53-6002016
MUNICIPALITY	Hanover Township	SAP VENDOR NO.	167310
NS FILE NO.	BR1111700	MPMS NO.	112837

RAILROAD DESIGN PHASE REIMBURSEMENT AGREEMENT

THIS RAILROAD DESIGN PHASE REIMBURSEMENT AGREEMENT ("Agreement") is made by and between the Commonwealth of Pennsylvania, acting through the Department of Transportation, located at 55 Keystone Industrial Park, Dunmore , PA 18512 ("DEPARTMENT")

and

the Norfolk Southern Railway Company, a corporation with its principal place of business located at Three Commercial Place, Norfolk, VA 23510 ("RAILROAD"), collectively referred to hereafter as the "Parties."

W I T N E S S E T H:

WHEREAS, the DEPARTMENT proposes to rehabilitate the structure on State Route 0029, Section P-22, in the Township of Hanover, Luzerne County ("Project");

WHEREAS, the Pennsylvania Public Utility Commission ("PUC") has exclusive jurisdiction over all rail-highway crossings in the Commonwealth of Pennsylvania and this Project is subject to any existing and future orders that may set forth cost allocations, work to be performed, and maintenance responsibilities;

WHEREAS, the tracks of the RAILROAD are located below the grade of the highway at approximately RAILROAD milepost HA-695.11 having DOT No. 517 801 A ;

WHEREAS, the DEPARTMENT authorized the RAILROAD to proceed with the preliminary engineering on June 10, 2020. This authorization included transportation and labor for field engineering, protective services, meetings, review of plans and specifications, preparation of plans and specifications if required, bridge inspection, and preparation of estimates and other related preparatory work in advance of physical construction operations; and

WHEREAS, the Parties desire to more fully set forth in detail the work, material, and labor for the preliminary engineering to be performed by the RAILROAD, and the costs thereof, estimated to be Twenty-Two Thousand Five

Hundred Seventy-Eight and 00 /100 (\$22,578.00) dollars, further described and itemized on Exhibit "A" entitled, "Railroad Force Account Estimate."

NOW, THEREFORE, for and in consideration of the premises, the mutual covenants hereinafter contained and with the intent to be legally bound hereby, the Parties agree as follows:

1. Incorporation of Recitals - The foregoing recitals are hereby incorporated by reference as if fully set forth among the terms and conditions of the Agreement.

2. Preliminary Engineering Work - The RAILROAD shall perform the necessary preliminary engineering in order to enable the DEPARTMENT to complete the design of the Project and to not unreasonably delay the DEPARTMENT's design schedule.

3. Cooperation - The Parties will ensure that their contractors cooperate and coordinate their respective schedules in an effort to not delay the design of the Project.

4. Compliance with Federal and State Law - The Parties agree that 23 CFR Parts 140 and 646 are incorporated herein by reference. This Project will be subject to the Buy America provisions in 23 U.S.C. § 313 and 23 CFR § 635.410 and the Steel Products Procurement Act, 73 P.S. § 1881 et seq.

5. Pennsylvania Prevailing Wage Act - Work performed under this Agreement by any worker for any contractor or subcontractor for the RAILROAD may be subject to the Pennsylvania Prevailing Wage Act, Act of August 15, 1961, P.L. 987, as amended, 43 P.S. §§ 165-1 - 165-17; 34 Pa. Code §§ 9.101-9.112. The RAILROAD shall be responsible for obtaining correct guidance on whether prevailing wages are applicable to the work performed under this Agreement. If prevailing wages are applicable, the RAILROAD shall insure that prevailing wages are included for all covered work in the specification bid proposal used to solicit bids to do the work and the contracts for the Project. If applicable, all contractors and subcontractors employing workers under this Agreement shall comply with the provisions of the Pennsylvania Prevailing Wage Act and its regulations. This shall include the required contract provisions found in 34 Pa. Code § 9.103. The RAILROAD can obtain prevailing wage rates and information about compliance through the following:

Bureau of Labor Law Compliance
1301 Labor & Industry Building
Seventh & Forster Streets

Harrisburg, PA 17120-0019

717-787-4671

www.dli.pa.gov

(keywords "prevailing wage/apprenticeship" then
"prevailing wage determination request")

The RAILROAD shall be responsible to maintain the documentation, particularly certified payrolls, showing compliance with the Prevailing Wage Act.

6. Reimbursement of Costs - The DEPARTMENT will, subject to provisions of section eight (8) hereinafter set forth, initially reimburse the RAILROAD for 100 percent of its actual costs directly involved in the Project, which the RAILROAD estimates at Twenty-Two Thousand Five Hundred Seventy-Eight and 00/100 (\$22,578.00) dollars and is further described on Exhibit "A", which is attached hereto and incorporated herein. It is understood and agreed that the RAILROAD may bill the DEPARTMENT no more frequently than sixty (60) days or upon incurring Five Thousand (\$5,000.00) dollars additional costs, whichever occurs first, for all actual and approved costs within the scope of the Project. Upon receipt of such verification and confirmation, the DEPARTMENT will promptly pay the RAILROAD the entire amount of such periodic billings.

7. Automated Clearing House - The Commonwealth will make payments to the RAILROAD through the Automated Clearing House ("ACH"). Within 10 days of the execution date of the Agreement, the RAILROAD must submit, or must have already submitted, its ACH and electronic addenda information, if desired, to the Commonwealth's Payable Service Center, Vendor Data Management Unit at 717-214-0140 (FAX) or by mail to the Office of Comptroller Operations, Bureau of Payable Service Center, Payable Service Center, Vendor Data Management Unit, 555 Walnut Street- 9th Floor, Harrisburg, PA 17101 A copy of the ACH enrollment form can be obtained online at:

www.vendorregistration.state.pa.us/cvmu/paper/Forms/ACH-EFTenrollmentform.pdf.

8. Reimbursement and Record Keeping - The DEPARTMENT's reimbursement to the RAILROAD for services performed under this Agreement shall be in accordance with the applicable provisions of the Federal Highway Administration's ("FHWA") Federal-Aid Policy Guide (23 CFR) and any supplements and amendments thereto. The RAILROAD agrees that the DEPARTMENT and/or its designees shall have the right to access and inspect the RAILROAD's records relating to the Project at any time during reasonable

business hours during the Project and for three (3) years after final payment has been received by the RAILROAD.

9. Inspection and Approval of Work - All materials furnished and work performed under this Agreement will be subject, at all times, to the inspection and approval of the DEPARTMENT, the PUC and the FHWA and/or their duly authorized representatives.

10. PUC Proceedings - The Parties will testify in any proceeding before the PUC in accordance with the terms of this Agreement and will submit this agreement to the PUC with the request it be incorporated into any order issued by the PUC.

11. Compliance with PUC Orders - Should there be any conflict between this Agreement and any order of the PUC, the Parties shall be bound by the lawful orders of the PUC on matters within its jurisdiction or the final determination by any proper Court on an appeal from said order or orders. In the event that the PUC's order or final determination on appeal directs the RAILROAD to bear its own costs for the said construction and/or protective service work for which the DEPARTMENT initially reimbursed the RAILROAD, the RAILROAD shall promptly return such reimbursement to the DEPARTMENT. Further, if sums initially paid to the RAILROAD exceed the actual cost for the RAILROAD's said construction and/or protective service, the RAILROAD shall promptly return all excess payments to the DEPARTMENT.

12. Federal Funding - This Project is subject to, and contingent upon, the approval for eligibility of federal funds by the FHWA and failure to obtain such approval shall relieve the Parties of their obligations under this Agreement.

13. Cancellation, Abandonment or Revision of Project - In the event, for any reason, the Project shall be canceled, abandoned, or revised, in such a manner that, in the opinion of the DEPARTMENT, the work described in this Agreement should no longer be required, then the only amount that will be payable to the RAILROAD will be the actual and related indirect costs of the work actually completed at the time of notification by the DEPARTMENT of the cancellation, abandonment, or revision, plus any additional expenses incurred by the RAILROAD in restoring its system to normal operation conditions.

14. Amendments and Modifications - No alterations or variations to this Agreement shall be valid unless made in writing and signed by the Parties. Amendments to this Agreement shall be accomplished through a

formal written document signed by the Parties with the same formality as the original Agreement. However, if the estimated cost of the services to be performed by the RAILROAD increases, causing the DEPARTMENT's total reimbursement obligation to increase, the Parties must execute a letter of amendment that will include a revised Exhibit "A." The DEPARTMENT cannot pay or reimburse the RAILROAD for the additional costs until the Parties execute the letter of amendment. Adequate funds must be available before the Parties execute the letter of amendment. The letter of amendment is not effective until duly authorized representatives of the RAILROAD, the DEPARTMENT, the Office of Chief Counsel, and the Office of the Comptroller sign and date the letter of amendment. A sample letter of amendment is attached as Exhibit "B" and made a part of this Agreement.

15. Changes to Standard Provisions - If there are changes to any Standard Provisions that need addressed at the time of a letter of amendment, as described in section 14, the Parties can incorporate those revised or updated Standard Provisions by noting the incorporation and attachment of such Standard Provisions to such letter of amendment. For the purposes of this section, Standard Provisions consist of those provisions or clauses required to be included in Commonwealth Agreements pursuant to federal or state law or Commonwealth Management Directives, including, but not limited to: Lobbying and Federal Audit Clause Assurances.

16. Titles Not Controlling - Titles of sections are for reference only, and shall not be used to construe the language in this Agreement.

17. Severability - The provisions of this Agreement shall be severable. If any phrase, clause, sentence or provision of this Agreement is declared to be contrary to the Constitution of Pennsylvania or of the United States or of the laws of the Commonwealth the applicability thereof to any government, agency, person or circumstance is held invalid, the validity of the remainder of this Agreement and the applicability thereof to any government, agency, person or circumstance shall not be affected thereby.

18. No Waiver - Either party may elect not to enforce its rights and remedies under this Agreement in the event of a breach by other party of any term or condition of this Agreement. In any event, the failure by either party to enforce its rights and remedies under this Agreement shall not be construed as a waiver of any subsequent breach of the same or any other term or condition of this Agreement.

19. Independence of the Parties - It is understood by and between the Parties that nothing contained herein is intended or shall be construed to, in any respect, create or establish the relationship of partners between the

RAILROAD and the DEPARTMENT, or as constituting the DEPARTMENT as the representative or general agent of the RAILROAD for any purpose whatsoever.

20. No Third-Party Beneficiary Rights - The Parties to this Agreement understand that this Agreement does not create or intend to confer any rights in or on persons or entities not a party to this Agreement.

21. Notices - All notices and reports arising out of, or from, the provisions of this Agreement shall be in writing and given to the Parties at the address provided under this Agreement, either by regular mail, facsimile, e-mail, or delivery in person.

22. Integration and Merger - This Agreement, when executed, approved and delivered, shall constitute the final, complete and exclusive Agreement between the Parties containing all the terms and conditions agreed on by the Parties. All representations, understandings, promises and agreements pertaining to the subject matter of this Agreement made prior to or at the time this Agreement is executed are superseded by this Agreement unless specifically accepted by any other term or provision of this Agreement. There are no conditions precedent to the performance of this Agreement except as expressly set forth herein.

23. Choice of Law - This Agreement shall be governed by and interpreted and enforced in accordance with the laws of the Commonwealth of Pennsylvania.

24. Effective Date - This Agreement shall become effective on the date that it is fully executed by the RAILROAD and the DEPARTMENT and all approvals required by the Commonwealth contracting procedures have been obtained, as indicated by the date of the last Commonwealth signature.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the Parties have executed this Agreement to be effective as of the date of the last signature affixed below.

ATTEST:

Norfolk Southern Railway Company

<u><i>[Signature]</i></u>	<u>10/27/20</u>	<u><i>Floyd E. Hudson</i></u>	<u>10/27/20</u>
Signature	Date	Signature	Date
<u>Asst. Mgr. Transportation</u>		<u>General Manager</u>	
Title		Title	

[COMMONWEALTH SIGNATURE PAGE FOLLOWS]

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

BY Richard N. Romm, P.E. 12/23/2020
District Executive Date

APPROVED AS TO LEGALITY
AND FORM

PRELIMINARILY APPROVED

BY _____
for Chief Counsel Date

BY _____
Senior Counsel in Charge Date

BY _____
Deputy General Counsel Date

FUNDS COMMITMENT DOCUMENT
NO. U04T093000
AMOUNT \$22,578.00

BY _____
Deputy Attorney General Date

BY _____
for Comptroller Operations

Prior Preapproved form:
OGC No. 18-FA-70.0
Appv'd OAG 11/5/15

FORCE ACCOUNT ESTIMATE

Work to be Performed By:	Norfolk Southern Railway Company
For the Account of:	Pennsylvania Department of Transportation
Project Description:	Proposed Rehabilitation of the SR 29 Bridge over NS
Location:	Nanticoke, Luzerne County, PA
Project No.:	MPMS# 112837
Milepost:	HA-695.11
File:	BR1111700
Date:	September 21, 2020

ITEM A - Preliminary Engineering	20,230
ITEM B - Construction Engineering	0
ITEM C - Accounting	2,348
ITEM D - Railroad Protective Services	0
ITEM E - Communications Changes	0
ITEM F - Signal & Electrical Changes	0
ITEM G - Track Work	0
ITEM H - T-Cubed	0
GRAND TOTAL	\$ 22,578

ITEM A - Preliminary Engineering

(Review plans and special provisions,
prepare estimates, etc.)

Labor:	60 Hours @ \$60 / hour=	3,600
Labor Additives:		2,830
Travel Expenses:		2,500
Services by Contract Engineer:		11,300
NET TOTAL - ITEM A		\$ 20,230

ITEM B - Construction Engineering

(Coordinate Railway construction activities,
review contractor submittals, etc.)

Labor:	0 Hours @ \$60 / hour=	0
Labor Additives:		0
Travel Expenses:		0
Services by Contract Engineer:		0
NET TOTAL - ITEM B		\$ -

ITEM C - Administration

Agreement Construction, Review and/or Handling:		1,250
Accounting Hours (Labor):	20 Hours @ \$30 / hour=	600
Accounting Additives:		498
NET TOTAL - ITEM C		\$ 2,348

ITEM D - Railroad Protective Services

(During construction on, over,
under, or adjacent to the track.)

Labor:	Protective Services	
	0 days @ 390.00 per day=	0
	(based on working 12 hours/day)	
Labor Additive:		0
Travel Expenses, Meals & Lodging:		
	0 days @ \$100/day=	0
Rental Vehicle	0 months @ \$950/month=	0
NET TOTAL - ITEM D		\$ -

ITEM E - Communications Changes

Material:		0
Labor:		0
Purchase Services:		0
Subsistence:		0
Additive:		0
NET TOTAL - ITEM E		\$ -

ITEM F - Signal & Electrical Changes

Material:	0
Labor:	0
Purchase Services:	0
Other:	0

NET TOTAL - ITEM F

\$	-
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ITEM G - Track Work

Material:	0
Labor:	0
Additive:	0
Purchase Services:	0

NET TOTAL - ITEM G

\$	-
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ITEM H - T-CUBED

Lump Sum	\$	-
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NOTES

1. For all groups of CONTRACT employees, the composite labor surcharge rate used in this estimate (including insurance) is 185.81%. Self Insurance - Public Liability Property Damage is estimated at 16.00%. Work will be billed at actual current audited rate in effect at the time the services are performed.
2. For all groups of NON-CONTRACT employees, the composite labor surcharge rate used in this estimate (including insurance is 78.59%. Self Insurance - Public Liability Property Damage is estimated at 16.00%. Work will be billed at actual current audited rate in effect at the time the services are performed.
3. All applicable salvage items due the Department will be made available to it at the jobsite for its disposal.
4. The Force Account Estimate is valid for one (1) year after the date of the estimate (09/21/2020). If the work is not performed within this time frame the Railway may revise the estimate to (1) include work not previously indicated as necessary and (2) reflect changes in cost to perform the force account work.

SAMPLE LETTER OF AMENDMENT

Date

Railroad Name
ATTN: Contact
Address
City, State Zip

Re: Amendment (**Amendment Letter Designation**)
Agreement # (**Contract Number**)

Dear (**Mr./Ms. Name**),

In accordance with the terms of the above-referenced Agreement, the Department is willing to amend its reimbursement obligation to the Railroad by increasing the estimated cost of the services to be performed by the Railroad from (**current dollar amount**) to (**new dollar amount**), as shown in the attached Exhibit "___." This amendment will become effective once all required signatures are affixed to this document.

We are requesting your concurrence concerning the amendment of the above-referenced Agreement. If you agree to the amendment, please concur by signing below and dating where indicated. Please attach a resolution or other documentation verifying your authorization to sign this amendment.

Your response is required no later than (**Date**). Please mail your response to the following address:

PENNDOT
Attn: **Your Name**
Your Organization
Your Address

Since the date of the above-referenced Agreement, some standard provisions and accompanying exhibits have been updated; copies of these updated exhibits are attached and supersede and replace the corresponding exhibit attached to the Original Agreement. **[Remove paragraph if not applicable.]**

On behalf of the above-named Railroad, I agree to the amendment of the above-referenced Agreement. I agree to all terms and conditions included in this Agreement and all previous amendments to it, if any.

Signature _____ Date _____

Indicate Title: ☐ Chairman ☐ President ☐ Vice-President ☐ Commissioner

or ☐ _____ (**Indicate title**)

All terms and conditions of this Agreement and its amendments (if any) not affected by this letter of amendment remain in full force and effect.

This letter of amendment is not effective until it is signed and dated by an Authorized Representative of the Department and the Office of Comptroller Operations. The Department will forward a copy of the fully executed letter of amendment to you for your files.

Sincerely,

Pennsylvania Department of Transportation

FOR DEPARTMENT USE ONLY

Authorized Representative of the Department:

Print Name

Title

Signature

Date

Form and Legality Approval:

for Chief Counsel

Date

Comptroller Operations Approval:

Funds Commitment No. _____

Amount \$ _____

for Comptroller Operations

Date

b6 b7C

NORFOLK SOUTHERN CORPORATION

July 6, 2010

D. H. Butler	F. M. Ehlers	B. Maestri
J. A. Hixon	T. N. Evans	R. E. Martinez
M. D. Manion	J. H. Friedmann	M. R. McClellan
J. P. Rathbone	W. A. Galanko	H. R. Mobley
D. W. Seale	T. A. Heilig	M. R. Stewart
J. A. Squires	R. E. Huffman	G. A. Thelen
D. D. Smith	T. E. Hurlbut	T. G. Werner
C. H. Allison, Jr.	D. F. Julian	M. J. Wheeler
T. J. Drake	R. M. Kesler, Jr.	F. B. Wimbush
C. C. Earhart	D. T. Lawson	H. D. McFadden

The Board of Directors at its meeting held on November 22, 2005, adopted resolutions granting certain authorities to the Chief Executive Officer of the Corporation (the "Resolutions"). Until further notice, certain of the authorities granted to me under the Resolutions and under Section 4 of Article III of the Corporation's Bylaws may be exercised as set forth in this letter. This letter replaces the letter dated August 24, 2006, delegating authority relating to the Corporation (see below for effect on existing subdelegations under prior letters).

This letter is a delegation of my authority to officers and employees for transactions and projects of Norfolk Southern Corporation. Many subsidiary companies have their own delegation letters which provide you the same authority at the subsidiary level that you have pursuant to the terms of this letter in your position as an officer or employee of Norfolk Southern Corporation. However, unless you are an officer of the subsidiary, you will execute documents as an agent of the subsidiary. Notwithstanding the broad authority granted to presidents and directors under state corporate law, persons serving in such a position for the Corporation's wholly-owned subsidiaries who are also officers of the Corporation should exercise their authority at the subsidiary level only in accordance with the terms of this letter, which serves as an internal control for the Corporation and its subsidiaries. You can request copies of delegation letters for subsidiary companies, as needed, from the Corporate Secretary.

General Matters. For purposes of this letter:

- (1) "Approved Capital Improvement Budget" includes any capital improvement budget and any amendment thereto approved by the Corporation's Board of Directors for the Corporation and its subsidiary or affiliated companies (excluding subsidiary or affiliated companies for which a separate capital improvement budget is approved).
- (2) "Executive Vice President" and "Senior Vice President" means any person with those titles.
- (3) "Vice President" means any person with the title Vice President, but does not include persons with the titles Resident Vice President or Group Vice President.
- (4) "Change of Scope" means a change to any project included in an Approved Capital Improvement Budget that materially alters the purpose of the particular project as

approved by the Board. Whether a change materially alters the purpose of an approved project is to be determined solely by the Financial Planning Department.

(4) "Real Property" means land and/or buildings.

(5) "Real Estate Manager" means a person designated as such in writing by the Chief Real Estate Officer.

(6) Whether or not an item is properly includable in an Approved Capital Improvement Budget shall be determined exclusively by the Controller or his or her designee.

(7) Whether a given expenditure involves an expense item or a capital item (such as a capital lease) shall be determined exclusively by the Controller or his or her designee.

(8) The "estimated value" of any lease or other term transaction is calculated by the Financial Planning Department (an operating lease is valued at the present value of the cash flows discounted at the cost of capital; the value of a capital lease is the estimated amount that the lease will be booked as a capital asset).

(9) The "appraised or deemed fair value" with respect to dispositions of Real Property shall mean fair market value as determined by a competent, independent appraiser or a statement of value or broker's analysis for the highest and best use of the property, provided that if the value of the Real Property at issue is reasonably estimated by the Real Estate Department to be less than **\$300,000**, the Chief Real Estate Officer, or his or her designee, may elect to use such estimated value as the "appraised or deemed fair value" of such Real Property in lieu of any of the foregoing valuation methods.

(10) The duration of any lease or other term transaction shall be deemed to be the shortest period after which the Corporation's obligations may cease.

(11) The authority of an officer or employee includes authority granted to those officers or employees who are subordinate to him (for example, a Senior Vice President may exercise all authorities granted to a Vice President).

Authorities Delegated. An officer with delegated authority to "approve" a project ordinarily will evidence that approval by written or electronic approval of a request. Once "approved" by an officer having requisite authority, a project may be implemented by the execution of contracts and commitments. An officer who is permitted, pursuant to this letter, to "execute contracts" shall be authorized to execute and deliver any contract, commitment, agreement or other instrument which may be necessary or appropriate to implement an already approved item or project. However, authority to "approve" projects or to "execute contracts" as provided in this letter does not include authority to approve payable documents (such as checks, drafts and other orders for payment of funds) or to approve actual payment of funds. Authority to approve payments of funds shall be governed by the Corporation's "Uniform Policy for Approval of Payable Documents" (or successor policy) included in the manual of Corporate Policies and Corporate Procedures and referred to in the Corporation's Compendium of Internal Controls.

Subdelegation. Unless otherwise indicated, each officer delegated authority by me may further delegate such authority to only **two** other direct report officers, and such authority may not be further subdelegated unless approved by me. In the event that further delegations are necessary, such officer shall request additional delegation authority from me, in writing, explaining the need for such further delegation. Existing subdelegations based on prior letters delegating authority from the Chief Executive Officer that are not inconsistent with this letter shall remain in effect until the earlier of the date such subdelegation is rescinded by its author

or the date a new subdelegation is granted which covers the same subject matter as the existing subdelegation. Each subdelegation of standing or long-term authority, whether to a given office or position (e.g., Assistant Vice President Tax Administration) or to a qualifying specific individual (e.g., John Doe), shall be in writing and shall be directed to the Corporate Secretary for retention, with a copy provided to Audit and Compliance, the individual(s) or officeholder(s) to whom such authority is subdelegated, and any other individuals as may be deemed necessary or desirable. Each subdelegation of short-term or event-specific authority shall be in writing (which may be in the form of electronic mail) and shall be directed to the individual(s) or officeholder(s) to whom such authority is subdelegated, with a copy provided to Audit and Compliance and any other individuals as may be deemed necessary or desirable.

I. Projects Included in Approved Capital Improvement Budget

(1) Included Budget Transactions. With respect to any project included in an Approved Capital Improvement Budget:

(a) Each Executive Vice President is authorized to approve the implementation of any project involving an estimated capital charge of less than **\$20,000,000**.

(b) Each Senior Vice President or Vice President is authorized to approve the implementation of any project involving an estimated capital charge of less than **\$10,000,000**.

(c) Each Vice President may execute contracts to implement any project properly approved for implementation by me or by another officer having appropriate authority.

(d) The Chief Purchasing Officer and any Director – Purchasing is authorized to execute any properly approved contract or transaction to implement any purchase, lease, license or other acquisition of (or of an interest in) any materials, equipment, supplies, or services. The Chief Purchasing Officer may further delegate authority granted to him or her under this letter, in writing, to any Manager, Assistant Manager or Supervisor in the Material Management Department as deemed necessary.

(2) Additions to Budget Approved by CEO. Each Vice President is authorized to execute contracts to implement any new project approved by me as an addition to a Capital Improvement Budget.

(3) Project Deferrals, Cancellations or Changes in Scope. With respect to any project included in an Approved Capital Improvement Budget:

(a) Each Executive Vice President is authorized to approve any deferral or cancellation of or changes in scope to approved spending for a project involving an estimated capital charge of less than **\$20,000,000**, *provided* that any such deferral, cancellation or change in scope is to be reported promptly to me.

(b) Each Senior Vice President or Vice President is authorized to approve any deferral or cancellation of or changes in scope to approved spending for a project involving an estimated capital charge of less than **\$10,000,000**, *provided* that any such deferral, cancellation or change in scope is to be reported promptly to me.

(c) Each Vice President is authorized to execute contracts to implement any deferral or cancellation of or changes in scope to approved spending for a project properly approved by me or by another officer having appropriate authority.

(4) Small Projects ("Category 49"). With respect to any Approved Capital Improvement Budget, each Executive Vice President is authorized to approve, and, when so approved,

any Vice President is authorized to execute contracts to implement any project involving aggregate estimated Approved Capital Improvement Budget charges of less than **\$500,000** funded from and within the limits of the "Small Projects" category or the "Other Items" category.

(5) Pre-Approved Transactions. Each Vice President and the Chief Purchasing Officer are authorized to execute contracts to implement any Pre-Approved Project (as defined in the Resolutions) which has been approved by me. Any such Pre-Approved Project shall be included in a subsequent year's Approved Capital Improvement Budget.

II. Operating Budget and Other Expenditures for Acquisitions of Services or Property other than Real Property

(1) CEO-Approved Transactions. Each Vice President is authorized to execute contracts to implement (i) any operating expense transaction approved by me and (ii) any purchase, lease, license or other acquisition of (or of an interest in) any property approved by me.

(2) Operating Expense Budget. Any contract, lease, license, or other form of corporate commitment, for the purchase or lease of personal property, materials and services, or other form of corporate commitment related to customary business operations (including operating leases pursuant to Section IV), may be authorized and executed by the officers, and in the amounts, as set forth below, provided (a) any purchase of materials, supplies or services must also follow procedures set forth in Corporate Procedure 500.2 and (b) any lease of property other than Real Property must also follow procedures set forth in Corporate Procedure 500.4.

Each Executive Vice President, Senior Vice President and Vice President is authorized to approve and, when so approved, to execute contracts to implement any lease, license, option or other acquisition of (or of an interest in) property other than Real Property (a) if classified by the Controller as a capital lease or other capital acquisition, in accordance with the authority specified in Section I herein or (b) if classified by the Controller as an operating lease or other operating budget item, in accordance with the authority specified below.

(a) Each Executive Vice President is authorized to approve and execute contracts or other documents where the estimated dollar value of costs at inception, or during the contract or applicable term or period, does not exceed **\$5,000,000**.

(b) Each Senior Vice President and Vice President is authorized to approve and execute contracts or other documents where the estimated dollar value of costs at inception, or during the contract or applicable term or period, does not exceed **\$1,000,000**.

(c) Each Vice President may execute contracts or other documents to implement any operating expense budget item properly approved by me or by another officer having appropriate authority.

(d) Each Vice President is authorized to approve, and, when so approved, each of them is authorized to execute contracts or other documents to implement any project pursuant to which all costs and expenditures will be billed to, and will be paid for or reimbursed by, a party other than the Corporation ("100% billable projects").

(e) The Chief Purchasing Officer and any Director - Purchasing is authorized to execute any properly approved contract or other documents to implement any

purchase, lease, license or other acquisition of (or of an interest in) any materials, equipment, supplies or services which will be required in the usual and ordinary conduct of the Corporation's business. The Chief Purchasing Officer may further delegate authority granted to him or her under this letter, in writing, to any Manager, Purchasing Agent, or Buyer in the Material Management Department as deemed necessary.

(f) Each Assistant Vice President, General Manager of an operating region, General Manager of a mechanical facility, or General Superintendent-Mechanical is authorized to approve and execute contracts or other documents where the estimated dollar value of costs at inception, or during the then contract or applicable term or period, do not exceed **\$250,000**.

III. Dispositions of Property other than Real Property

(1) Each Executive Vice President is authorized to approve and, when so approved, each of them and each Vice President is authorized to execute contracts or other documents to implement (a) any sale, lease, license or other disposition of (or of an interest in) any surplus materials and supplies where the estimated value of the sale or other disposition does not exceed **\$5,000,000**, and which are no longer necessary or useful for the operation of the Corporation or (b) any sale, lease, license or other disposition of (or of any interest in) any equipment for which there is an approved retirement AFE.

(2) Each Senior Vice President and Vice President is authorized to approve and, when so approved, each of them is authorized to execute contracts or other documents to implement (a) any sale, lease, license or other disposition of (or of an interest in) any surplus materials and supplies where the estimated value of the sale or other disposition does not exceed **\$1,000,000**, and which are no longer necessary or useful for the operation of the Corporation or (b) any sale, lease, license or other disposition of (or of any interest in) any equipment for which there is an approved retirement AFE.

(3) The Chief Purchasing Officer and any Director – Purchasing is authorized to execute any properly approved contracts or other documents to implement any sale, lease, license or other disposition of (or of an interest in) any surplus materials and supplies that are no longer necessary or useful for the operation of the Corporation, and any sale, lease, license or other disposition of (or of any interest in) any equipment for which there is an approved retirement AFE. The Chief Purchasing Officer may further delegate authority granted to him or her under this letter, in writing, to any Manager, Purchasing Agent, or Buyer in the Material Management Department as deemed necessary.

IV. Real Property Sales, Leases, and Licenses

(1) General. Individuals must always obtain the advice and written approval of the Senior Vice President Energy and Properties or the Chief Real Estate Officer, or their designee, prior to executing any contract or other document regarding acquisition or disposition of a Real Property asset.

(2) Acquisitions. Each Executive Vice President, Senior Vice President and Vice President is authorized to approve and, when so approved, to execute contracts or other documents to implement any purchase, lease, license, option or other acquisition of (or of an interest in) Real Property (a) if classified by the Controller or his or her designee as a capital lease or other capital acquisition, in accordance with the authority specified in

Section I herein or (b) if classified by the Controller as an operating lease or other operating budget item, in accordance with the authority specified in Section II herein.

(3) Dispositions.

(a) Executive Vice Presidents and Others. Each Executive Vice President, the Senior Vice President Energy and Properties, and the Chief Real Estate Officer is authorized to approve, and, when so approved, each of them and each Vice President is authorized to execute contracts or other documents to implement, any sale, lease, license, option or other disposition of (or of an interest in) any Real Property asset where the estimated value, or an appraised or deemed fair value of the interest sold or otherwise disposed of does not exceed **\$5,000,000**, *provided* that any such disposition is to be reported promptly to me.

(b) Senior Vice Presidents and Vice Presidents. Each Senior Vice President and Vice President is authorized to approve, and, when so approved, each of them is authorized to execute contracts or other documents to implement, any sale, lease, license, option or other disposition of, or of an interest in, any Real Property asset where the estimated value, or an appraised or deemed fair value of the interest sold or otherwise disposed of does not exceed **\$1,000,000**, *provided* that any such disposition is to be reported promptly to me.

(4) Real Estate Officers. Authorization is granted to each Assistant Vice President Real Estate and, except as otherwise noted below, to each Real Estate Manager:

(a) to approve and execute leases and licenses to or from the Corporation of Real Property where the estimated value of the leased or licensed interest does not exceed **\$250,000**, and rights of entry for not more than sixty days;

(b) to approve and, when approved by the Chief Real Estate Officer or another authorized officer, to execute and deliver contracts, deeds, options and other instruments necessary to implement sales and conveyances by the Corporation of Real Property where the estimated value or an appraised or deemed fair value of the interest sold, leased, or otherwise disposed of does not exceed **\$500,000**, *provided* that such authorization is granted only to each Assistant Vice President Real Estate;

(c) to execute and deliver any deed, contract, lease or other instrument or document to implement a properly approved transaction involving the conveyance of Real Property to or from the Corporation; and

(d) to approve, execute and deliver rights of entry for purposes of assessment, testing, environmental investigation or clean-up or other customary business purposes.

(5) Each Real Estate Agent is authorized:

(a) to approve and execute leases to or from the Corporation of Real Property *provided* that (i) each such lease is the form of Short Term Lease approved by the Chief Real Estate Officer and the Law Department and where the estimated value of the interest leased does not exceed **\$50,000**, *provided* that any renewal of such lease or license will require reauthorization at the time of renewal; and (ii) such lease is terminable upon not more than 30 days written notice; and

(b) to approve, execute and deliver any non-binding option to purchase Real Property on behalf of the Corporation or the subsidiaries of the Corporation.

V. Other Authorizations

(1) Operating Officers. The Chief Operating Officer is authorized to approve and, when so approved, he and any Vice President reporting to him is authorized to execute and deliver siding agreements, right of entry agreements (for environmental or other purposes) and agreements covering public projects, private industry projects or other operating matters where the net expense to the Corporation and the deemed fair value of any easements to be granted by the Corporation in connection with any such agreement will not exceed \$100,000. Each Transportation Department Vice President and each Transportation Department official designated by him is authorized to approve and to execute and deliver right of entry agreements (for environmental or other customary business purposes) and agreements covering operations over sidings, public projects, private industry projects or other customary operating matters where the net expense to the Company and the deemed fair value of any easements to be granted by the Company in connection with any such agreement will not exceed \$50,000. Each General Manager, Division Superintendent and Terminal Superintendent is authorized to approve and execute (a) rights of entry for operating purposes for not more than thirty days and (b) temporary leases of track having a maximum monthly consideration of \$2,500 and a duration not to exceed six months, upon forms issued or approved by the Chief Operating Officer and in accordance with such instructions as he may issue in connection with the use of the forms.

(2) Engineering Officers. The Vice President-Engineering is authorized to approve and, when so approved, he and each Assistant Vice President in the Engineering Department and each Real Estate Manager is authorized to execute and deliver agreements that are, or that are in the nature of, licenses for placing and maintaining wires, conduits or pipelines (including customary accessories) on, over or through the property of the Corporation and for encroachment on Corporation property by roads, highways, buildings or other structures, which agreements expire upon completion of a particular project or which are revocable or terminable at the end of a term not exceeding three years.

(3) Permits and Applications. Each Vice President and each Assistant Vice President in the Engineering Department is authorized to approve, execute and deliver any permit, application or other document necessary with respect to (a) the Corporation's business, (b) the licensing, titling or registration of any equipment or (c) compliance with regulatory requirements. Applications and other documents pertaining to the registration, licensing and titling of vehicles, trailers and like equipment may be approved and executed by the Chief Purchasing Officer or the chief official of the department or office having jurisdiction over or using that equipment.

(4) Taxation. The Vice President-Taxation is authorized to approve, execute and deliver tax returns required by any federal, state, local or foreign government or agency, and to approve, execute and deliver waivers, closing agreements, settlement contracts, claims, pleadings and other documents in connection with or related to the payment, settlement, protest or litigation of any federal, state, local or foreign taxes (any such tax return or other document a "Tax Document"). Any Assistant Vice President within the Taxation Department may, as may be specified in and in accordance with the written authorization of the Vice President-Taxation, approve, execute and deliver any Tax Document. Any Staff Tax Counsel, any Director, any Assistant Director or any Manager within the Taxation Department may, as may be specified in and in accordance with the written

authorization of the Vice President-Taxation, approve, execute and deliver tax returns required by any federal, state, local or foreign government or agency, and approve, execute and deliver protests, claims or pleadings related to the payment, settlement, protest or litigation of any federal, state, local or foreign taxes. Also, each of the Vice President-Taxation and the Controller and, as may be specified in and in accordance with the written authorization of the Vice President-Taxation or the Controller, each of the Director Tax Review, the Assistant Vice President-Accounting Operations, the Director Payroll Accounting, the Manager Payroll Accounting and the Assistant Manager Payroll Accounting is authorized to approve, execute and deliver returns, agreements, pleadings and other documents pertaining to payroll taxes.

(5) Law Department. The Chief Legal Officer and, to the extent of the authority specified by him, each Law Department attorney or other person designated by him is authorized to approve, execute, verify and deliver arrangements or agreements in settlement of litigation or claims by or against the Corporation, and to execute, verify and deliver any instrument, bond, pleading or document required by law or which he deems for the protection or furtherance of the Corporation's interests in, or connected with, any legal proceeding in or before any court or governmental commission or other regulatory body to which the Corporation is or may be a party.

(6) Transportation Contracts and Other Related Services. Each of the Chief Marketing Officer, each Marketing Department Senior Vice President and Vice President and each employee and other person designated in writing by any of them, is authorized to approve, execute and deliver contracts for the provision of rail transportation and related services, *provided* that, in each instance, the contract has been reviewed and approved by the Chief Operating Officer and the Law Department, and where special conditions apply as defined in the Marketing Authorization Process found in the Compendium of Internal Controls, such other approvals as required, which prior review and approval may be in accordance with any guidelines established by the responsible officer or department.

(7) Securities and Investments. Each Vice President, the Treasurer, the Corporate Secretary, any Assistant Treasurer and any Assistant Secretary is authorized to execute or cause to be executed on behalf of the Corporation written proxies, consents, waivers or other instruments in connection with the voting, transfer, cancellation or other handling of any stock or securities held or owned by the Corporation. The authority of officers to purchase and sell securities in connection with the Corporation's cash management and investment program shall be governed by the "Investment Policy" approved by the Corporation's Board of Directors.

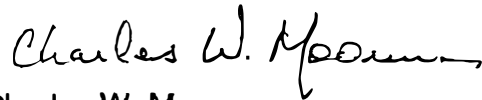
(8) Intercompany Advances. Each Vice President is authorized to effect advances to or from any of the Corporation's *consolidated* subsidiary companies or entities in such amounts and on such terms as considered necessary and advisable.

(9) Insourcing. Each Executive Vice President, Senior Vice President and Vice President is authorized to approve, execute and deliver any contract or other documents whereby locomotives, rail cars, rail related equipment or services are manufactured, rebuilt or performed by the Corporation for sale to or on behalf of third parties with a projected cost to the Corporation (direct materials, labor, freight and warranty) of less than **\$1,000,000**, provided that such project has been approved in advance by the Finance Department. The System Manager Locomotive Sales and Marketing is

authorized to approve, execute and deliver any contract whereby locomotives, rail cars or other rail related equipment are manufactured or rebuilt by the Corporation for sale to or on behalf of third parties with a projected cost to the Corporation (direct materials, labor, freight and warranty) of less than **\$250,000**, provided that such project has been approved in advance by the Finance Department.

None of the foregoing delegations will be exercised so as to be inconsistent with (a) The Thoroughbred Code of Ethics (b) the Corporate Policies and Procedures or (c) policies set out in the Compendium of Internal Controls.

No contract for consulting services, including renewal contracts, may be entered into without my prior written approval; *provided, however*, that this requirement shall not apply to (a) Real Property appraisal or broker contracts procured by the Senior Vice President Energy and Properties or the Chief Real Estate Officer or (b) professional, consulting and similar services procured by the Law Department for purposes of legal or regulatory proceedings.

A handwritten signature in black ink, reading "Charles W. Moorman". The signature is written in a cursive, flowing style with a long horizontal stroke at the end.

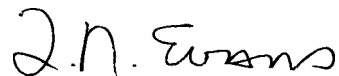
Charles W. Moorman

Delegation of Authority – Norfolk Southern Corporation

Norfolk, Virginia - May 1, 2013

General Manager – Eastern Region
General Manager – Northern Region
General Manager – Western Region

In accordance with paragraph V(1) of the Chairman, President and Chief Executive Officer's letter of July 6, 2010, copy attached, you are authorized as agent of and in the name and on behalf of this Corporation to approve and to execute and deliver right of entry agreements (for environmental and other customary business purposes) and agreements covering operations over sidings, public projects, private industry projects and other customary operating matters where the net expense to the Company and the deemed fair value of any easements to be granted by the Company in connection with any such agreement will not exceed \$50,000.



T. N. Evans
Vice President
Transportation

Attachment

cc: C. W. Moorman
M. D. Manion
W. A. Galanko
H. D. McFadden

EFFECTIVE DATE	<u>October 18, 2021</u>	AGREEMENT NO.	05G152
COUNTY	Luzerne	FID NO.	23-2622160
MUNICIPALITY	White Haven Borough	SAP VENDOR NO.	130829
		MPMS NO.	99552

RAILROAD DESIGN PHASE REIMBURSEMENT AGREEMENT

THIS RAILROAD DESIGN PHASE REIMBURSEMENT AGREEMENT ("Agreement") is made by and between the Commonwealth of Pennsylvania, acting through the Department of Transportation, located at 1002 Hamilton Street, Allentown, PA 18101 ("DEPARTMENT")

and

the Reading Blue Mountain & Northern Railroad Company, a corporation with its principal place of business located at One Railroad Boulevard, PO Box 218, Port Clinton, PA 19549 ("RAILROAD"), collectively referred to hereafter as the "Parties."

W I T N E S S E T H:

WHEREAS, the DEPARTMENT proposes to replace the bridges carrying Interstate 80 over the tracks of RAILROAD on State Route 0080, Section 08B, in the Borough of White Haven, Luzerne County ("Project");

WHEREAS, the Pennsylvania Public Utility Commission ("PUC") has exclusive jurisdiction over all rail-highway crossings in the Commonwealth of Pennsylvania and this Project is subject to any existing and future orders that may set forth cost allocations, work to be performed, and maintenance responsibilities;

WHEREAS, the tracks of the RAILROAD are located below the grade of the highway at approximately RAILROAD milepost 145.2 having DOT No. Unknown;

WHEREAS, the DEPARTMENT authorized the RAILROAD to proceed with the preliminary engineering on March 2, 2020. This authorization included transportation and labor for field engineering, meetings, review of plans and specifications and preparation of estimates and other related preparatory work in advance of physical construction operations; and

WHEREAS, the Parties desire to more fully set forth in detail the work, material, and labor for the preliminary engineering to be performed by the

RAILROAD, and the costs thereof, estimated to be Sixteen Thousand Five Hundred and 00/100 (\$16,500.00) dollars, further described and itemized on Exhibit "A" entitled, "Railroad Force Account Estimate."

NOW, THEREFORE, for and in consideration of the premises, the mutual covenants hereinafter contained and with the intent to be legally bound hereby, the Parties agree as follows:

1. Incorporation of Recitals - The foregoing recitals are hereby incorporated by reference as if fully set forth among the terms and conditions of the Agreement.

2. Preliminary Engineering Work - The RAILROAD shall perform the necessary preliminary engineering in order to enable the DEPARTMENT to complete the design of the Project and to not unreasonably delay the DEPARTMENT's design schedule.

3. Cooperation - The Parties will ensure that their contractors cooperate and coordinate their respective schedules in an effort to not delay the design of the Project.

4. Compliance with Federal and State Law - The Parties agree that 23 CFR Parts 140 and 646 are incorporated herein by reference. This Project will be subject to the Buy America provisions in 23 U.S.C. § 313 and 23 CFR § 635.410 and the Steel Products Procurement Act, 73 P.S. § 1881 et seq.

5. Pennsylvania Prevailing Wage Act - Work performed under this Agreement by any worker for any contractor or subcontractor for the RAILROAD may be subject to the Pennsylvania Prevailing Wage Act, Act of August 15, 1961, P.L. 987, as amended, 43 P.S. §§ 165-1 - 165-17; 34 Pa. Code §§ 9.101-9.112. The RAILROAD shall be responsible for obtaining correct guidance on whether prevailing wages are applicable to the work performed under this Agreement. If prevailing wages are applicable, the RAILROAD shall insure that prevailing wages are included for all covered work in the specification bid proposal used to solicit bids to do the work and the contracts for the Project. If applicable, all contractors and subcontractors employing workers under this Agreement shall comply with the provisions of the Pennsylvania Prevailing Wage Act and its regulations. This shall include the required contract provisions found in 34 Pa. Code § 9.103. The RAILROAD can obtain prevailing wage rates and information about compliance through the following:

Bureau of Labor Law Compliance
1301 Labor & Industry Building

Seventh & Forster Streets
Harrisburg, PA 17120-0019
717-787-4671

www.dli.pa.gov

(keywords "prevailing wage/apprenticeship" then
"prevailing wage determination request")

The RAILROAD shall be responsible to maintain the documentation, particularly certified payrolls, showing compliance with the Prevailing Wage Act.

6. Reimbursement of Costs - The DEPARTMENT will, subject to provisions of section eight (8) hereinafter set forth, initially reimburse the RAILROAD for 100 percent of its actual costs directly involved in the Project, which the RAILROAD estimates at Sixteen Thousand Five Hundred and 00/100 (\$16,500.00) dollars and is further described on Exhibit "A", which is attached hereto and incorporated herein. It is understood and agreed that the RAILROAD may bill the DEPARTMENT no more frequently than sixty (60) days or upon incurring Five Thousand (\$5,000.00) dollars additional costs, whichever occurs first, for all actual and approved costs within the scope of the Project. Upon receipt of such verification and confirmation, the DEPARTMENT will promptly pay the RAILROAD the entire amount of such periodic billings.

7. Automated Clearing House - The Commonwealth will make payments to the RAILROAD through the Automated Clearing House ("ACH"). Within 10 days of the execution date of the Agreement, the RAILROAD must submit, or must have already submitted, its ACH and electronic addenda information, if desired, to the Commonwealth's Payable Service Center, Vendor Data Management Unit at 717-214-0140 (FAX) or by mail to the Office of Comptroller Operations, Bureau of Payable Service Center, Payable Service Center, Vendor Data Management Unit, 555 Walnut Street- 9th Floor, Harrisburg, PA 17101 A copy of the ACH enrollment form can be obtained online at:

www.vendorregistration.state.pa.us/cvmu/paper/Forms/ACH-EFTenrollmentform.pdf.

8. Reimbursement and Audit Clause Compliance - The DEPARTMENT's reimbursement to the RAILROAD shall be in accordance with the provisions of Federal Highway Administration's ("FHWA") Federal-Aid Policy Guide (23 CFR) and any supplements and amendments thereto. The DEPARTMENT will reimburse the RAILROAD without delay for all the actual cost of Construction Work, upon receipt by the DEPARTMENT of the RAILROAD billing and confirmation thereof by the DEPARTMENT, which may include, but

is not limited to supporting time sheets, material invoices and equipment records of the RAILROAD and/or other documents to substantiate the billing. The RAILROAD shall make its invoices and records available for audit and shall be bound by the terms and conditions of the audit clause attached hereto as Exhibit "B".

9. Inspection and Approval of Work - All materials furnished and work performed under this Agreement will be subject, at all times, to the inspection and approval of the DEPARTMENT, the PUC and the FHWA and/or their duly authorized representatives.

10. PUC Proceedings - The Parties will testify in any proceeding before the PUC in accordance with the terms of this Agreement and will submit this agreement to the PUC with the request it be incorporated into any order issued by the PUC.

11. Compliance with PUC Orders - Should there be any conflict between this Agreement and any order of the PUC, the Parties shall be bound by the lawful orders of the PUC on matters within its jurisdiction or the final determination by any proper Court on an appeal from said order or orders. In the event that the PUC's order or final determination on appeal directs the RAILROAD to bear its own costs for the said construction and/or protective service work for which the DEPARTMENT initially reimbursed the RAILROAD, the RAILROAD shall promptly return such reimbursement to the DEPARTMENT. Further, if sums initially paid to the RAILROAD exceed the actual cost for the RAILROAD's said construction and/or protective service, the RAILROAD shall promptly return all excess payments to the DEPARTMENT.

12. Federal Funding - This Project may become subject to the approval for eligibility of federal funds by the FHWA. In that event, failure to obtain such approval shall relieve the Parties of their obligations under this Agreement.

13. Right-to-Know Law - The Pennsylvania Right-to-Know Law, 65 P.S. §§ 67.101 - 3104, applies to this Agreement. Therefore, this Agreement is subject to, and the RAILROAD shall comply with, the clause entitled "Contract Provisions – Right to Know Law", attached as Exhibit "C" and made a part of this Agreement. As used in this Agreement, the term "Contractor" refers to the RAILROAD.

14. Cancellation, Abandonment or Revision of Project - In the event, for any reason, the Project shall be canceled, abandoned, or revised, in such a manner that, in the opinion of the DEPARTMENT, the work described in this Agreement should no longer be required, then the only amount that

will be payable to the RAILROAD will be the actual and related indirect costs of the work actually completed at the time of notification by the DEPARTMENT of the cancellation, abandonment, or revision, plus any additional expenses incurred by the RAILROAD in restoring its system to normal operation conditions.

15. Amendments and Modifications - No alterations or variations to this Agreement shall be valid unless made in writing and signed by the Parties. Amendments to this Agreement shall be accomplished through a formal written document signed by the Parties with the same formality as the original Agreement. However, if the estimated cost of the services to be performed by the RAILROAD increases, causing the DEPARTMENT's total reimbursement obligation to increase, the Parties must execute a letter of amendment that will include a revised Exhibit "A." The DEPARTMENT cannot pay or reimburse the RAILROAD for the additional costs until the Parties execute the letter of amendment. Adequate funds must be available before the Parties execute the letter of amendment. The letter of amendment is not effective until duly authorized representatives of the RAILROAD, the DEPARTMENT, the Office of Chief Counsel, and the Office of the Comptroller sign and date the letter of amendment. A sample letter of amendment is attached as Exhibit "D" and made a part of this Agreement.

16. Changes to Standard Provisions - If there are changes to any Standard Provisions that need addressed at the time of a letter of amendment, as described in section 15, the Parties can incorporate those revised or updated Standard Provisions by noting the incorporation and attachment of such Standard Provisions to such letter of amendment. For the purposes of this section, Standard Provisions consist of those provisions or clauses required to be included in Commonwealth Agreements pursuant to federal or state law or Commonwealth Management Directives, including, but not limited to: Right-to-Know Law, Lobbying, and Federal Audit Clause Assurances.

17. Titles Not Controlling - Titles of sections are for reference only, and shall not be used to construe the language in this Agreement.

18. Severability - The provisions of this Agreement shall be severable. If any phrase, clause, sentence or provision of this Agreement is declared to be contrary to the Constitution of Pennsylvania or of the United States or of the laws of the Commonwealth the applicability thereof to any government, agency, person or circumstance is held invalid, the validity of the remainder of this Agreement and the applicability thereof to any government, agency, person or circumstance shall not be affected thereby.

19. No Waiver - Either party may elect not to enforce its rights and remedies under this Agreement in the event of a breach by other party of any term or condition of this Agreement. In any event, the failure by either party to enforce its rights and remedies under this Agreement shall not be construed as a waiver of any subsequent breach of the same or any other term or condition of this Agreement.

20. Independence of the Parties - It is understood by and between the Parties that nothing contained herein is intended or shall be construed to, in any respect, create or establish the relationship of partners between the RAILROAD and the DEPARTMENT, or as constituting the DEPARTMENT as the representative or general agent of the RAILROAD for any purpose whatsoever.

21. Assignment - This Agreement may not be assigned by the RAILROAD, either in whole or in part, without the written consent of the DEPARTMENT.

22. No Third-Party Beneficiary Rights - The Parties to this Agreement understand that this Agreement does not create or intend to confer any rights in or on persons or entities not a party to this Agreement.

23. Notices - All notices and reports arising out of, or from, the provisions of this Agreement shall be in writing and given to the Parties at the address provided under this Agreement, either by regular mail, facsimile, e-mail, or delivery in person.

24. Integration and Merger - This Agreement, when executed, approved and delivered, shall constitute the final, complete and exclusive Agreement between the Parties containing all the terms and conditions agreed on by the Parties. All representations, understandings, promises and agreements pertaining to the subject matter of this Agreement made prior to or at the time this Agreement is executed are superseded by this Agreement unless specifically accepted by any other term or provision of this Agreement. There are no conditions precedent to the performance of this Agreement except as expressly set forth herein.

25. Choice of Law - This Agreement shall be governed by and interpreted and enforced in accordance with the laws of the Commonwealth of Pennsylvania (without regard to conflict of law provisions) and the decisions of the Pennsylvania courts. The RAILROAD consents to the jurisdiction of any court of the Commonwealth of Pennsylvania and any federal courts in Pennsylvania, waiving any claim or defense that such forum is not convenient or proper. The RAILROAD agrees that any such court shall have in personam

jurisdiction over it and consents to service of process in any manner authorized by Pennsylvania Law.

26. Effective Date - This Agreement shall become effective on the date that it is fully executed by the RAILROAD and the DEPARTMENT and all approvals required by the Commonwealth contracting procedures have been obtained, as indicated by the date of the last Commonwealth signature.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the Parties have executed this Agreement to be effective as of the date of the last signature affixed below.

ATTEST:

Reading Blue Mountain & Northern
Railroad Company

 3/4/2021
Signature Date

Real Estate Assistant
Title

 3/4/21
Signature Date

Assistant VP Real Estate
Title

[COMMONWEALTH SIGNATURE PAGE FOLLOWS]

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

BY Christopher J. Kufro 3/4/2021
District Executive Date

APPROVED AS TO LEGALITY
AND FORM

PRELIMINARILY APPROVED

BY [Signature] 9/13/2021
for Chief Counsel Date

BY Karen L. Cummings 9.9.2021
Senior Counsel in Charge Date

BY Pamela J. Cross Digitally signed by pcross
DN: dc=LCL, dc=PA,
ou=CWOPA, ou=GC, ou=OGC,
ou=USERS, cn=pcross
Date: 2021.09.17 12:01:41
-04'00'
Deputy General Counsel Date

FUNDS COMMITMENT DOCUMENT
NO. U05G152000
AMOUNT \$16,500.00

BY Lois P. Lara Digitally signed by Lois P. Lara
Date: 2021.10.01 13:59:24 -04'00'
Deputy Attorney General Date

BY Ann Lefevre Digitally signed by Ann Lefevre
Date: 2021.10.18 08:16:18 -04'00'
for Comptroller Operations

Prior Preapproved form:
OGC No. 18-FA-17.1
Appv'd OAG 3/5/14

READING & NORTHERN RAILROAD

1 Railroad Blvd., P.O. Box 218, Port Clinton, PA 19549

Phone: 610.562.2100

www.rbmnr.com

December 1, 2020

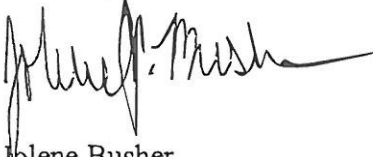
Rodney O. Rehnert
Project Manager, District Grade Crossing Administrator
PA Department of Transportation
Engineering District 5-0
1002 Hamilton Street
Allentown, PA 18101-1013

RE: 99552 SR 0080-08B FAE

Dear Mr. Rehnert,

The Reading Blue Mountain and Northern Railroad is giving a Force Account Estimate for the SR 0080 Bridge project in Luzerne County. The Preliminary Engineering \$15,000.00, Accounting, \$500.00, Misc. \$1,000. The Total is \$16,500.00.

Sincerely,



Jolene Busher
AVP Real Estate
Reading Blue Mountain and Northern Railroad
1 Railroad Blvd
Port Clinton, PA 19549

Exhibit "A" Page 1 of 1



SERVING OUR CUSTOMERS AND THE ENVIRONMENT

AUDIT CLAUSE TO BE USED IN AGREEMENTS WITH SUBRECIPIENTS RECEIVING FEDERAL AWARDS FROM THE COMMONWEALTH

The Reading Blue Mountain & Northern Railroad Company must comply with all applicable federal and state grant requirements including *The Single Audit Act Amendments of 1996*; *2 CFR Part 200 as amended*; and any other applicable law or regulation, and any amendment to such other applicable law or regulation that may be enacted or promulgated by the federal government.

If the Reading Blue Mountain & Northern Railroad Company is a local government or non-profit organization that expends \$750,000 or more in federal awards during its fiscal year, the Reading Blue Mountain & Northern Railroad Company is required to provide the appropriate single or program specific audit in accordance with the provisions outlined in *2 CFR Part 200.501*.

If the Reading Blue Mountain & Northern Railroad Company expends total federal awards of less than the threshold established by *2 CFR 200.501*, it is exempt from federal audit requirements for that year, but records must be available for review or audit by appropriate officials (or designees) of the federal agency, pass-through entity, and Government Accountability Office (GAO).

If the Reading Blue Mountain & Northern Railroad Company is a for-profit entity, it is not subject to the auditing and reporting requirements of *2 CFR Part 200, Subpart F - Audit Requirements (Subpart F)*. However, the pass-through commonwealth agency is responsible for establishing requirements, as necessary, to ensure compliance by for-profit subrecipients. The contract with the for-profit subrecipient should describe applicable compliance requirements and the for-profit subrecipient's compliance responsibility. Methods to ensure compliance for federal awards made to for-profit subrecipients may include pre award audits, monitoring during the contract and post-award audits. The post-award audits may be in the form of a financial audit in accordance with *Government Auditing Standards*, a single audit report or program-specific audit report in accordance with *Subpart F*. However, these post-award audits must be submitted directly to the affected commonwealth agency that provided the funding. Only single audit reports for local governmental and non-profit subrecipients are electronically submitted to the Federal Audit Clearinghouse.

ADDITIONAL POTENTIAL COMPONENTS OF THE SINGLE AUDIT REPORTING PACKAGE

In instances where a federal program-specific audit guide is available, the audit report package for a program-specific audit may be different and should be prepared in accordance with the appropriate audit guide, *Government Auditing Standards*, and *Subpart F*.

Exhibit B

In addition to the requirements of *Subpart F*, commonwealth agencies may require that the single audit reporting packages include additional components in the SEFA, or supplemental schedules, as identified through the respective grant agreement.

SUBMISSION OF THE AUDIT REPORT

The Reading Blue Mountain & Northern Railroad Company must submit an electronic copy of the audit report package to the Federal Audit Clearinghouse, which shall include the elements outlined in *Subpart F*.

SUBMISSION OF THE FEDERAL AUDIT CLEARINGHOUSE CONFIRMATION

The subrecipients must send a copy of the confirmation from the Federal Audit Clearinghouse to the resource account RA-BOASingleAudit@pa.gov.

AUDIT OVERSIGHT PROVISIONS.

The Reading Blue Mountain & Northern Railroad Company is responsible for obtaining the necessary audit and securing the services of a certified public accountant or independent governmental auditor.

The commonwealth reserves the right for federal and state agencies or their authorized representatives to perform additional audits of a financial or performance nature, if deemed necessary by commonwealth or federal agencies. Any such additional audit work will rely on work already performed by the Reading Blue Mountain & Northern Railroad Company's auditor and the costs for any additional work performed by the federal or state agencies will be borne by those agencies at no additional expense to the Reading Blue Mountain & Northern Railroad Company.

Audit documentation and audit reports must be retained by the Reading Blue Mountain & Northern Railroad Company's auditor for a minimum of five years from the date of issuance of the audit report, unless the Reading Blue Mountain & Northern Railroad's auditor is notified in writing by the commonwealth, the cognizant federal agency for audit, or the oversight federal agency for audit to extend the retention period. Audit documentation will be made available upon request to authorized representatives of the commonwealth, the cognizant federal agency for audit, the oversight federal agency for audit, the federal funding agency, or the GAO.

Exhibit B

Page 2 of 2

Contract Provisions – Right to Know Law

- a. The Pennsylvania Right-to-Know Law, 65 P.S. §§ 67.101-3104, (“RTKL”) applies to this Contract. For the purpose of these provisions, the term “the Commonwealth” shall refer to the contracting Commonwealth agency.
- b. If the Commonwealth needs the Contractor’s assistance in any matter arising out of the RTKL related to this Contract, it shall notify the Contractor using the legal contact information provided in this Contract. The Contractor, at any time, may designate a different contact for such purpose upon reasonable prior written notice to the Commonwealth.
- c. Upon written notification from the Commonwealth that it requires the Contractor’s assistance in responding to a request under the RTKL for information related to this Contract that may be in the Contractor’s possession, constituting, or alleged to constitute, a public record in accordance with the RTKL (“Requested Information”), the Contractor shall:
 1. Provide the Commonwealth, within ten (10) calendar days after receipt of written notification, access to, and copies of, any document or information in the Contractor’s possession arising out of this Contract that the Commonwealth reasonably believes is Requested Information and may be a public record under the RTKL; and
 2. Provide such other assistance as the Commonwealth may reasonably request, in order to comply with the RTKL with respect to this Contract.
- d. If the Contractor considers the Requested Information to include a request for a Trade Secret or Confidential Proprietary Information, as those terms are defined by the RTKL, or other information that the Contractor considers exempt from production under the RTKL, the Contractor must notify the Commonwealth and provide, within seven (7) calendar days of receiving the written notification, a written statement signed by a representative of the Contractor explaining why the requested material is exempt from public disclosure under the RTKL.
- e. The Commonwealth will rely upon the written statement from the Contractor in denying a RTKL request for the Requested Information unless the Commonwealth determines that the Requested Information is clearly not protected from disclosure under the RTKL. Should the Commonwealth determine that the Requested Information is clearly not exempt from disclosure, the Contractor shall provide the Requested Information within five (5) business days of receipt of written notification of the Commonwealth’s determination.
- f. If the Contractor fails to provide the Requested Information within the time period required by these provisions, the Contractor shall indemnify and hold the Commonwealth harmless for any damages, penalties, costs, detriment or harm that the Commonwealth may incur as a result of the Contractor’s failure, including any statutory damages assessed against the Commonwealth.

g. The Commonwealth will reimburse the Contractor for any costs associated with complying with these provisions only to the extent allowed under the fee schedule established by the Office of Open Records or as otherwise provided by the RTKL if the fee schedule is inapplicable.

h. The Contractor may file a legal challenge to any Commonwealth decision to release a record to the public with the Office of Open Records, or in the Pennsylvania Courts, however, the Contractor shall indemnify the Commonwealth for any legal expenses incurred by the Commonwealth as a result of such a challenge and shall hold the Commonwealth harmless for any damages, penalties, costs, detriment or harm that the Commonwealth may incur as a result of the Contractor's failure, including any statutory damages assessed against the Commonwealth, regardless of the outcome of such legal challenge. As between the parties, the Contractor agrees to waive all rights or remedies that may be available to it as a result of the Commonwealth's disclosure of Requested Information pursuant to the RTKL.

i. The Contractor's duties relating to the RTKL are continuing duties that survive the expiration of this Contract and shall continue as long as the Contractor has Requested Information in its possession.

SAMPLE LETTER OF AMENDMENT

Date

Railroad Name

ATTN: Contact

Address

City, State Zip

Re: Amendment (**Amendment Letter Designation**)

Agreement # (**Contract Number**)

Dear (**Mr./Ms. Name**),

In accordance with the terms of the above-referenced Agreement, the Department is willing to amend its reimbursement obligation to the Railroad by increasing the estimated cost of the services to be performed by the Railroad from (**current dollar amount**) to (**new dollar amount**), as shown in the attached Exhibit "___." This amendment will become effective once all required signatures are affixed to this document.

We are requesting your concurrence concerning the amendment of the above-referenced Agreement. If you agree to the amendment, please concur by signing below and dating where indicated. Please attach a resolution or other documentation verifying your authorization to sign this amendment.

Your response is required no later than (**Date**). Please mail your response to the following address:

PENNDOT
Attn: **Your Name**
Your Organization
Your Address

Since the date of the above-referenced Agreement, some standard provisions and accompanying exhibits have been updated; copies of these updated exhibits are attached and supersede and replace the corresponding exhibit attached to the Original Agreement. **[Remove paragraph if not applicable.]**

On behalf of the above-named Railroad, I agree to the amendment of the above-referenced Agreement. I agree to all terms and conditions included in this Agreement and all previous amendments to it, if any.

Signature  Date 3/4/21

Indicate Title: ☐ Chairman ☐ President ☐ Vice-President ☐ Commissioner

or ☒ Assistant VP Real Estate (**Indicate title**)

All terms and conditions of this Agreement and its amendments (if any) not affected by this letter of amendment remain in full force and effect.

This letter of amendment is not effective until it is signed and dated by an Authorized Representative of the Department and the Office of Comptroller Operations. The Department will forward a copy of the fully executed letter of amendment to you for your files.

Sincerely,

Pennsylvania Department of Transportation

FOR DEPARTMENT USE ONLY

Authorized Representative of the Department:

Print Name

Title

Signature

Date

Form and Legality Approval:

for Chief Counsel

Date

Comptroller Operations Approval:

Funds Commitment No. _____

Amount \$ _____

for Comptroller Operations

Date

READING & NORTHERN RAILROAD

2015 Regional Railroad of the Year

1 Railroad Blvd, P.O. Box 218, Port Clinton, PA 19549

Phone: 610.562.2100

Fax: 610.562.1920

www.READINGNORTHERN.COM

Port Clinton PA – August 28, 2019

RE: RBMN RE Project Manager – Jolene Busher


Jolene Busher as an authorized agent of Reading and Northern railroad and in name and behalf of Reading and Northern Railroad is authorized to enter into and execute agreements covering operations over Public or Private Projects with the Pennsylvania Department of Transportation (PennDOT).



Matthew A. Johnson

Vice President Asset Management

Reading and Northern Railroad



SERVING OUR CUSTOMERS AND THE ENVIRONMENT

Attachment 21

Permitted Design Variances and Exceptions

Attachment 21. Permit Design Variances and Exceptions

Design Variance

Design Variance	Desired Value	Proposed Value	Existing Value	District / Central Office / FHWA Approval
I-78 LENHARTSVILLE				
N/A	N/A	N/A	N/A	N/A
I-79 BRIDGEVILLE				
N/A	N/A	N/A	N/A	N/A
I-80 CANOE CREEK				
N/A	N/A	N/A	N/A	N/A
I-80 NESCOPECK				
N/A	N/A	N/A	N/A	N/A
I-80 NORTH FORK				
N/A	N/A	N/A	N/A	N/A
I-80 WHITE HAVEN				
N/A	N/A	N/A	N/A	N/A
I-81 SUSQUEHANNA				
Permanent Emergency Median Crossover at STA 2077+00, STA 2077+50, Insufficient Radii	33'	17'	N/A	N/A
Permanent Emergency Median Crossover at STA 2222+00, STA 2222+50, Insufficient Radii	33'	15'	15'	N/A
Permanent Emergency Median Crossover at STA 2381+20, STA 2381+20, Insufficient Radii	33'	16'	N/A	N/A
Permanent Emergency Median Crossover at STA 2452+67, Insufficient Distance to Speed Change Taper (with respect to the distance from the PA Crossover to the NY Weigh Station, Northbound)	1500'	246'	46'	N/A
Permanent Emergency Median Crossover at STA 2451+50, STA 2451+75, Insufficient Spacing of Crossover at State Line	786'	285'	85'	N/A
I-83 SOUTH BRIDGE				
N/A	N/A	N/A	N/A	N/A
I-95 GIRARD POINT				
N/A	N/A	N/A	N/A	N/A

Design Exception

Design Exception	Required Value	Proposed Value	Existing Value	District / Central Office / FHWA Approval
I-78 LENHARTSVILLE				
Ramp B Loop Horizontal Radius	134'	90'	96'	Yes
Ramp C Loop Horizontal Radius	134'	90'	96'	Yes
SR 0078 Superelevation	3.6%	3.0%	3.0%	Yes
I-79 BRIDGEVILLE				
Horizontal Curve Radius – Ramp A	R = 340' (35 MPH)	R = 310' (30 MPH)	R = 310' (30 MPH)	No – design not advanced far enough. TBD in coordination with the Development Entity
Horizontal Curve Radius – Ramp B	R = 340' (35 MPH)	R = 150' & 300' (25 MPH)	R = 150' & 310' (25 MPH)	
Horizontal Curve Radius – Ramp C	R = 340' (35 MPH)	R = 310' (25 MPH)	R = 310' (25 MPH)	
Horizontal Curve Radius – Ramp D	R = 340' (35 MPH)	R = 150' (25 MPH)	R = 150' (25 MPH)	
Acceleration Length - I-79 NB Rest Area Ramp	1230'	565'	565'	
Shoulder Width (Inside) - I-79 SB/Alpine Road Overpass	12'	4'	4'	
Vertical Clearance – I-79 SB/Alpine Road Overpass	16'-6"	16'-3"	16'-3"	
Horizontal Curve Radius - I-79 NB/Ramp E Auxiliary Lane/Prestley Road Overpass)	2,040'	1,645'	1637.02'	
I-80 CANOE CREEK				
N/A	N/A	N/A	N/A	N/A
I-80 NESCOPECK				
N/A	N/A	N/A	N/A	N/A
I-80 NORTH FORK				
N/A	N/A	N/A	N/A	N/A
I-80 WHITE HAVEN				
Stopping Sight Distance, I-80 WB	730'	510'	510'	Yes
I-81 SUSQUEHANNA				
N/A	N/A	N/A	N/A	N/A
I-83 SOUTH BRIDGE				
N/A	N/A	N/A	N/A	N/A
I-95 GIRARD POINT				
N/A	N/A	N/A	N/A	N/A

Attachment 22

Standard Special Provisions

SPECIAL PROVISIONS

Special Provision: **C113A - a00113 CHANGES TO SPECIFICATIONS: SECTION 910**

Item(s) Associated:

Header:

CHANGES TO SPECIFICATIONS: SECTION 910

Provision Body:

SECTION 910—HIGHWAY LIGHTING

- **910.2(a) Highway Lighting Material. Revise to read as follows:**

(a) Highway Lighting Material. Section 1101. Submit for approval, before purchase and at no additional cost to the Department, catalog cuts, certifications, photometric calculations, drawings, and manufacturer's specifications for all lighting material including lighting poles, luminaires, junction boxes, conduits, cables, and power supply components proposed for the project. Refer to the Project Office Manual for material information requirements.

- **910.3(a) General. Revise to read as follows:**

(a) General. Comply with local government, electric utility company, and State codes or requirements; the electrical regulations of the Department of Labor and Industry; and the construction requirements of the NEC and NESC. Cooperate with the electric utility company or agency furnishing power to the system and meet the necessary service requirements. Acquire permits as specified in Section 107.02. Furnish certificates of approval from appropriate agencies when required. Upon work completion, submit to the Department five copies of "as-built" drawings, as directed, showing the date, all changes from the indicated system made during construction, and all revised circuit diagrams. Upon receipt, "as-built" drawing copies will be supplied to the agency maintaining the system. The acceptance of drawings will not relieve Contractor responsibility for erroneous or inconsistent dimensions, notations, or omissions or for the proper installation and operation of the electrical systems.

- **910.3(p) Junction Boxes. Revise to read as follows:**

(p) Junction Boxes. Obtain acceptance of all changes in box locations before installation.

Excavate, then construct or install the box. Set each junction box on minimum 8-inch base of AASHTO No. 57 or equivalent. Backfill with suitable material and compact in lifts as specified in Section 206.3(b)4 around the junction box. Dispose of excess or unsuitable material. Top of junction boxes must be flush with surrounding surface.

If using precast junction boxes with knockouts, remove the knockouts, then tightly grout the conduit or conduit sleeves in place with nonshrink mortar.

Ground exposed metal parts of junction boxes with a minimum No. 4 AWG grounding electrode conductor and a minimum 5/8-inch by 8-foot ground rod with no more than 24 inches of exposed rod in each junction box. Connect the grounding electrode conductor to the ground rod with either an exothermic weld or with a bronze connector clamp. Connection to an adjacent system ground rod is allowable.

- **910.3(r) Galvanize Repair. Revise to read as follows:**

(r) Galvanize Repair. Repair field damage to any galvanized finishes according to ASTM A780.

- **910.3(u) Tests. Revise to read as follows:**

(u) Tests. Perform the following tests as applicable and record the test data on the test forms. Use meters that bear a certification of calibration with the past year from a recognized testing laboratory. Provide the electrical energy and furnish personnel and equipment to complete the tests. Correct any defects disclosed by the tests and then retest the corrections. Perform the tests in the presence of the Representative.

- **910.4(a) Junction Boxes. Revise to read as follows:**

(a) Junction Boxes. Each, for the type indicated.

The price includes the ground wire, ground rod, ground clamp, bedding, and necessary excavation and backfill.

Project Specific Details:

Special Provision: **C114A - a00114 CHANGES TO SPECIFICATIONS: SECTION 954**

Item(s) Associated:

Header:

CHANGES TO SPECIFICATIONS: SECTION 954

Provision Body:

SECTION 954—ELECTRICAL DISTRIBUTION

- **954.2(b) Conduit. Revise to read as follows:**

(b) Conduit.

1. Rigid Steel Conduit. Section 1101.09, except may be used for direct burial, and UL-6 Listing for rigid metallic conduit, galvanized inside and outside.

2. Rigid Polyvinyl Chloride Conduit. Section 1101.09 with UL-651 Listing for rigid nonmetallic conduit, and UL-514 Listing for fittings.

3. Cable Pulling Lubricant. Section 1101.13(c).

4. Conduit Sealant. Electrical putty or approved sealant as recommended by the signal cable or conduit manufacturer.

5. Stainless Steel Wool. Grade 3 or 4 stainless steel wool.

6. Fiber Optic Microduct.

- High-Density Polyethylene (HDPE). HDPE 3-way factory bundled microduct with a polyethylene oversheath. Each microduct is to be smooth on the outside, micro-ribbed on the inside, and have a co-extruded permanent lubrication layer.
- Microduct oversheath is to be orange. Inner microduct colors are to be green, orange, and blue.
- Microduct sizes are referenced using an outer dimension or inner dimension. The 3-way microduct must meet or exceed the 27 mm outer dimension or 20 mm inner dimension.

7. Fiber Optic Conduit

- HDPE SDR11 1 1/4 inch inner dimension. Reels can be separate or combined onto a single reel.
- Colors of the HDPE are to be green, orange, and blue.

- **954.2(k) Service Receptacle. Revise to read as follows:**

(k) Service Receptacle. Provide one duplex Ground Fault Circuit Interrupter (GFCI) receptacle that is only used by service technicians working on the signal controller system. No other internal equipment is to be connected to the service receptacle. Minimum rating 20A.

- **954.2(l) Other Material. Revise to read as follows:**

(l) Other Material.

- Fine Aggregate, Type A or Type B Section 703.1
- High Early Strength Cement Concrete—Section 704
- Asphalt Material. Asphalt Cement, Class PG 64S-22, as specified in Section 702

- **954.3(a) Trench Excavation and Backfill. Revise to read as follows:**

(a) Trench Excavation and Backfill. Excavate and backfill as specified in Section 910.3(a).

Excavate for conduit runs parallel to the roadway, or as indicated.

Install microducts under roadway pavement and paved shoulders. Use directional boring for the installation of microducts when crossing under roadway pavement, unless indicated otherwise on plans.

Place a detectable underground warning tape within the last layer of backfill material for the entire length of the trench.

1. Conduit Trench and Backfill. Cut existing pavement only if indicated. If applicable for Type II trench and backfill, require full slab sidewalk replacement as specified in Section 676.3.

Restore existing pavement. For flexible pavement, use asphalt material of a type equal to the existing pavement, as determined by the Representative. For rigid pavement, use High Early Strength Cement Concrete as specified in Section 704.1 and installed as specified in Section 516.

2. Microduct Trench and Backfill. Neatly cut existing pavement to create a vertical face for the full depth of the pavement.

Excavate microduct trench to a depth that provides 15 inches of cover over the microducts. Excavate trench width to maintain a one-half inch clearance between the trench walls and the bundled microducts.

Provide a one-inch Type A or Type B Fine Aggregate bedding for the microducts. Cover microducts with nine-inches of Type A or Type B Fine Aggregate and backfill the remainder of the trench with suitable material. Use no rock or coarse aggregate for trench backfill. Compact backfill material for the full trench width, as specified in Section 206.3(b) for the specific material type placed.

Restore shoulders or roadways to original grades, cross slope, shoulder type and pavement type according to Department specifications. For flexible pavement, use asphalt material of a type equal to the existing pavement, as determined by the Representative. Seal the asphalt surface course joints resulting from the microduct trench with hot PG 64S-22 asphalt binder. For rigid pavement, use High Early Strength Cement Concrete as specified in Section 704.1.

• **954.3(c) Conduit. Revise to read as follows:**

(c) Conduit. Install as specified in Section 910.3(g), 1204.3(a), 1204.3(b), and as follows:

If allowed by the Representative, indicated conduit runs may be changed to avoid underground obstructions.

Install conduit as indicated. Install high-impact, plastic spacers a maximum of 8 feet on center, if more than two rigid, nonmetallic conduits are to be installed in a common trench.

Install conduit into a junction box using a knock-out hole or by cutting a circular hole ¼ inch larger than the outside diameter of the conduit. Drill holes approximately 10 to 18 inches above the bottom of the junction box. Field drilled holes must not cut into structural reinforcement, reinforcing rib, corner of the box, or box lip to avoid damaging structural integrity.

If the conduit installation into a junction box creates tension stress on the installation of the fiber optic cable, install the conduit through the open bottom of the junction box as an alternative to the preferred side entry method.

All conduit entering the bottom of the junction box must extend a minimum of 12 inches above the gravel base. Seal knock-out holes after installation of conduit.

Submit As-Built drawings to the Representative in the file format requested by the Department prior to the start of construction.

Make all conduit couplings in a junction box meeting ANSI Tier 22 load ratings and minimum 17 inches by 24 inches x 36 inches dimensions.

Install the conduit in such a way the manufacturer's minimum bending radius and force limitations are not violated before, during, or after installation. Minimum conduit bend radius is calculated at 20 times the diameter of conduit.

Perform acceptance testing between pull points or at all transition points.

Before fiber optic cable installation, verify duct integrity to discover any missing sections, improper couplings, kinks, or blockage in the ducts. Use sponge testing to clean out water and debris. Repair, replace, or clean duct to ensure cable installation meets or exceeds manufacturer's guidelines.

After installing all related cables, seal all conduits within junction boxes and foundations, including all spare or abandoned conduits, with electrical putty or an approved sealant as recommended by the cable or conduit manufacturer. Insert grade 3 or 4 stainless steel wool at a minimum of 2 inches in the conduit before the sealant.

When installing conduit to an existing foundation, do not compromise the integrity of the foundation. Restore any concrete loss to the foundation. Exposed conduit accessing an existing foundation shall be rigid metal as specified in Section 954.2(b)1.

1. Conduit for Fiber Optic Cable. Install conduit for fiber optic cable parallel to the roadway at a depth between 36 inches and 48 inches. Install under highways and commercial driveways at a minimum depth of 60 inches and under residential streets at a depth between 36 inches and 48 inches.

Install conduit as indicated. Maintain at least a 12-inch separation between conduit and other perpendicular underground utilities. Maintain a minimum 18-inch separation in all directions for a parallel installation with existing utilities.

Pull strength of the conduit is calculated at 80 percent of tensile or breaking strength which for a HDPE SDR11 1 1/4 inch conduit is approximately 1,700 pounds.

2. Microducts.

Each microduct will have a ½ inch wide pull line with a minimum pull strength of 1,250 pounds. Pull line made of polyester or similar material and have sequential footage markings.

Perform separate pressure testing on each individual microduct. Each microduct must maintain 100 pounds per square inch for a period of 1 minute with a minimum of 5 percent pressure drop allowed. Record and deliver to the Representative each test result upon completion and before installing cable.

Complete proof testing of each microduct from pull point to pull point and all transitions. Each microduct must be proofed with an appropriately sized proofing ball to ensure that a minimum of 80 percent of the published inner dimension is maintained.

- **954.4 MEASUREMENT AND PAYMENT. Revise to read as follows:**

954.4 MEASUREMENT AND PAYMENT—Sections 1104.05, 1204.4 and as follows:

(a) Conduit. Linear Foot

For the type indicated.

(b) Trench and Backfill. Linear Foot

For the type indicated.

(c) Microduct Trench and Backfill. Linear Foot

For the type indicated

(d) Directional Boring. Linear Foot

For the type indicated.

(e) Signal Cable. Linear Foot

The unit price includes cable, identification tags, and cable lashing.

(f) Junction Box. Each

For the type indicated.

(g) Electrical Service. Each

For the type indicated.

The price includes service pole, service head, meter socket, service disconnect, power line surge protector, exposed conduit, conduit fittings, service wire, generator adaptor kit, ground rod, and ground wire.

(h) Signal Controller Cabinet. Each

For the type indicated.

The price includes enclosure, internal cabinet power supply system, generator adaptor kit, terminal blocks, mounting hardware, breakers, fuse holders, internal wiring, equipment and communication surge protection, displays, programming hardware, relays, receptacles, light, and heater.

(i) Uninterruptible Power Supply (UPS). Each

(j) Cement Concrete Sidewalks. Section 676.4

Project Specific Details:

Special Provision: **C115A - a00115 CHANGES TO SPECIFICATIONS: SECTION 1101**

Item(s) Associated:

Header:

CHANGES TO SPECIFICATIONS: SECTION 1101

Provision Body:

SECTION 1101—HIGHWAY LIGHTING

- **1101.10(a) Junction Boxes. Revise to read as follows:**

(a) Junction Boxes. Furnish as shown on the Standard Drawings for the type indicated, and as follows:

- **Concrete Junction Boxes.** Provide cast-in-place boxes made from Class A cement concrete as specified in Section 704; or provide precast boxes as specified in Section 714. Provide frames as specified in Section 605. Refer to Standard Drawings RC-81M and RC-82M for details of junction boxes JB-1, 2, 11, and 12.
- **Cast iron or Welded Steel Plate Junction Boxes.** Provide boxes as specified in Section 605. Provide boxes hot-dipped galvanized as specified in Section 1105.02(s) and according to ASTM A123 after fabrication. Provide a cover with a closed cell neoprene gasket with screws to secure cover. Provide a factory installed grounding stud and hex nut in rear of the box, as applicable. Refer to Standard Drawing BC-721M for junction box JB-25 details.
- **Polymer Concrete.** Provide boxes according to ANSI Tier 22. Provide lid according to ANSI Tier 22.

Project Specific Details:

Special Provision: **C116A - a00116 CHANGES TO SPECIFICATIONS: SECTION 1204**

Item(s) Associated:

Header:

CHANGES TO SPECIFICATIONS: SECTION 1204

Provision Body:

SECTION 1204—ITS COMMUNICATIONS

- **1204.2(a) Micro-Fiber Optic Cable. Revise to read as follows:**

(a) Micro-Fiber Optic Cable. Provide a fiber optic cable meeting the following:

1. Fiber Optic Distribution Cable.

- Single-mode fiber.
- Mini Loose tubes.
- Dielectric central member.
- Outer Jacket, High-Density Polyethylene (HDPE). HDPE 3-way factory bundled microduct with a polyethylene oversheath. Each microduct is to be smooth on the outside, micro-ribbed on the inside, and have a co-extruded permanent lubrication layer.
- Meets Bellcore TR-TSY-000020, REA PE-90 and ANSI/ICEA S-87-640 according to ANSI/TIA/EIA-568A Commercial Building Telecommunications Cabling Standard.
- Reverse oscillation buffer tube stranding.
- Footage markings printed every 2 feet along outer jacket.
- Attenuation at 1310/1550 nm: 0.35/0.25 dB/km (maximum attenuation for every fiber in cable across entire operating temperature range).
- Operating temperature range: -40F to 158F
- Maximum Nominal Outside Diameter - 6.2 mm.
- Microduct oversheath is to be orange. Inner microduct colors are to be green, orange, and blue.
- Microduct sizes are referenced using an outer dimension or inner dimension. The 3-way microduct must meet or exceed the 27 mm outer dimension or 20 mm inner dimension.

2. Fiber Optic Termination Cable.

- Single-mode fiber.
- Loose tube cable.
- Dielectric central member.
- Medium density polyethylene cable jacket.
- Meets Bellcore TR-TSY-000020, REA PE-90 and ANSI/ICEA S-87-640 according to ANSI/TIA/EIA-568A Commercial Building Telecommunications Cabling Standard.
- Reverse oscillation buffer tube stranding.
- Footage markings printed every 2 feet along outer jacket.
- Attenuation at 1310/1550 nm: 0.35/0.25 dB/km (maximum attenuation for every fiber in cable across entire operating temperature range).
- Operating temperature range: -40F to 158F
- Maximum Nominal Outside Diameter - 10.5 mm.

- **1204.2(b) Standard Fiber Optic Cable. Revise to read as follows:**

(b) Standard Fiber Optic Cable. Provide a fiber optic cable meeting the following:

1. Fiber Optic Cable.

- Single-mode fiber.
- Loose tube cable.
- Dielectric central member.
- Medium density polyethylene cable jacket. HDPE SDR11 1 1/4 inch inner dimension. Reels can be separate or combined onto a single reel.
- Meets Bellcore TR-TSY 000020, REA PE-90 and ANSI/ICEA S-87-640 according to ANSI/TIA/EIA 568A Commercial Building Telecommunications Cabling Standard.
- Reverse oscillation buffer tube stranding.
- Footage markings printed every 2 feet along outer jacket.
- Attenuation at 1310/1550 nm: 0.35/0.25 dB/km (maximum attenuation for every fiber in cable across entire operating temperature range).
- Operating temperature range: -40F to 158F
- Colors of the HDPE are to be green, orange, and blue.

2. Tracer Wire. Provide a single 24 AWG (minimum) THHN copper cable. The tracer wire is only required for underground installations.

- **1204.2(c)3 Radio Interface.** Revise to read as follows:

3. Radio Interface.

- EIRP: Up to +36dBm for point to multipoint deployments, +49 dBm for point to point deployments
- RF Output: +30dBm rated transmitter.
- Operating Frequency: 5180 MHz - 5825 MHz.
- Bandwidths: 10, 20, 40, and 80 MHz.
- Receive Sensitivity: Up to 500 Mbps.
- Distance: Up to 2 miles (FCC Class A, Part 15 compliant).
- Distance: Up to 4 miles with MAC lock enabled (FCC Class A, Part 15 compliant).

- **1204.2(c)5 Enclosure.** Revise to read as follows:

5. Enclosure.

- Cast aluminum NEMA-4X/IP67 enclosure.
- Two weatherproof Ethernet connectors.
- System LEDs (Power-On, Ethernet Link, Signal Strength).
- Weight: 5.5 pounds with bracket and sunshield.
- Dimensions: No Larger than 12 inch by 12 inch by 3 inch.
- Pole Mounting Assembly.

- **1204.2(c)7 Environmental Specifications.** Revise to read as follows:

7. Environmental Specifications.

- Operating temperature: -40F to 158F
- Storage temperature: -40F to 185F
- Relative humidity (non-condensing): 5% to 95%.

- **1204.2(d)5 Enclosure.** Revise to read as follows:

5. Enclosure.

- Cast aluminum NEMA-4X/IP67 enclosure.

- Three weatherproof Ethernet connectors.
- System LEDs (Power-On, Ethernet Link, Signal Strength).
- Weight: 23.15 pounds with mounting bracket.
- Dimensions: No Larger than 12 inch by 12 inch by 3 inch.
- Pole Mounting Assembly.

- **1204.2(d)7 Environmental Specifications.** Revise to read as follows:

7. Environmental Specifications.

- Operating temperature: -40F to 131F
- Relative humidity (non-condensing): 5% to 95%.

- **1204.2(e) Cellular Modem.** Revise to read as follows:

(e) Cellular Modem - Provide an Industrial grade 4G/LTE Private IP Cellular modem, cabling, antenna and connectors to provide a fully functioning cellular data connection. Provide a modem that is compatible with existing District modems, existing SIM cards, spare parts, and District Inventory and meeting or exceeding the following requirements:

1. Security:

- IPsec VPN
- GRE Tunnel
- Friends List

2. Network Technology:

- HSUPA
- With fallback to: HSDPA, UMTS, EDGE, GPRS (MS-12)
- Tri-Band UMTS/HSDPA/HSUPA, 850/1900/2100 MHz
- Quad-Band GPRS/EDGE, 850/900/1800/1900 MHz
- EV-DO Rev A or later with fallback to: CDMA 1x EV-DO Revision 0, CDMA 1xRTT, CDMA IS-95

3. Radio Interface:

- Operating Frequency: 700/800 MHz Cellular, 1900 MHz PCS
- FCC Approved
- PCS Type Certification Review Board (PTCRB)
- Carrier Specific Approvals.

4. Environmental Specifications.

- Operating temperature: -40F to 158F
- Storage Temperature: -40F to 185F
- Vibration/Shock: MIL-STD-810G
- ROHS Compliant

5. Electrical Specifications.

- Input Voltage: (9-28V DC)

6. Maximum Device Dimensions.

- Size: 5.6 inch by 1.5 inch by 4.0 inch

7. Host Interfaces

- Ethernet: 10/100 Mbps RJ-45

- RS-232: DB9 DCE (300 – 230400 baud)
- Antenna Connection: Primary 50 Ohm SMA, Rx Diversity 50 Ohm SMA

8. Application Interfaces

- TCP/IP
- UDP/IP
- DHCP
- HTTP
- SNMP
- SMTP
- SMS
- MSCI
- Modbus
- Binary

9. LED Indicators

- Network
- Signal
- Activity
- Service

10. Provide OMNI Directional antenna as follows:

- Support a cellular frequency of 698-960 MHz and 1710-2170 MHz PCS frequency band as well as all 3G and 4G/LTE frequencies used in the United States.
- Max Impedance: 50 Ohms
- Gain: 6 dBd or greater
- Power: 50W
- Vertical Polarization
- Connector: N/Female

Provide necessary low loss N/Female to N/Female connectors. Utilize ultra-low loss coaxial cable for connection between antenna and modem. Provide cable with dB loss less than 1.9 dB and diameter of 7/16 inches. Provide cable length as required to eliminate any cable splicing and eliminate any excess cable to make the length as short as possible.

Provide necessary additional ancillary equipment, hardware and cabling to integrate new modem into the District's communications network.

Modem shall be compatible with the use of an existing SIM card currently in use by the District. Modem shall auto configure based on the installed SIM. See contact information in the project documents for SIM card.

- **1204.3(a) Micro-Fiber Optic Cable.** Revise to read as follows:

(a) Micro-Fiber Optic Cable. Install fiber optic cable in new conduit/inner duct as indicated. Use appropriate installation techniques so the optical and mechanical characteristics of the cable are not degraded. Unless otherwise approved, use only the equipment and procedures specified by the manufacturer of the fiber optic cable. Install the cable in such a way the manufacturer's minimum bending radius and force limitations are not violated before, during, or after installation.

Before any fiber optic cable installation is performed, provide the Representative with four copies of the cable manufacturer's recommended installation plan and equipment set up locations and maximum force limitations for each cable size and type. The installation system to be used is to be inspected and approved by the Representative. Provide a list of the minimum allowable cable bending radius and cable manufacturer's approved pulling lubricants and guidelines for their application. Only these lubricants are allowed.

Before installation, verify duct integrity to discover any missing sections, improper couplings, kinks or blockage in the ducts. Use air pressure to test duct connectivity. Use mandrel testing to verify duct path integrity. Use sponge testing to clean out water and debris. Repair, replace or clean duct to ensure cable installation meets or exceeds manufacturer's guidelines.

Establish adequate voice communications between the blower units and receiving end and all intermediate locations. Set up the cable reels on the same side of the junction box as the conduit section in which the cable is to be placed. Make the reel level and bring it

into proper alignment with the conduit section so the cable will pass from the top of the reel in a long smooth bend into the duct without twisting. Do not pay off the cable from the bottom of the reel. Feed the cable by manually rotating the wheel.

Install the cable in the duct with a factory installed cable grip and swivel attached to the air carrier unit to prevent twisting during the installation. Use an approved cable feeder guide between the cable reel or storage stack and the face of the duct to protect the cable, and to guide the cable into the duct as it is payed off the reel or from the storage stack. The dimensions and set-up of the feeder guide are to be such that the cable does not bend at any location to a radius less than the cable's minimum allowable bending radius. Do not exceed this minimum-bending radius at any time during cable installation.

Keep cable ends sealed at all times during installation, using an approved cable end cap. Do not use tape to seal the cable end. Keep the cable end sealed until termination takes place. Provide a minimum of 50 feet of slack for cables that are not immediately terminated.

Ensure the blower tractor unit is not allowed to continue to operate if cable motion stops. As the cable reaches any intermediate locations, make sure it is routed properly. Ensure no sharp bends exist that are less than the cable's minimum bend radius. Apply lubricant as required. When the cable reaches the end point, stop the blower and blower tractor according to the blower manufacturer's recommendations. Break down blower units according to the manufacturer's recommendations.

Use an approved lubricant, if needed, in the amount recommended by the cable manufacturer, to facilitate pulling the cable. Lubricate the cable as it is payed off the cable reel or storage stack into the cable feeder. Place an approved cable lubricator (funnel) around the cable just ahead of the cable feeder to facilitate proper lubrication of the cable. After the cable has been installed, wipe the exposed cable in a junction box or cabinet clean of cable lubricant with a cloth before leaving the junction box or cabinet.

Take every precaution to ensure the cable is not damaged during storage and installation. Do not allow workers to step on the cable or run it over with any vehicle or equipment. Do not pull the cable along the ground, over edges or corners, over or around obstructions, or through unnecessary curves or bends. Use approved cable guides, feeders, shoes, and bushings to prevent damage to the cable during installation. Replace and reinstall all damaged cables at no additional cost to the Department.

Use micro conduit for fiber optic backbone installations with limited or no right-of-way. Place conduit for interstate and limited access roads alongside the outside asphalt shoulder within right-of-way. Alternative placement can be in the median provided enough right-of-way exists to not interfere with opposing vehicular traffic in a multilane divided highway without special traffic control provisions. Install conduit in continuous intervals with maximum distance of 1,100 feet between junction boxes. Place junction boxes at every crossroad for future lateral construction. Place junction boxes at all 90-degree horizontal bends. Place junction boxes within 8 feet of all transition points.

Use micro conduit for fiber optic laterals installed with limited or no right-of-way. Install conduit in continuous intervals with maximum distance of 500 feet between junction boxes. Place junction boxes at all 90-degree horizontal bends. Place junction boxes within 8 feet of all transition points.

Install cable into orange duct for ITS applications.

Cable runs are to be continuous between allowable termination points in equipment cabinets and multiplexer nodes. Carefully determine the length of cable necessary to reach from termination point to termination point. Do not splice fiber optic cable in conduit or junction boxes.

Cable may be furnished and installed through an intermediate junction box if approved. Intermediate junction boxes will be considered part of cable installation, and no separate payment will be made for this work.

Install the necessary length of cable from one equipment cabinet or multiplexing node to the immediate next downstream equipment cabinet or multiplexing node. Carefully store the remaining length of cable to be installed in the next conduit in a manner that is not hazardous to pedestrian or vehicular traffic yet ensures no damage to the cable occurs. Store the cable in a manner that allows that length of cable to be safely pulled into the next conduit and is approved.

In junction boxes, store 50 feet of slack fiber optic cable for the distribution fiber and 20 feet of slack fiber for the termination fiber spur that passes through the junction box. In addition, provide 50 feet of slack fiber for all fiber types at a junction box adjacent to an equipment field device cabinet. Neatly store slack cable on the side walls of the junction box using racking hardware approved. Optical fibers must be placed inside loose buffer tubes. Each buffer tube must contain 12 fibers. The fibers must not adhere to the buffer tubes.

No separate payment will be made for equipment used to install, terminate and test the fiber optic cable. The unit price for fiber optic cable includes all cable ties, clamps, associated material, and labor required to install the cable.

The firm or subcontractor involved in the installation of the fiber optic cable must meet the requirements of Section 102.01.

• **1204.3(b) Standard Fiber Optic Cable.** Revise to read as follows:

(b) Standard Fiber Optic Cable. Install fiber optic cable in new conduit as indicated. Use appropriate installation techniques so the optical and mechanical characteristics of the cable are not degraded. Unless otherwise approved, use only the equipment and procedures specified by the manufacturer of the fiber optic cable. Install the cable in such a way neither the minimum bending radius nor the maximum pulling tension are violated before, during, or after installation.

Before any fiber optic cable installation is performed, provide the Representative with four copies of the cable manufacturer's recommended and maximum pulling tensions for each cable size and type. These pulling tensions are to be specified for pulling from the cable's outer jacket. Also provide a list of the minimum allowable cable bending radius and the cable manufacturer's approved pulling lubricants and guidelines for their application. Only these lubricants are allowed.

The installation system to be used is to be inspected and approved by the Representative.

Establish adequate voice communications between the cable feeding location and the cable pulling equipment before starting any pulling operations. Set up the cable reels on the same side of the junction box as the conduit section in which the cable is to be placed. Make the reel level and bring it into proper alignment with the conduit section so the cable will pass from the top of the reel in a long smooth bend into the duct without twisting. Do not pull the cable from the bottom of the reel. Feed the cable by manually rotating the wheel.

Pull the cable in the conduit with a cable grip designed to provide a firm hold on the exterior covering of the cable. Use an approved cable feeder guide between the cable reel or storage stack and the face of the duct to protect the cable, and to guide the cable into the duct as it is payed off the reel or from the storage stack. The dimensions and set-up of the feeder guide are to be such that the cable does not bend at any location to a radius less than the cable's minimum allowable bending radius. Do not exceed this minimum-bending radius at any time during cable installation.

Keep cable ends sealed at all times during installation, using an approved cable end cap. Do not use tape to seal the cable end. Keep the cable end sealed until termination takes place. Provide a minimum of 50 feet of slack for cables that are not immediately terminated.

At any time, the allowable pulling tension is to be 70% of the manufacturer's maximum pulling tension for pulling by the outer jacket. Ensure the allowable pulling tension is not exceeded at any time during cable installation by using one of the following methods, as approved:

- Pulling the cable by hand.
- Approved mechanical means.

If the cable is pulled by mechanical means, use a clutch device to ensure the allowable pulling tension is not exceeded. Also, attach a strain gauge to the pulling line at the cable exit location, and at a sufficient distance from the take-up device, so the strain gauge can be read throughout the entire cable pulling operation.

Use an approved lubricant if needed, in the amount recommended by the cable manufacturer, to facilitate pulling the cable. Lubricate the cable as it is payed off the cable reel or storage stack into the cable feeder. Place an approved cable lubricator (funnel) around the cable just ahead of the cable feeder to facilitate proper lubrication of the cable. After the cable has been installed, wipe the exposed cable in a junction box or cabinet clean of cable lubricant with a cloth before leaving the junction box or cabinet.

Take every precaution to ensure the cable is not damaged during storage and installation. Do not allow workers to step on the cable or run it over with any vehicle or equipment. Do not pull the cable along the ground, over edges or corners, over or around obstructions, or through unnecessary curves or bends. Use approved cable guides, feeders, shoes, and bushings to prevent damage to the cable during installation. Replace and reinstall all damaged cables at no additional cost to the Department.

Install conduit for fiber optic backbone. Place conduit for interstate and limited access roads along the shoulder right-of-way to limit interference of vehicular traffic. Alternative placement can be in the median provided enough right-of-way exists to not interfere with opposing vehicular traffic in a multilane divided highway without special traffic control provisions. Install conduit in continuous intervals with maximum distance of 1,100 feet between junction boxes. Place junction boxes at every crossroad for future lateral construction. Place junction boxes at all 90-degree horizontal bends. Place junction boxes within 8 feet of all transition points.

Install conduit for lateral fiber optic cable in continuous intervals with maximum distance of 500 feet between junction boxes. Place junction boxes at all 90-degree horizontal bends. Place junction boxes within 8 feet of all transition points.

Install cable into orange duct for ITS applications.

Cable runs are to be continuous between allowable termination points in equipment cabinets and multiplexer nodes. Carefully determine the length of cable necessary to reach from termination point to termination point. Do not splice fiber optic cable in conduit or junction boxes.

Cable may be furnished, installed, and pulled through an intermediate junction box if approved. Intermediate junction boxes will be considered part of cable installation, and no separate payment will be made for this work.

Pull the necessary length of cable to be installed from one equipment cabinet or multiplexing node to the immediate next downstream equipment cabinet or multiplexing node. Carefully store the remaining length of cable to be installed in the next conduit in a manner that is not hazardous to pedestrian or vehicular traffic yet ensures no damage to the cable occurs. Store the cable in a manner that allows that length of cable to be safely pulled into the next conduit and is approved.

In junction boxes, store 50 feet of slack fiber optic cable for the distribution fiber and 20 feet of slack fiber for the termination fiber spur that passes through the junction box. In addition, provide 50 feet of slack fiber for all fiber types at a junction box adjacent to an equipment field device cabinet. Neatly store slack cable on the side walls of the junction box using approved racking hardware.

No separate payment will be made for equipment used to install, terminate and test the fiber optic cable. The unit price for fiber optic cable includes all cable ties, clamps, associated material, and labor required to install the cable.

The firm or subcontractor involved in the installation of the fiber optic cable must meet the requirements of Section 102.01.

Project Specific Details:

Special Provision: **C117A - a00117 CHANGES TO SPECIFICATIONS: SECTION 314**

Item(s) Associated:

Header:

CHANGES TO SPECIFICATIONS: SECTION 314

Provision Body:

SECTION 314—SUPERPAVE ASPHALT MIXTURE DESIGN, STANDARD CONSTRUCTION, ASPHALT RICH BASE COURSE

314.1 DESCRIPTION—This work is the standard construction of a plant-mixed asphalt rich base course (ARBC) on a prepared surface using a volumetric mixture design developed with the Superpave Gyratory Compactor (SGC) using prescribed manufactured additives, or plant process modifications or both.

314.2 MATERIAL—Section 413.2 with the following modifications:

(c) Recycled Asphalt Material. Section 413.2(c) with the following modifications and additions:

1. RAP. Add the following: Do not exceed 20 percent by weight RAP content in ARBC mixtures.

2. Manufacturer Waste Recycled Asphalt Shingles (RAS). Add the following: Do not use RAS material in ARBC mixtures.

(e) Mixture Composition for Standard and RPS Construction. Section 413.2(e) with the following modifications and additions:

1. Virgin Material Mixtures. Size, uniformly grade, and combine aggregate fractions, asphalt binder, and either WMA Technology additive(s) or modifier(s) in proportions to produce a JMF that conforms to the material, gradation, and volumetric Superpave Asphalt Mixture Design requirements according to Bulletin 27, except as modified in Table A1. Produce an asphalt mixture for the indicated nominal maximum aggregate size (NMAS) and design ESALs except as procedurally modified by the WMA Technology Manufacturer Technical Representative to address laboratory procedures when preparing, compacting and testing asphalt mixtures to achieve a uniform blend. Special additive(s) or modifier(s) need not be used if mixture temperature, workability, and compaction can be achieved solely through plant mechanical modification to produce foamed asphalt. Do not incorporate the WMA Technology additive, modifier or process during the volumetric asphalt mixture design process, so that the JMF volumetrics and material percentages are based on a mixture with no WMA Technology. Only use the WMA Technology additive, modifier or process to evaluate results from moisture susceptibility testing during the mix design process. Develop an asphalt mixture JMF, then incorporate the WMA Technology additive, modifier, or process into that JMF during production. Create an asphalt JMF cover sheet (Form TR-448A) for approval containing the WMA Technology used, additive dosage rate or percent water added for foaming, material code, and the TSR data from the moisture susceptibility testing. Submit a copy of each completed JMF, signed by a certified Asphalt Level 2 plant technician, to the DME/DMM at least 3 weeks before the planned start of mixture production. Include a list of all material sources and the asphalt mixture producer in the JMF. Provide the calibration factors (C_1 and 200 C_2) according to PTM No. 757 with the JMF. Do not start mixture production until after the DME/DMM reviews the JMF.

TABLE 1
Mix Design Requirements for Asphalt Rich Base Courses

Volumetric Mix Design Property	25 mm NMAS
Design Gyrations (N_{design}) for All Ranges of Design ESALs	50
Design Air Voids (V_a) for All Specified Ranges of Design ESALs (Percent)	2.5
Voids in Mineral Aggregate (VMA) Minimum for All Specified Design ESALs and Production QC Samples (Percent)	13.0
Voids Filled with Asphalt (VFA) for All Ranges of Design ESALs (Percent)	80 - 85

314.3 CONSTRUCTION—Section 413.3 as specified for standard construction and with additions and modifications as follows:

(b) Weather Limitations. Section 413.3(b). Replace with the following:

Do not place ARBC on prepared surfaces that are wet or if the temperature of the air or the prepared surface is 35F or lower. If work is halted because of weather conditions, the Representative may allow the Contractor to place limited quantities of ARBC that are en route to the project.

(h) Spreading and Finishing. Revise as follows:

1.b Spreading and Finishing. Add the following:

Place the indicated compacted depth of ARBC in one layer not less than 3 inches or more than 6 inches.

(j) Mat Density acceptance. Add the following:

Accept ARBC by Optimum-Rolling Pattern as specified in Section 413.3(j)3.

(l) Surface Tolerance. Replace the requirement for defective pavement with the following:

The pavement is defective if irregularities are more than 1/4-inch.

(m) Tests for Depth. Replace with the following:

Control the loose depth of each layer to construct the ARBC to the compacted depth indicated and within the specified tolerance. In the presence of the Inspector, drill full-depth cores at one random location selected by the Inspector according to PTM No. 1 in each 3,000 square yards of completed ARBC and at other locations the Inspector suspects are deficient.

The Inspector will measure the depth of the full-depth cores according to PTM No. 737. Pavement deficient in depth by 1/2 inch or more and that cannot be satisfactorily corrected is defective. After the Inspector completes depth measurements, backfill, compact, and seal core holes with the mixture used to construct the course. Immediately start correcting courses or pavement that are deficient in depth at the core location and proceed longitudinally and transversely until the depth is less than 1/2 inch deficient of the design depth.

314.4 MEASUREMENT AND PAYMENT—Section 413.4(a), with modifications as follows:

(a) Asphalt Mixtures (Standard). Revise as follows:

1. Asphalt Courses. Add the following:

1.f Superpave Asphalt Mixture Design, Asphalt Rich Base Course. Square Yard or Ton

Project Specific Details:

Special Provision: **C118A - a00118 CHANGES TO SPECIFICATIONS: SECTION 1047**

Item(s) Associated:

Header:

CHANGES TO SPECIFICATIONS: SECTION 1047

Provision Body:

SECTION 1047 – POLYESTER POLYMER CONCRETE (PPC) OVERLAY

- Section 1047.3(b)1.c.2 **Placement Schedule**, revised to read:

1.c.2 Placement Schedule.

- Provide schedule for each structure receiving overlay.
- Provide placement sequence for each structure. Include paving lengths, widths, directions, and phase joint locations. Cold joints between passes must be within 6 inches of the indicated line striping or centered within a lane. Limit joints as much as practical. Do not add joints, other than those indicated, unless approved.

Project Specific Details:

Special Provision: **C119A - a00119 CHANGES TO SPECIFICATIONS: SECTION 110**

Item(s) Associated:

Header:

CHANGES TO SPECIFICATIONS: SECTION 110

Provision Body:

SECTION 110 – PAYMENT

- Section 110.03(d)3.a **Owned Equipment**, revised to read:

3.a Owned Equipment. The term “owned equipment”, as used herein, applies to equipment (including trucks and machinery) that the Contractor is required to provide for the proper execution of the original contract work, as specified in Section 108.05(c), whether such equipment is actually owned by the Contractor, is leased (rented), or has been obtained in some other manner.

For any owned equipment used in the performance of force account work, a rental rate will be determined using data obtained from the Rental Rate Blue Book (aka. EquipmentWatch Cost Recovery), which is published by EquipmentWatch, a division of Penton, Inc. Blue Book published data considered “current” as of the first day that work is performed on a specific force account is the data that will remain applicable throughout the performance of such work even if Blue Book data for an applicable piece of owned equipment is updated during that time. Outdated Blue Book data will be voided by the Department annually, as of a specific date, and no longer accepted thereafter.

The Department utilizes ECMS to keep electronic records of force account work. To enable the Department to electronically account for owned equipment utilized by Contractors and subcontractors in the performance of force account work within ECMS, the following actions must be taken:

- Purchase a subscription to all necessary volumes of the Blue Book, in electronic format, based on the various ages of the pieces in the Contractor’s equipment inventory for Department projects,
- Utilize the All Saved Models tool available to subscribers to create a Department project equipment inventory,
- From the equipment included in the All Saved Models inventory, create an equipment Group,
- Use the Group Manager tool to select the applicable equipment Group and generate a Basic Fleet Report (i.e. the report that lists the ID, subtype, manufacturer, model, year, serial number, and configuration, as applicable, for each piece of equipment in the Group),
- Using the available “CSV” button, export the Basic Fleet Report to a spreadsheet and save the spreadsheet in a .csv (Comma Separated Values) file format. Note: Do not use the available “PDF” button to export the Basic Fleet Report as ECMS will not allow a spreadsheet saved in .pdf format to be imported.
- At this point, if the Contractor or subcontractor’s owned equipment inventory includes any pieces that are not listed in the Blue Book, such equipment must be added to the spreadsheet. When adding equipment with no Blue Book listing to the spreadsheet, care should be taken to ensure that applicable information relating to ID, subtype, manufacturer, model, year, serial number, and configuration, as it is entered, is consistent with the existing column headings.
- Log in to ECMS and import the .csv file using the “Import Equipment” hyperlink found on the “Contractor Portal” screen.

At a minimum, the equipment Group imported to ECMS must include all of the owned equipment that will be used to perform the authorized force account work on a given project. However, to avoid having to repeat the above import procedure for future force account work on the same project or for force account work on other projects, the Contractor may elect to import a spreadsheet file that lists all of the equipment assigned to a given project or its entire Department project, owned equipment inventory. The ECMS equipment Group import procedure may be repeated at any time (e.g. to import new pieces added to the inventory or to import a piece that was missed in a prior import).

An hourly rental rate for owned equipment will be computed by dividing the Blue Book monthly rate by 176. To this rate, the Blue Book area adjustment percentage for Pennsylvania and the age adjustment percentage for the model year of the piece of equipment will be applied. Blue Book city-level regional adjustment factors will not be used in computing an hourly rental rate for owned equipment.

An allowance will be made for operating costs by adding, to the above adjusted hourly rate, the Blue Book estimated operating cost per hour, for each hour that the owned equipment is actually in operation on the force account work.

If a piece of owned equipment is required at the work site on a standby basis, but is not operating, compensation, if any, will be at 50% of the adjusted hourly rate, exclusive of operating costs.

Payment for standby time will not be made on any day a piece of owned equipment is operated the entire work day. For a standard 8-hour work day, when equipment operates less than 8 hours, payment for standby time will be limited to the number of hours that, when added to the operating time for that day, equals 8 hours. For work days that exceed 8 hours, when equipment operates less than 10 hours, payment for standby time will be limited to the number of hours that, when added to the operating time for that day, equals 10. When force account work extends into one or more full weeks, in any 1-week period payment for standby time will be limited to the number of hours that, when added to the operating time for that week, equals 40 hours, regardless of the number of hours per day or days per week the Contractor works (i.e. overtime, multiple shifts, etc.). Payment for standby time will not be made on days the Contractor elects not to work or days not normally a work day. Standby time will not be paid if equipment is awaiting repair, while repairs are being made, or for maintenance or servicing of equipment. Standby time will not be paid for equipment not on the job site (i.e. while equipment is awaiting transport or being transported to the job site).

With the exception of owned equipment used for maintenance and protection of traffic, owned equipment used on a 24-hour basis will be reimbursed at a daily rental rate, which will be determined by dividing the Blue Book monthly rate by 22. Owned equipment used for maintenance and protection of traffic on a 24-hour basis will be reimbursed at the Blue Book daily rate. Applicable adjustment percentages from the Blue Book will be applied.

Where owned equipment utilized in the performance of force account work is not listed in the Blue Book, a rental rate will be determined based on the sale price for such equipment at the time of purchase, if the equipment is actually owned, or the applicable lease agreement. In these cases, for equipment that is actually owned, the monthly rate will be computed as 6% of the sale price, and the total hourly rate determined by dividing the monthly rate by 160, when the equipment is operating, and by 352, when the equipment is required at the work site on a standby basis, but not operating, with no adjustment percentages applied. For equipment that is leased, an hourly rental rate will be determined by prorating the lease cost. Additionally, if not included in the lease cost, an allowance will be made for operating costs by adding, to the hourly rental rate, the Blue Book estimated operating cost per hour for an equivalent piece of equipment for each hour the equipment is actually in operation on the force account work. The equivalence of the piece of equipment in the Blue Book listing to the piece of equipment actually used must be mutually agreed upon.

Owned equipment used on a 24-hour basis with no listing in the Blue Book will be reimbursed at a daily rental rate, which will be computed as 6% of the sale price for the equipment at the time of purchase divided by 22, with no adjustment percentages applied. If owned equipment used for maintenance and protection of traffic on a 24-hour basis, instead of being purchased, the equipment was actually fabricated by the owner, the "sale price" used to determine the daily rental rate will be the owner's total, documented, fabrication cost. If equipment used on a 24-hour basis with no listing in the Blue Book is leased, whether or not the equipment is used for maintenance and protection of traffic, the daily rental rate will be determined by prorating the lease cost.

The rates established above include the cost of fuel; oil; lubrication; supplies; necessary attachments; repairs; overhaul and maintenance of any kind; storage; all costs of moving equipment on to and away from the work site, except as specified below; and all incidentals.

If a piece of owned equipment, not already on or near the project site, is needed specifically for the force account work, the cost of moving the equipment on to and away from the work site will be reimbursed, provided the equipment will not be used immediately thereafter in the performance of original contract work.

The Department will not approve any Contractor requests for reimbursement of owned equipment costs incurred in the performance of force account work in excess of those outlined above unless such costs were mutually agreed upon, in writing, based on an acceptable cost breakdown prepared by the Contractor.

- Section 110.03(d)5.b **TABLE A.** revised to read:

TABLE A

Consumable Item	Unit of Measure	% of Value Reimbursed	Payment Frequency
Structural Steel – Plate	LB	1%	Monthly*
Metal Bridge Overhang Brackets	Each	1%	Monthly*
Steel Sheet Piling	LB	1%	Monthly*
Structural Steel – Falsework	LB	1%	Monthly*
Wood – Structural Timber	Board Foot	33%	One Time
Wood – Dimensional Lumber	Board Foot		
Plywood	Sheet		
Concrete Forms – Metal	SF	1%	Monthly*
Concrete Forms – Laminated			
Concrete Curing Blankets	Each	25%	One Time

*For each 1-month period or portion thereof.

- Section 110.14 **PRICE ADJUSTMENT FOR STEEL COST FLUCTUATIONS**, First Paragraph revised to read:

These requirements provide for a price adjustment, in the form of a payment to the Contractor or a rebate to the Department, for fluctuations in the cost of the steel used in the applicable materials placed as part of the construction work specified in Sections 620, 621, 948, 1002, 1005, 1050, 1080, and 1085.

Project Specific Details:

Special Provision: **C120A - a00120 CHANGES TO SPECIFICATIONS: SECTION 413**

Item(s) Associated:

Header:

CHANGES TO SPECIFICATIONS: SECTION 413

Provision Body:

SECTION 413 – SUPERPAVE MIXTURE DESIGN, STANDARD AND RPS CONSTRUCTION OF PLANT-MIXED ASPHALT COURSES WITH PERCENT WITHIN LIMITS AND LTS TESTING (PWL-LTS)

- **Section 413.2(e) Table B, revised to read:**

TABLE B
Job-Mix Formula
Volumetric Tolerance Requirements of the Laboratory Compacted Mix

Property	Each Specimen	Multiple Specimens
Air Voids at N_{design} (V_a)	($\pm 2\%$)	($\pm 1.5\%$)
Minimum VMA % for 4.75 mm	16.0	-
Minimum VMA % for 9.5 mm	15.5	-
Minimum VMA % for 12.5 mm	14.5	-
Minimum VMA % for 19.0 mm	13.5	-
Minimum VMA % for 25.0 mm	12.5	-
Minimum VMA % for 37.5 mm	11.5	-

Project Specific Details:

Special Provision: **C121A - a00121 CHANGES TO SPECIFICATIONS: SECTION 108**

Item(s) Associated:

Header:

CHANGES TO SPECIFICATIONS: SECTION 108

Provision Body:

SECTION 108—PERFORMANCE AND PROGRESS

- **SECTION 108.05(c) Equipment. Revise to add the following:**

7. Unmanned Aircraft System (UAS). Coordinate all UAS flights over Department projects with the Representative to state the purpose, location, and time of flights. The Remote Pilot in Command (PIC) must be Federal Aviation Administration (FAA), Part 107, certified and comply with all FAA regulations, and conform to Publication 832 for all flights. All UAS devices must be registered with the FAA, be free from damage, and in good operating condition. In the event of an incident or accident involving injury or property damage, the PIC shall immediately report the incident to the Representative and provide a written report of the event within 10 days.

For flights requested by the Department, submit a copy of the PIC Part 107 license, PennDOT certification, insurance, and provide a list of the FAA UAS device registration numbers for pre-approval by the District UAS Coordinator. All mission planning and risk assessment documentation must be maintained on site and be available to the FAA, Representative, or public officials upon request. Flight plans used for producing terrain surfaces or calculating quantities for pay items must be reviewed and approved by a Professional Land Surveyor registered in the Commonwealth of Pennsylvania. After Professional Land Surveyor approval, submit flight plan to the District UAS Coordinator or Representative for review and acceptance. Video and data obtained on Department funded missions remain the property of the Department and cannot be shared or used without written approval by the District UAS Coordinator or Representative.

Project Specific Details:

Special Provision: **D150A - a00150 REVISED CHANGED CONDITION CLAUSE FOR**

DESIGN BUILD PROJECTS WITH ADA CURB RAMP ITEMS OF WORK

Item(s) Associated:

Header:

REVISED CHANGED CONDITION CLAUSE FOR DESIGN BUILD PROJECTS WITH ADA CURB RAMP ITEMS OF WORK (ESTIMATED ITEM QUANTITIES PROVIDED BY THE DEPARTMENT)

Provision Body:

Pursuant to the provisions of 23 CFR 635.109(c), the second bullet point and the last paragraph of the changed condition clause, Section 110.02(d) are not applicable to the following items of work:

(To be filled in by designer, listed below are eligible items of work).

- **0630-0001 - PLAIN CEMENT CONCRETE CURB**
- **0630-0010 - PLAIN CEMENT CONCRETE CURB, INCLUDING REMOVAL OF EXISTING CURB**
- **4676-0001 - CEMENT CONCRETE SIDEWALK**
- **0695-0001 - DETECTABLE WARNING SURFACE**
- **DESIGN OF CONCRETE CURB RAMPS**

Any changes that result in actual quantities decreasing to below 75% of the original contract quantity or increasing to over 125% of the original contract quantity will NOT be negotiated for a new unit cost. Any changes in quantities to the above items will be paid at the contract unit price.

Project Specific Details:

Special Provision: **G401A - a00401 ADVANCE NOTICE OF TRAFFIC RESTRICTIONS**

Item(s) Associated:

Header:

ADVANCE NOTICE OF TRAFFIC RESTRICTIONS

Provision Body:

Notify the Engineer at least 4 calendar days in advance of the start of any operation which will affect the flow of traffic and provide the Engineer with details of the work to be done. After notification, the District Office will advise the public of these traffic restrictions and possible delays.

Project Specific Details:

Special Provision: **G501A - a00501 AIR POLLUTION CONTROL IN AIR BASINS**

Item(s) Associated:

Header:

AIR POLLUTION CONTROL IN AIR BASINS

Provision Body:

No burning will be permitted on this project except that the Department of Environmental Protection will permit the operation of an air curtain destructor, (open pit incinerator) as defined in Title 25, Section 129.14, of the Rules and Regulations of the Department of Environmental Protection, for the destruction of wood waste generated by clearing and grubbing operations, provided that the incinerators are properly designed, located, and operated. Permission may be granted for units both within and outside the air basin areas defined in Title 25, Section 121.1 of Chapter 121 of the Rules and Regulations of the Department of Environmental Protection, but each proposal is required to be reviewed on an individual basis by the appropriate Regional Air Pollution Control Engineer.

If an air pollution problem is subsequently created by the operation of such a unit the Department of Environmental Protection will notify the Contractor and will take appropriate enforcement action if necessary.

Project Specific Details:

Special Provision: **G1150A - a01150 REQUIRED REPORTING FOR ALL WASTE AND BORROW SITES REQUIRING AN NPDES PERMIT**

Item(s) Associated:

Header:

REQUIRED REPORTING FOR ALL WASTE AND BORROW SITES REQUIRING AN NPDES PERMIT

Provision Body:

The Contractor should submit the form entitled, "Tracking Sheet for Waste/Borrow Sites with NPDES Permits" to the Environmental and Policy Development Section within 5 working days of receipt of the NPDES permit. An electronic version can be found on ECMS's File Cabinet by selecting References, and then selecting File Cabinet. The file is in the CTR-Contractor folder and is named **Waste/Borrow NPDES Permit Reporting**.

Additional instructions for submission of the form may be provided at the Pre-construction Conference.

Project Specific Details:

Special Provision: **G2301B - a02301 MAINTENANCE AND PROTECTION OF RAILROAD TRAFFIC**

Item(s) Associated:

Header:

MAINTENANCE AND PROTECTION OF RAILROAD TRAFFIC

Provision Body:

I. Make the safety and operation continuity of the railroad company traffic of the first importance. At all times protect and safeguard such traffic and arrange project work accordingly. Whenever the work may affect the safety and movement of trains, submit the method of doing such work to the chief engineer of the railroad company or duly authorized representative for approval. Do not begin or prosecute work without such approval. However, the approval of the railroad company's chief engineer or duly authorized representative will not be considered as a release from responsibility for any damage to the railroad company by the acts of the Contractor or those of his/her employees. Prepare and submit plans for approval to the railroad company's chief engineer for all work, including, but not limited to, tunneling under tracks, sheeting, shoring, and erection in the vicinity of and over tracks.

II. During the construction period, the railroad company and the Department will co-operate with each other in the protection of their respective traffic and in the construction as indicated. Give the chief engineer of any involved railroad fourteen (14) days written notice before any work is started on railroad property, in order that the necessary arrangements may be made to properly protect railroad traffic.

III. The railroad company will provide all watchmen, operators, flagmen, clearance men, and similar protective services, considered by the railroad company's chief engineer or his duly authorized representative as necessary to insure the safety of trains contingent upon the project's operations, at the sole expense of the Department. It is agreed, however, that providing of such watchmen, and other precautions, will not relieve liability of payment for damage caused by project operations. The Department will not be responsible for such damage.

IV. It is expressly understood that this contract includes no work for which the railroad company is to be billed. Therefore, do not bill the railroad company for any work which may be performed unless the railroad company gives a written request that such work be performed at its expense.

V. The raising or surfacing of tracks due to any settlement, caused by the project operations will be performed by the railroad, but the cost will be borne entirely by Contractor.

VI. During construction a minimum overhead clearance of 6.7m(7m for electrical tracks) (22 feet (23 feet for electrical tracks)) above the top of rail and a minimum horizontal clearance of 13 feet from centerline of tangent track will be permitted. If the clearances indicated are less than those stated above, then the lesser clearance will be permitted. In any case, this minimum side clearance applies to tangent track only. For curved track, provide additional minimum side clearance to compensate for curvature. Contact the railroad company's chief engineer to ascertain the amount of additional minimum side clearance required. If at any time during construction it is decided that project operations require overhead and/or side clearances less than the minimum stated or indicated submit a request to the railroad company's chief engineer as outlined above for safety and continuity of railroad operations. Deviate from those minimums stated above or indicated, only upon receipt of approval of such a request.

VII. Do not work over any high tension wires or within 10 feet on each side and below such wires. When it is necessary to work or place equipment within these limits, make arrangements with the railroad to furnish electrical clearance men and de-energize the wires contingent upon railroad operation. Where voltage exceeds 50,000 volts, increase this working clearance.

Project Specific Details:

Special Provision: **G2302A - a02302 Worker Protection and Investment**

Item(s) Associated:

Header:

Worker Protection and Investment

Provision Body:

In accordance with the Governor's Executive Order 2021-06, *Worker Protection and Investment*, contractors and grantees of the Commonwealth must certify they are in compliance with Pennsylvania's Unemployment Compensation Law, Worker's Compensation Law, and all applicable Pennsylvania state labor and workforce safety laws including, but not limited to:

1. Construction Workplace Misclassification Act
2. Employment of Minors Child Labor Act
3. Minimum Wage Act
4. Prevailing Wage Act
5. Equal Pay Law
6. Employer to Pay Employment Medical Examination Fee Act
7. Seasonal Farm Labor Act
8. Wage Payment and Collection Law
9. Industrial Homework Law
10. Construction Industry Employee Verification Act
11. Act 102: Prohibition on Excessive Overtime in healthcare
12. Apprenticeship and Training Act
13. Inspection of Employment Records Law

To ensure compliance with these statutes, Contractors and Grantees are required to submit the Worker Protection and Investment Certification Form (BOP-2201) in response to all ECMS procurement solicitations. The form is available in the ECMS File Cabinet (in References Tab). If assistance with the Form is needed, contact the ECMS Help Desk at 855-783-8330 or at 717- 783-8330. ECMS Help Desk assistance is available 24 hours a day, 7 days a week.

This form must be completed for the Prime Contractor and all subcontractors and/or services.

The Prime Contractor must email the completed BOP-2201 Form to workprotect@pa.gov or fax the Form to 717-265-7207, signed by an authorized representative of the Contractor, possessing sufficient knowledge to make the representations and certifications on the BOP-2201 Form by 3:00 P.M. prevailing local time within 7 calendar days after the bid opening. When the seventh (7th) calendar day after the bid opening falls on a day that the Department offices are closed, submit the BOP-2201 Form by 3:00 P.M. prevailing local time on the next business day. Failure or refusal to provide the BOP-2201 Form, or inclusion on any Pennsylvania Department of Labor and Industry Worker Protection and Labor Law Non-Compliance List, will be considered a refusal to comply with bidding requirements and may result in rejection of the bid, and other appropriate consequences.

For Subcontractors/Services, the completed BOP-2201 Form must be attached with the Public Works Verification Act form and submitted in ECMS before a subcontractor request can be approved. A subcontractor/service identified on any Pennsylvania Department of Labor and Industry Worker Protection and Labor Law Non-Compliance List will not be approved.

The Pennsylvania Department of Labor and Industry has created a public list of businesses that have been found to be non-compliant with Pennsylvania state labor and workforce safety law which will be published on its public-facing website. The link to the Department of Labor and Industry's website is: www.dli.pa.gov/Pages/Non-Compliance-List.aspx. Questions regarding inclusion on the list should be directed to the appropriate bureau with the Department of Labor and Industry.

Project Specific Details:

Special Provision: **G3901A - a03901 BLC-TYPE BRIDGE STRUCTURE**

Item(s) Associated:

Header:

BLC-TYPE BRIDGE STRUCTURE

Provision Body:

I. Revise the BLC-500 (Dec. 1983); BLC-510 (Aug. 1983); and BLC-520 (Nov. 1983) Standard Drawings as follows:

II. Delete all references to the use of Class AAA Cement Concrete in parapets and safety curbs.

III. Manually adjust the formulae to determine superstructure cement concrete quantities to reflect the amount of Class AA Cement Concrete in the parapets.

IV. In the "Summary of Estimated Quantities" tables, include an item for "Class AA Cement Concrete" for the amount of concrete for parapets and safety curbs.

V. Add the Note:

- Use Class AA Cement Concrete for cast-in-place parapets and safety curbs.

Project Specific Details:

Special Provision: **G4001A - a04001 SUPER LOAD BRIDGE BEAMS**

Item(s) Associated:

Header:

SUPER LOAD BRIDGE BEAMS

Provision Body:

I. The following requirements apply to the transportation of super load bridge beams (over 48,760 mm (160 ft.) long or over 91,050 kg (201,000 lbs.) gross weight):

(a) No request for waiver of any provisions of Chapter 179 of Title 67 will be approved, except as noted herein.

(b) No transporting equipment's axle will be permitted to exceed 120 KN (27,000 pounds), regardless of gross weight.

(c) Schedule no more than 2 super loads of 2 beams each to travel to the job site on the same day. No more than 1 super load of 2 beams will be guaranteed on any day in which another super load is being escorted over all or part of the same route. However, an additional 2 super loads of 2 beams each will be permitted to travel to the job site on the same day, provided all escort costs incurred by the Pennsylvania State Police, including premium time rates as assessed, will be borne by the contractor.

(d) Schedule no super load to travel within 2 hours of another super load having the same origin.

(e) No Saturday or Sunday movement will be scheduled.

(f) The Inspector-in-Charge will collect the hauling permit at the site.

(g) Alternate Bridge Structure designs with super loads will not be approved unless the "As-Designed" Bridge Structure provided super load bridge beams.

(h) Reimburse the Pennsylvania State Police at regular and overtime rates for time expended on travel to and from and for escorting of super load bridge beams. A minimum of 24 hours advance notice of cancellation is required in order to avoid time charges.

(i) All super loads will be escorted at a maximum of 65 km/h (40 mph) on all limited access, four-lane highways and 40 km/h (25 mph) on all two-lane or four-lane non-limited access highways. All bridges will be traversed at a maximum of 16 km/h (10 mph) unless the permit specifies otherwise.

Project Specific Details:

Special Provision: **I8622A - a08622 ITEM 8622-XXXX - GRAVIX RETAINING WALL SYSTEM**

Item(s) Associated:

Header:

ITEM 8622-XXXX - GRAVIX RETAINING WALL SYSTEM

Provision Body:

I. DESCRIPTION -

This work is the design, manufacture, storage, delivery, installation, and assembly of precast reinforced concrete Gravix Retaining Wall System along with the construction of footing as indicated and specified on the approved PennDOT Drawing No. 2020-236 (Dated 4/19/2021).

(a) Design. Provide design in accordance with PennDOT Drawing No. 2020-236 (Dated 4/19/2021) using Load Resistance Factor Design.

II. MATERIAL -

Gravix Retaining Wall System, PennDOT Drawing No. 2020-236 (Dated 4/19/2021), including design and fabrication requirements is available upon request from the District Bridge Engineer office. Obtain Gravix Retaining Wall System units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Shop Drawings. Provide approved shop drawings before fabricating Gravix Retaining Wall System units. Provide shop drawings meeting the general requirements of Section 105.02(d).

(b) Installation. Install in accordance with PennDOT Drawing No. 2020-236 (Dated 4/19/2021).

IV MEASUREMENT AND PAYMENT -

Square Foot

Project Specific Details:

Special Provision: **N10231A - a10231 ACCELERATED CONCRETE PAVEMENT PATCHING WITH LIGHTWEIGHT FINE AGGREGATE**

Item(s) Associated:

Header:

ACCELERATED CONCRETE PAVEMENT PATCHING WITH LIGHTWEIGHT FINE AGGREGATE

Provision Body:

II. MATERIAL—Section 516.2 with the following additions and modifications:

(a) Class AA Cement Concrete, Modified. – Section 516.2(a), add the following:

Provide accelerated concrete that includes light weight fine aggregate according to ASTM C1761. Provide lightweight fine aggregate test results, performed within 6 months of the JMF submission date, according to ASTM C1761, Sections 10 and 11, and computations for the quantity of lightweight fine aggregate needed according to ASTM C1761, Appendix X1, when the JMF is submitted to the DME for approval. ASTM C1761 testing can be done in the presence of the inspector, or by an AASHTO resource accredited laboratory.

(j) Concrete Curing Material. Revise to read as follows:

Sections 711.1 and 711.2(b)

III. CONSTRUCTION—Section 516.3 with the following modifications:

(j) Curing of Concrete. Section 501.3(l)

Project Specific Details:

Special Provision: **N10303C - a10303 ULTRA HIGH PERFORMANCE CONCRETE**

Item(s) Associated:

Header:

ULTRA HIGH PERFORMANCE CONCRETE

Provision Body:

I. DESCRIPTION—This work is the batching, transporting, placing, finishing, and curing of Ultra High Performance Concrete (UHPC) to connect pre-cast structural elements (e.g. pre-cast concrete bridge deck panels). UHPC is a cementitious composite material composed of an optimized gradation of granular constituents, a water to cement ratio less than 0.25, and a high percentage of discontinuous internal fiber reinforcement.

II. MATERIAL—

(a) General. UHPC is a self-leveling, self-consolidating cementitious concrete mortar containing a well-graded matrix of fibers that provide ductility in bending and an ultra-low permeability. Supply the dry components of the UHPC mixture from a single material manufacturer with a minimum of 5 years of experience in manufacturing and commercial supply of UHPC.

(b) Ultra High Performance Concrete Mixture. Produce mix using either a premixed ultra-high performance composite material with the manufacturer's recommended steel fibers, admixtures, and water that is certified as specified in Section 106.03(b) or a combination of the following:

- **Cement** – Section 701

- **Fine Aggregate** – Section 703.1 except the maximum nominal size is not to exceed 0.024 inches.
- **Supplementary Cementitious Material** – Section 724.4
- **Admixture** – Section 711.3
- **Steel Fibers** – ASTM A 820, Type 1, cold drawn high-carbon steel with a minimum tensile strength of 290,000 pounds per square inch. Provide a steel fiber content that is a minimum of 2 % of the mix's dry volume.
- **Water** – Section 720.1, if concrete mix temperatures rise above 80F, ice may be required to decrease mix temperatures.

Produce a UHPC mixture meeting the following properties:

Table A
UHPC Expected Properties

Description	Test method	Acceptance Criteria
Compressive Strength	AASHTO T 22, 28-days*	21,700 pounds per square inch
Long-Term Shrinkage	ASTM C 157; 28-days	≤ 766 micro-strain
Freeze-Thaw Resistance	ASTM C 666 / AASHTO T 161 (300 cycles)	Relative Dynamic Modulus of Elasticity > 96%
Rapid Chloride Permeability	ASTM C 1202 / AASHTO T 277	≤ 250 coulombs
Chloride Ion Penetration	AASHTO T 259; 1/2 inch depth	< 0.1183 pounds per cubic yard
Abrasion Resistance	ASTM C 944 Double load abrasion device, 6 inch diameter	< 0.73 grams lost
Scaling Resistance	ASTM C 672	y < 3
Alkali-Silica Reaction	ASTM C 1293	<0.04 at one year
*Sample size use either 3 inch diameter cylinders or 4 inch cubes.		

(c) Mixing and Testing. At least 90 days before construction, submit the mix design to the District Materials Engineer/District Materials Manager (DME/DMM) for approval. If using a Portland cement based premix, ensure uniform consistency of all matrix materials (blended premix, steel fibers and admixture). Deliver materials in undamaged packaging to the batch site.

Protect materials against loss of physical and mechanical properties by storing premix, fibers, and additives according to manufacturer specifications.

Mold test cylinders according to PTM No. 521. Test compressive strength samples according to AASHTO T 22. Required minimum UHPC compressive strength:

- 5,700 pounds per square inch at 24 hour moist cure
- 14,500 pounds per square inch at 4-day moist cure
- 21,700 pounds per square inch at 28-day moist cure

III. CONSTRUCTION—

(a) Equipment. Have all equipment to be used for mixing, placing, and finishing of the UHPC accepted by the Representative before the start of work.

1. Mixing Equipment. Batch UHPC on site with mixing equipment specified by the manufacturer.

2. Placing and Finishing Equipment. Place and finish according to Section 1042.3(a)3. Vibrating screeds maybe used, if permitted in writing by the Representative. Vibrating screeds are to be power-vibrated, but are not to be substitute for high-frequency vibrators.

(b) Formwork, Batching, and Curing. Follow approved installation drawings and the manufacturer's recommendations for the design and fabrication of forms. Construct forms from plywood coated to prevent absorption of water for the UHPC mixture. Ensure forms are tightly sealed to prevent leakage.

Follow the batching sequence as specified by the supplier and approved by the DME/DMM. During batching, ensure dry components are well blended and free of clumps when added to the mix. Fill UHPC field joints with a positive head to provide for settlement. Hardened UHPC joints must be within a tolerance of $\pm 1/8$ inch of the precast panels.

Cure according to manufacturer's recommendations to attain the required minimum UHPC compressive strength. Accelerators may be added to the UHPC mix to speed strength gain. Protect UHPC from freezing during curing.

(c) Pre-Pour Meeting. Before the initial placement of the UHPC, arrange for an on-site meeting with the UHPC manufacturer's representative, the Contractor's employees, and the Representative. At least 15 days before the pre-pour meeting, submit, for review and acceptance, a QC Plan showing the methods, sequence, and schedule for placing concrete. The objective of the meeting will be to review the QC plan and outline clearly the procedures for mixing, transporting, placing, finishing and curing of the UHPC material.

(d) Placement. Do not start placement until a manufacturer's representative, who is knowledgeable about supplying, mixing, delivery, placing, and curing of UHPC material, is on site for the joint placement.

Place concrete according to environmental conditions in Section 1001.3(k)6. Where required, pre-wet the inside of forms with water immediately before placing concrete. Placement can be performed by either overfilling of joints with grinding or by chimney method. For chimney method, use poly (methyl methacrylate) top sheet.

Dead loads and/or vehicular live loads (construction or traffic) are allowed on the deck after the UHPC has attained a minimum compressive strength of 14,500 pounds per square inch.

(e) Field Tests. Measure the slump flow on each batch of UHPC. Perform testing according to AASHTO T 119 except use a mini-slump cone. An acceptable slump flow range is between 7 inches and 10 inches. Record all test results and submit to the Representative.

Mold 3 inch by 6 inch compressive strength test cylinders or 4 inch by 4 inch cubes according to PTM No. 521 for each batch. Field cure cylinders or cubes with the UHPC joint. Test for compressive strength according to AASHTO T 22 at 4-days and 28-days. Acceptable minimum UHPC compressive strengths are 14,500 pounds per square inch at 4-days and 21,700 pounds per square inch at 28-days. If the 4-day compressive strength test result is less than the required minimum UHPC compressive strength specified, continue the field cure on the lot of concrete represented by the cylinders or cubes until the specified 28-day required minimum UHPC

compressive strength is obtained, or for a maximum of 28 days. At 28-days, if the compressive strength test result is less than the 28-day required minimum UHPC compressive strength specified, acceptance of the concrete lot will be based on compressive strength testing of cores obtained from the lot of concrete represented by the cylinders or cubes as specified in Section 110.10(d)., except test cores according to AASHTO T 22.

(f) Surface Profile. Where necessary, grind the surface smooth to obtain the surface tolerance to match the profile of the structural elements that are being connected. Perform grinding after the concrete has attained a minimum compressive strength of 14,500 pounds per square inch.

(g) Defective Work. Remove and replace concrete that is segregated, bulged, uneven, or that shows honeycombing or marks that cannot be satisfactorily repaired. If directed, remove and replace concrete that has not attained the required minimum UHPC compressive strength.

IV. MEASUREMENT AND PAYMENT—Cubic Yard

Project Specific Details:

Special Provision: **N10451B - a10451 STEEL MATERIALS FOR TEMPORARY BRIDGES**

Item(s) Associated:

Header:

Steel Materials for Temporary Bridges

Provision Body:

All steel furnished for temporary bridge structures is to be in accordance with the provisions of Act 3-1978, as amended by the Act 161-1982, and the Act 144-1984. Use or furnish only steel products produced in the United States or territory or possession of the United States in the performance of the contract, or any subcontract, for temporary bridge construction as required by the aforementioned Act.

Project Specific Details:

Special Provision: **D10502A - a10502 BRIDGE SHOP DRAWINGS (DESIGN-BUILD)**

Item(s) Associated:

Header:

BRIDGE SHOP DRAWINGS (DESIGN-BUILD)

Provision Body:

The Lead Design Engineer will be responsible for review and acceptance of bridge shop drawings and shop drawings for other fabricated material. Distribute approved shop drawings in accordance with Section 105.02(d).

Project Specific Details:

**N10650C - a10650 MINIMUM EFFECTIVE ASPHALT FOR 9.5
MM OR 12.5 MM SUPERPAVE MIXTURES**

Special Provision:

Item(s) Associated:

Header:

MINIMUM EFFECTIVE ASPHALT FOR 9.5 MM OR 12.5 MM SUPERPAVE MIXTURES

Provision Body:

Submit a 9.5 mm or 12.5 mm Superpave mix design prepared as specified in Section 413.2, in accordance with Bulletin 27, and as follows:

- Submit a design with minimum effective asphalt (Pbe) based on the combined aggregate bulk specific gravity (Gsb) in accordance with the Minimum Pbe Table below.
- New designs need to meet the minimum Pbe requirements in the Table below along with existing volumetric requirements as listed in Bulletin 27 Chapter 2A.

Minimum Pbe		
Gsb	9.5 mm Superpave Mixes	12.5 mm Superpave Mixes
2.250 to 2.274	6.2	5.8
2.275 to 2.324	6.1	5.7
2.325 to 2.374	6.0	5.6
2.375 to 2.424	5.9	5.5
2.425 to 2.474	5.8	5.4
2.475 to 2.524	5.7	5.3
2.525 to 2.574	5.6	5.2
2.575 to 2.624	5.5	5.1
2.625 to 2.674	5.4	5.0
2.675 to 2.724	5.3	4.9
2.725 to 2.774	5.2	4.8
2.775 to 2.824	5.1	4.7
2.825 to 2.874	5.0	4.6
2.875 to 2.924	4.9	4.5
2.925 to 2.974	4.8	4.4
2.975 to 3.024	4.7	4.3
3.025 to 3.074	4.6	4.2

Changes to Previously Approved Mix Designs*:

- Changes to a previously approved 9.5 mm or 12.5 mm mix design that meet or exceed the requirements in the “Minimum Pbe” Table will not be allowed.

- Additional virgin asphalt binder will be allowed provided the minimum Pbe is met or exceeded and all other mix properties are met.
- Ndesign air voids may range from 3.5% to 4.0% for mixture design.
- The maximum Design voids filled with asphalt (VFA) is revised to 80.
- Follow the steps below to achieve the minimum Pbe:
 - Step 1
 - Verify the additional virgin asphalt binder content according to Bulletin 27, Appendix J, Section C. If the laboratory mixed, laboratory compacted specimens meet Bulletin 27, Condition B of Appendix J, Table J -2, then no other adjustments to proportions or gradation will be required.
 - Step 2
 - If the addition of virgin asphalt cannot meet Bulletin 27, Condition B of Appendix J, Table J-2, gradation changes are permissible as long as changes are within multiple sample tolerances as specified in Section 413.2(e) Table A.
 - Step 3
 - If Bulletin 27, Condition B of Appendix J, Table J-2 cannot be achieved with Step 1 or Step 2, a complete re-design of the JMF will be required.

(Previously Approved Mix Designs- JMF's approved in previous year or new designs submitted with the only change being either PG grade or HMA to WMA, with no changes to target asphalt content or gradation)*

Project Specific Details:

Special Provision: **N11701F - a11701 MECHANICALLY STABILIZED RETAINING WALL SYSTEMS**

Item(s) Associated:

Header:

MECHANICALLY STABILIZED RETAINING WALL SYSTEMS

Provision Body:

I. DESCRIPTION - This work is the designing, furnishing, and erecting of approved mechanically stabilized systems used as retaining walls. These systems, some of which are proprietary, employ either strip or grid type metallic reinforcements in the soil mass and a discrete modular precast facing.

II. DESIGN - Submit to the District Bridge Engineer, for review and for approval, 4 sets of plans and design calculations for mechanically stabilized earth retaining walls, prepared in accordance with PENNDOT Design Manual Part 4. Allow a maximum of 30 calendar days from the day final plans are received by the District Bridge Engineer for review and approval. Perform fabrication of standard panels in accordance with the approved plans using pre-approved standard shop drawings. Do not perform any construction before approval of design and completed plans. Use mylar furnished by the Department.

Have a Professional Engineer (P.E.), registered in the Commonwealth of Pennsylvania, sign and date the first sheet of the computations.

Include the following statement on the first sheet of the drawings above the P.E. seal:

"I hereby certify that all design assumptions have been validated either through construction details or notes on these drawings, or through the contract plans and provisions."

In the event certain design parameters, stresses, or specifications are in conflict, the following order of predominance will govern:

- Design requirements listed herein and in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS", of the special provisions.
- Design related Strike-off Letters in effect on the date of project advertisement. Refer to the list in PART B.
- PENNDOT Design Manual Part 4, "Structures".
- PENNDOT Design Standards.
- AASHTO Standard Specifications for Highway Bridges (date as indicated) and interim specifications.

In the event that a clear order of predominance cannot be established, or a difference in the interpretation of the design cannot be resolved, the Chief Bridge Engineer will arbitrate and such decision will be final.

If weep holes are not indicated, and no other provision for subsurface drainage has been incorporated into the design but is required to validate design assumptions of lateral earth pressure from dry backfill, provide a weep hole in every other precast face panel exposed at ground elevation. Locate weep holes a minimum of 300 mm (1 foot) above finished ground elevation.

Provide cast-in-place or preapproved, precast concrete bridge barriers as shown on plans.

Provide cast-in-place or precast copings.

III. MATERIAL -

(a) Precast Concrete Face Panels. Furnish precast face panels as specified in Section 714, except provide concrete having a 28-day minimum compressive strength of 28 MPa (4,000 pounds per square inch) when tested in accordance with PTM No. 604.

Provide panels having a minimum structural thickness of 140 mm (5 1/2 inches).

Place tie strips, reinforcement bars, connecting rods (where required), PVC pipe for weep holes when indicated, PVC tubes (where required), and handling devices, to the dimensions and tolerances indicated or as approved by the Representative, before casting.

1. Testing and Inspection. Acceptability of the precast panels will be determined on the basis of slump and entrained air content testing of the concrete mixture, compressive strength testing, and visual inspection. Furnish facilities for the Department to perform all necessary sampling and testing in an expeditious and satisfactory manner. Acceptance will be as herein specified.

Acceptance of precast concrete panels with respect to compressive strength will be based on the results of production lot testing. A production lot is defined as the panels represented by 1-day's production or 40 panels whichever is less. Acceptance will be based on compliance with the requirements of Sections 714.4(b) and

714.7(a), except the lot compressive strength will be determined as the average of the compressive strength testing of two cylinders and no individual test result may be below 25 MPa (3,600 pounds per square inch).

Acceptance with respect to visual inspection will be based on compliance with the requirements of Section 713.2(d). In addition, precast units may be rejected for color variations on the front.

Completed precast units will be inspected before shipment, and cracked, damaged, or otherwise unsatisfactory units will be rejected. Properly patch all excessive voids and other defects on exterior surfaces in accordance with the approved QC Plan.

Repairs and repair procedures beyond the limits of repair defined in Publication 145 require the approval of the Representative. Mark rejected panels with the words "Rejected for Department Use" using waterproof paint.

2. Forms. Construct forms of steel in a manner that assures the production of uniform units, and leave forms in place until they can be removed without damage to the unit.

Replace damaged forms or forms having a deteriorated surface on the finished face.

3. Mixing and Placing Concrete. Mix and deliver concrete as specified in Section 704. For transporting, placement, and consolidation of concrete, use methods that will prevent segregation of concrete materials and displacement of steel reinforcement from its proper position in the form. Do not place concrete in forms or casting beds when ambient temperatures are below 4 °C (40F) or above 38 °C (100F). Do not use admixtures containing chlorides.

4. Casting. Cast the panels on a flat area, front face down. Set connection guides into the rear face. Do not attach the panel reinforcing steel to or allow contact with embedded loops, tie strips, reinforcing steel, or other devices. Hold attachment devices in place during concrete placement to ensure that proper alignment is maintained. Place concrete in each unit without interruption and consolidate by use of a vibrator, supplemented by such hand tamping as may be necessary to force concrete into the corners of the form and prevent formation of honeycomb segregation, cracking, or cleavage planes. Use clear form oil throughout the casting operation.

5. Concrete Finish. Provide a conventional surface finish for the front face, unless otherwise indicated or specified, and, for the rear face, a floated surface finish. Screed to eliminate open pockets of aggregate and surface distortions in excess of 6 mm (1/4 inch) on the rear face of the panel.

When a special or decorative surface finish is required, display for approval a typical sample of the face panels, showing the color, texture, and finish intended to be used, before standard production of panels. Acceptability of the production units with respect to their architectural surface treatment will be made at a distance of 9000 mm (30 feet), in natural daylight, when compared to the approved sample(s).

6. Curing. Cure units in accordance with the approved QC Plan until the concrete obtains 80% of the specified minimum 28-day compressive strength.

7. Tolerances. Manufacture all units within the following tolerances:

- Do not exceed an angular distortion with regard to height of 5 mm (0.02 inch) in 1525 mm (5 feet).
- Panel Dimensions. Position of panel connection devices within 25 mm (1 inch). All other dimensions within 5 mm (3/16 inch).
- Panel Squareness. Not to exceed 13 mm (1/2 inch), as determined by the difference between two diagonals.
- Panel Surface Finish. Surface defects on smooth formed surfaces, measured over a length of 1525 mm (5 feet), not to exceed 3 mm (1/8 inch) and on texture finished surfaces not to

exceed 8 mm (5/16 inch).

For panels using welded wire fabric as grid reinforcement, fabricate panels in a manner that ensures compliance with the wire mesh to panel connection requirements indicated in BC-799M.

8. Marking. Clearly scribe or paint with waterproof paint, on the rear face of each panel, the date of manufacture, lot production number and piece mark.

9. Handling, Storing, and Shipping. Handle, store, and ship all units in such a manner as to eliminate the danger of chipping, cracking, fracture, and excessive bending stress, or damage to connection hardware. Support the panels in storage, on firm blocking located immediately adjacent to the tie strips, to avoid bending tie strips. Care should be taken to not bend or damage tie strips when handling with a forklift. Use dunnage or blocking which will not stain the face of the precast unit.

Do not ship units until the 28-day minimum compressive strength is attained. Provide 24-hour advance notice of loading and shipping schedule.

Repair or replace any unit damaged during handling, transporting, erecting, or backfilling, or any unit that cannot be placed satisfactorily in the wall, in accordance with the approved QC Plan.

(b) Reinforcement.

1. Reinforcing Strips and Tie Strips. Fabricate tie strips of hot rolled steel conforming to the requirements of ASTM-A1011/1011M, Structural Steel (SS), Grade 340, or ASTM A1011/A1011M, High-Strength Low-Allow Steel (HSLAS), Grade 340 (Grade 50), Class 1, including all trace elements. Hot roll reinforcing strips from bars conforming to ASTM-A36/A36M or ASTM-A572/A572M (AASHTO-M223/223M), Grade 450, or equivalent, to the required shape and dimensions. Hot dip galvanize reinforcing strips and tie strips, after fabrication, as specified in Section 1105.02(s)) and in accordance with ASTM-123. Cut to length within the tolerances indicated on approved shop drawings. Punch holes for bolts, in the location shown, before galvanizing. Carefully inspect all reinforcing and tie strips to ensure they are true to size and free from defects that may impair their strength and durability. Cutting of reinforcing strips at pile locations, vertical obstacles, or utilities is not acceptable.

Care must be taken to avoid bending or damage to the galvanized coating on reinforcing and tie strips during handling, storing, and shipping.

2. Steel Mesh Reinforcement. Conform to the requirements of ASTM-A82 for cold drawn wire. Shop fabricate and weld the finished mesh fabric in accordance with ASTM-A185. In addition, comply with the following:

- Fabricate, transport, store, and place steel mesh in a manner that ensures compliance with the wire mesh to panel connection requirements as indicated in BC-799M.
- Fabricate wire mesh in a manner that produces a flat mesh with straight longitudinal and transverse wires meeting the following tolerances:

Flatness:

Length of Wire Mesh:	3000 mm (10') or less	3300 mm (11') to 6000 mm (20')	6300 mm (21') to 9000 mm (30')	9300 mm (31') or greater
Permissible Variation:	50 mm (2")	70 mm (2 3/4")	90 mm (3 1/2")	100 mm (4")

Straightness of Longitudinal Wires:

Length of Wire Mesh:	3000 mm (10') or less	3300 mm (11') to 6000 mm (20")	6300 mm (21') to 9000 mm (30")	9300 mm (31') or greater
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Maintain flatness and straightness of the wire mesh during transportation and assembly. Wire mesh not meeting the flatness and straightness tolerances may be realigned using a method that does not damage the galvanizing, damage or weaken the weld at intersection points of the longitudinal and transverse wires, or weaken the strength of the wires. Submit the realignment procedure to the Representative for approval.

Galvanize mesh panels as specified in Section 1105.02(s) and in accordance with ASTM-A641, after fabrication. Provide wire size and mesh configuration as indicated. Carefully inspect all mesh reinforcement and attachment devices to ensure they are true to size and free from any defects that may impair their strength and durability. Cutting of steel mesh or grids at pile locations, vertical obstacles, or utilities is not acceptable.

Care must be taken to avoid bending or damage to the galvanized coating on reinforcing mesh or grids during handling, storing, and shipping.

3. Reinforcement Bars. Grade 420 (Grade 60), Section 709.1(a)1. Provide epoxy coated reinforcement bars, as specified in Section 709.1(c), or galvanized reinforcement bars, as specified in Section 709.1(e) for cast-in-place or precast concrete bridge, barrier, moment slab (cast-in-place) curb, and copings and precast panels.

(c) Fasteners and Attachment Devices.

- Provide galvanized, high strength hexagonal bolts and nuts meeting the requirements of Section 1105.02(d) for reinforcement in Section III (b)1.
- Provide embedded loops fabricated from cold drawn steel wire conforming to ASTM-A82 and welded in accordance with ASTM-A185. Galvanize loops as specified in Section 1105.02(s) and in accordance with ASTM-A641 for reinforcement in Section III (b)2.
- Provide connector bar fabricated from cold drawn steel wire conforming to ASTM-A82 and galvanized as specified in Section 1105.02(s) and in accordance with ASTM-A641 for reinforcement in Section III (b)2.
- Fabricate connector rods (where required) from PVC conforming to material as recommended by the manufacturer or steel conforming to ASTM-A36/A36M and galvanize as specified in Section 1105.02(s) and in accordance with ASTM-A123. Fabricate to required diameters and lengths as indicated.

(d) Bearing Pads.

- For horizontal joints between panels, provide preformed EPDM rubber pads conforming to ASTM-D 2000 2AA 812 A13 C12 F17, neoprene elastomeric pads having a Durometer Hardness of 80 ± 5 , or preformed high density polyethylene panel pads conforming to ASTM-D1505 and having a minimum density of 0.946 g/cm^3 .

(e) Granular Fill Material. Provide crushed or natural sand, crushed or uncrushed gravel, blasted limestone, blasted sandstone, or any standard size coarse aggregate meeting the following gradation as determined in accordance with PTM 616:

Sieve Size Percent Passing

75 mm (3 inches) 100

19 mm (3/4 inch) 20 - 100

425 μm (No. 40) 0 - 60

75 μm (No. 200) 0 - 10*

*Determination of the fines content (minus 75 µm (No. 200) sieve material) for MSE wall reinforced backfill must be determined by wash test according to PTM No. 100, Amount of Material Finer Than 75 µm (No. 200) sieve in Aggregate. This is in addition to PTM No. 616, Sieve Analysis of Coarse and Fine Aggregate.

Have the backfill conform to all of the following additional requirements:

1. Furnish materials meeting the quality requirements of Type C coarse aggregate or better as specified in Section 703.2(a), Table B, except furnish materials free of clay lumps, friable particles, coal and coke. Do not use metallurgical slag or cinders.
2. Furnish materials with a maximum plasticity index (PI) of 3 as determined in accordance with AASHTO T89 and T90.
3. Furnish material exhibiting an angle of internal friction of not less than 34 degrees as determined, in accordance with AASHTO-T236, on the portion finer than the 2.0 mm (No. 10) sieve compacted to 95% of PTM No. 106, Method B, at optimum moisture content, except for coarse aggregate meeting the requirements of Section 703.2.

Direct shear testing may be performed on samples containing material larger than the 2.0 mm (No. 10) sieve, if the shear device conforms with AASHTO-T236, Sections 5.4 and 5.5.

4. Provide materials meeting the following electrochemical criteria:

<u>Test</u>	<u>Criterion</u>
pH, AASHTO T289	6 - 10
Resistivity, AASHTO T288	<ul style="list-style-type: none">• ≥ 5000 ohm-centimeters - No chloride or sulfate testing is required.• 2000 - 5000 ohm centimeters -
	Perform the specified chloride and sulfate tests.
Chlorides, AASHTO T291, Method B	< 100 parts per million (ppm)
Sulfates, AASHTO T290, Method B	< 200 parts per million (ppm)

Provide randomly selected backfill samples for testing 30 calendar days before use, as directed by the Representative. Obtain approval for backfill material, before use. Each sample submitted is to consist of the following:

- Three bags of approximately 20 kg (40 pounds) containing a normal specimen representing the complete gradation.
- One bag containing approximately 5 kg (10 pounds) of material passing the 2.36 mm (No. 8) sieve.

During the backfilling operation, under the direction and supervision of the Representative, obtain verification samples (n=3) as specified in Section 703.5(b), Table F. The Representative will select sample locations according to PTM No. 1.

If the material sampled fails to meet the specified requirements, immediately discontinue its use, and remove and replace all material placed since the last passing acceptance or verification sample was obtained. Do not continue backfilling until new backfill material has been sampled and approved.

(f) Pipe Underdrain. Section 610.2(a)

(g) Polyvinyl Chloride (PVC) Pipe. Section 610.2(a)4.

(h) Cast-in-Place Concrete. Section 704. Provide Class A Cement Concrete for footings and leveling pads and Class AA Cement Concrete for curbs, concrete bridge barriers or traffic barriers, moment slabs, and backwalls above bridge seats.

(i) Geomembrane. Section 736.

- Dimensional Stability (ASTM-D1204).....+2 %

(j) Geotextiles. Class 4, Type A, Section 735

(k) Certification. Certify as specified in Section 106.03(b)3. Furnish a copy of the results of all tests performed which are necessary to assure compliance with the specifications. Furnish a copy of Form CS-4171 with each shipment of precast products.

(l) Nonshrink Grout. Section 1080.2(c)

IV. CONSTRUCTION -

(a) Shop Drawings. Before fabrication, submit and obtain approval for shop drawings. Show complete fabrication details and dimensions, as well as handling, transportation, and construction procedures for all wall elements.

(b) Excavation and Foundations. Grade the structure foundation level, or to the indicated slope, for a width equal to or exceeding the length of the reinforcing strips or mesh, or as indicated. Before wall construction, except where constructed in rock, compact the foundation with a smooth wheel vibratory roller. Remove any foundation soils found to be unsuitable and replace with granular material. Excavate, as specified in Section 204, to the limits and construction stages indicated.

Do not begin wall erection until the foundation has been accepted.

Construct cast-in-place footings and leveling pads as specified in the applicable portions of Section 1001.3, to the dimensions and details indicated and within the right of way, before placement of precast wall units.

Place bottom of footing and/or leveling pad at a minimum depth equal to prevailing frost depth but not less than 900 mm (3 feet) below finished ground elevation unless otherwise indicated.

(c) Stub Abutment on Piles. If stub abutment supported on piles is indicated, construct stub abutment support system, during placement of MSE wall backfill, as follows:

- Drive all piles before MSE wall installation.
- Encase each pile in a Smooth Wall or Corrugated Galvanized Steel (SWCGS) pipe of sufficient thickness to prevent buckling or distortion during placement and compaction of wall backfill.
- Place spacers between the pile and the SWCGS pipe to prevent the pipe from coming in contact with the pile during backfilling of the wall.
- Extend SWCGS pipe from the bottom of MSE wall backfill to the bottom of the bridge stub abutment footer.
- After positioning, seal the top of the SWCGS pipe to prevent debris accumulation during placement of wall backfill, and keep the pipe sealed until filled with Type A fine aggregate.

- Fill the SWCGS pipe loosely with Type A fine aggregate either before or after completion of MSE wall construction and as directed and approved by the Representative.

(d) Wall Erection. Align precast concrete panels, vertically, using inserts cast into the top edge of the panels. Place panels in successive horizontal lifts, in the sequence indicated or shown on the approved shop drawings, as backfill placement proceeds. As the specified granular fill material is placed behind a panel, maintain the panel in a vertical position by means of clamps placed at the junction of adjacent panels and temporary wooden wedges placed in the horizontal joint at the junction of the two adjacent panels on the external side of the wall. Provide external bracing, if required, for the initial lift.

Install drainage system behind the wall as indicated or as shown on the approved shop drawings.

At least two, but no more than three, rows of panel wedges are to remain in place at all times during construction. Carefully remove wooden wedges, as panel erection progresses, so as to prevent chipping or cracking of concrete panels. Properly repair any damage to erected concrete panels as directed. Remove all wedges when the wall is completed.

Install joint filler as indicated or as shown on the approved shop drawings.

Cover all joints between panels, on the back side of the wall, with geotextile fabric. Apply adhesive to panels only. Do not apply adhesive to geotextile fabric or within 50 mm (2 inches) of a joint. Provide geotextile fabric having a minimum width of 300 mm (12 inches), and overlap fabric a minimum of 100 mm (4 inches).

(e) Backfilling. Have backfill placement closely follow the erection of each lift of panels. Roughly level the backfill at each reinforcing element location before placing and bolting.

As indicated, place reinforcing elements normal to the face of the wall. Do not exceed 200 mm (8 inches) (loose) for the maximum lift thickness and closely follow panel erection. Decrease lift thickness if necessary, to obtain the specified density.

Place backfill in such a manner as to avoid any damage or disturbance to wall materials or misalignment of facing panels. Remove and replace any wall materials which become damaged during backfill placement. Correct any misalignment or distortion of wall facing panels due to placement of backfill. Place backfill to the level of the connection and in such a manner as to assure that no voids exist directly beneath reinforcing elements.

Under fill conditions, place specified backfill material to the dimensions as indicated.

At the end of each day, slope the last level of backfill away from the wall in order to rapidly direct runoff away from the wall face. In addition, do not allow surface runoff from adjacent areas to enter the wall construction site. Place and compact the backfill as specified in Section 1001.3(q)2.b; except, the 7 day waiting period for backfilling is not required. Place backfill material at a moisture content less than or equal to the optimum moisture content. Compact backfill without causing disturbance to or distortion of reinforcing members and panels. Achieve compaction within 900 mm (3 feet) of the wall by making at least three passes with light mechanical tampers, rollers, or vibratory systems.

For applications where stub abutments are to be used to support bridge or other structural loads, compact the top 1525 mm (5 feet) below footing elevation to 100% of the determined dry mass (weight) density.

Do not exceed 20 mm (3/4 inch) for vertical tolerances and horizontal alignment tolerances when measured along a 3 m (10-foot) straightedge. The maximum allowable offset in any panel joint is 20 mm (3/4 inch). Do not exceed an overall vertical tolerance for the wall (top to bottom) of 12 mm per 3 m (1/2 inch per 10 feet) of wall height. Provide uniform vertical and horizontal joint openings between panels.

Check the top row of panels with a level and 3 m (10-foot) straightedge, after each layer of backfill material is placed and compacted. Satisfactorily correct panels not within specified tolerances, before placing additional backfill material.

For structures at stream crossings, provide a blanket of No. 57 coarse aggregate behind the wall panels, to a width of 460 mm (18 inches), for the full length and to the height indicated (minimum 100-year flood level).

Provide Class 2, Type A geotextile fabric, with a minimum overlap of 100 mm (4 inches), at the interface of the coarse aggregate blanket and the granular fill material.

Place geomembrane as indicated. Overlap seams a minimum of 457 mm (18 inches) or seam joints by use of extrusion welding methods with a maximum overlap of 100 mm (4 inches).

Perform site-specific field or laboratory pullout tests, for fully saturated conditions, as indicated or directed and in the presence of the Representative.

(f) Pipe Underdrain. Place, as required, as specified in Section 610.3 and as indicated.

(g) Dewatering. Furnish, install, operate, and maintain satisfactory dewatering systems as required to maintain the site in a dry and workable condition. Include all equipment and materials, and continue as long as necessary.

(h) Technical Assistance. Arrange for a company representative to be present at the project site to assist the fabricator, Contractor, and Representative until they are familiar and confident in casting, installation, and erection procedures. Arrange for monthly visits to the project site by a company representative/engineer during wall construction. Provide a technical representative to assist in the event unusual problems or special circumstances arise.

Project Specific Details:

Special Provision: **N11902A - a11902 AGGREGATE AND PIPE FOR ACIDIC DRAINAGE**

Item(s) Associated:

Header:

AGGREGATE AND PIPE FOR ACIDIC DRAINAGE

Provision Body:

I. DESCRIPTION—This work provides non-alkaline aggregate and plastic pipe in combination drains, underdrains, base drains, subgrade drains, subsurface drain outlets, and miscellaneous drainage for the conveyance of acidic drainage.

II. MATERIAL—

(a) Aggregate. Coarse Aggregate, Fine Aggregate, and Local Stone as specified in Section 604.2(b), Section 610.2(b), Section 612.2, and Section 613.2, excluding material produced from any alkaline materials such as limestone or other calcareous rock, slag, or recycled concrete.

(b) Pipe. As specified in Section 604.2(a) and Section 610.2(a), excluding metal and concrete pipe. Use only Polyethylene (PE), Polyvinyl Chloride (PVC), Polypropylene (PP), or Acrylonitrile-Butadiene Styrene (ABS) pipe, as applicable.

III. CONSTRUCTION—At acidic drainage locations identified on the plans and as directed by the Representative, construct subsurface drains using non-alkaline aggregates and plastic pipes. Construct as specified in Section 604.3, Section 610.3, Section 612.3, and/or Section 613.3, as applicable and indicated.

IV. MEASUREMENT AND PAYMENT—Payment for these materials is included in the standard pay items as specified in the applicable Section 604.4, Section 610.4, Section 612.4, and Section 613.4, for the type and quantity of drain or outlet constructed.

Project Specific Details:

Special Provision: **N12301A - a12301 PERMANENT ANCHORED WALLS**

Item(s) Associated:

Header:

PERMANENT ANCHORED WALLS

Provision Body:

I. DESCRIPTION

This work consists of performing all work necessary for the installation of permanent anchored wall.

II. QUALIFICATIONS

Be experienced, or choose a subcontractor who is experienced, in the design and construction of permanent anchored walls, and meet the following qualifications:

- (a) Provide proof of at least 3 years of experience in the installation of permanent anchored walls.
- (b) Submit a list containing at least 5 projects which demonstrate installation experience in permanent anchored walls. Include a brief description of each project and the name and phone number of owner's representative knowledgeable in each project listed.
- (c) Provide a registered Professional Engineer, who has at least 3 years of experience in the design and construction of permanent anchored walls, to supervise the work.
- (d) Provide drill operators and on-site supervisors having a minimum of 3 years of experience installing permanent anchored walls.
- (e) Do not use names of consultants or manufacturer's representatives to meet the requirements of this section.
- (f) Allow at least 21 calendar days for approval of staff qualifications.

III. DESIGN

Submit to the Engineer, for review and for approval, plans and design calculations for the anchored walls. Allow a maximum of 30 calendar days (45 calendar days if design variations are proposed), from the day final plans are received by the Engineer, for review and approval. Do not start work prior to approval of design and completed plans. The design must follow PennDOT Design Manual Part 4M, or FHWA DP-68-1R November 1984 where no specific methodology or criteria are available in PennDOT Design Manual Part 4M (Design Manual Part 4). In cases where the two publications conflict, the DM-4M will govern unless otherwise approved by the Chief Bridge Engineer. In the event that a clear order of predominance cannot be established,

or a difference in the interpretation of the design cannot be resolved, the Chief Bridge Engineer will be arbiter and such decision will be final. Include and address the following in plans and design submission:

(a) Variations in design with bid documents, if proposed.

(b) Four complete sets of design plans (full size with at least one set of reproducible mylars) and calculations which include:

1. An explanation of all symbols and notations.
2. All geotechnical information including soil and rock test results, ground water information, design earth pressures, and all related information used in the design.
3. External stability and slope stability analyses of the soil-wall system. Provide a minimum factor of safety of 1.5.
4. Estimated anchor capacity, tendon type and capacity, anchorage type, unbonded and bonded lengths, total anchor length, installation angle anchor locations and spacings.
5. A description of the anchor installation including drilling, grouting, and stressing information.
6. Soldier pile (steel sheet piles, H-piles, concrete piles) sizes and spacing, ground support system, wale sizes and spacing (lagging type and size, timber grade, and pressure treatment), hardware details, pile embedment depth, and installation methods.
7. Details, dimensions, and schedules of all reinforcing steel in soldier piles where poured concrete piles are used, lagging and concrete facing including dowels and/or studs for attaching a concrete facing to the anchored wall, if applicable.
8. Corrosion protection details for the anchors, piles, wales, hardware, and other components.
9. Detailed plans for proof, performance, creep and lift-off testing of anchors indicating loading and measuring devices to be used, test locations, and testing procedures to be followed.
10. Analyses of the states of stress in soldier piles, lagging, and anchors at critical stages of the construction using assumptions at least equivalent to the following earth pressure cases:
 - Soldier piles and lagging cantilevered during construction prior to installation of the first row of anchors.
 - Intermediate excavations for subsequent anchor installations.
 - Final construction condition assuming excavation for drainage facilities in front of wall, as indicated.
11. Analysis of the completed wall to demonstrate redundancy. Use earth pressure theories as outlined in DM-4M(DM-4). Submit for Department approval, as part of a preliminary design submission, the theory and design loads prior to preparing the final design. Allow 4 weeks for Department review.

(c) A plan showing the location and/or orientation of each anchor.

(d) Details of the anchor tendon and the corrosion protection system, including the following:

- Spacers and their location
- Centralizers and their location

- Corrosion protection system for unbonded length
- Corrosion protection system for bonded length
- Anchorage and trumpet
- Corrosion protection system for anchorage

(e) Plans for a permanent drainage system for the site.

(f) Anchors. Select the ground anchor type and the installation method. Determine the bond length and anchor diameter necessary to develop the required load. Conform with the TESTING subsection of this specification. Perform a geotechnical investigation to obtain design parameters for the anchors, if not available. Design anchors to remain within the right-of-way.

Specify corrosion protection for anchor tendons in accordance with all the requirements of this specification.

Determine the tendon size so that the anchor design load does not exceed 50% of the Guaranteed Ultimate Tensile Strength (GUTS) of the tendon. Size the tendon so the maximum anchor test load does not exceed 75% of the GUTS of the tendon.

Use a bond length sufficient to develop the design load selected for the anchor, but not less than 4600 mm (15 feet) nor more than 12 200 mm (40 feet). Provide the following factors of safety:

- SOIL - Factor of safety = 2.5
- ROCK - Factor of safety = 3.0
- CORROSION PROTECTION - Provide not less than 2 layers of corrosion protection.

Encapsulate the tendon bond length unless otherwise directed by the Engineer. Protect the bond length portion of the tendon from corrosion, by encapsulation in a grout-filled corrugated plastic or deformed steel tube. Grout the tendon inside the encapsulation in the drill hole. Center the tendon within the bond length encapsulation with a minimum of 5 mm (0.20 inch) of grout cover. Use spacers along the bond length of multi-element tendons to separate the elements of the tendon so the prestressing steel will bond to the encapsulation grout.

Use centralizers to provide a minimum of 13 mm (0.5 inch) of grout cover over the tendon bond length encapsulation. Attach centralizers to the encapsulation so that their center to center spacing will not exceed 3000 mm (10 feet). Locate upper centralizer a maximum of 1500 mm (5 feet) from the top of the tendon bond length. Locate lower centralizer a maximum of 300 mm (1 foot) from the bottom of the tendon bond length.

Centralizers are not required on encapsulated, pressure-injected ground anchor tendons if the ground anchor is installed in coarse-grained soils using grouting pressures greater than 1 MPa (150 psi).

Centralizers are not required on encapsulated, hollow-stem augered ground anchor tendons if the ground anchor is grouted through the hole and is maintained full of grout 230 mm (9 inch) slump or less during extraction of the auger.

(g) Unbonded Length. Specify a free anchor length which extends beyond the existing or theoretical failure plane, but not less than 4.5 m (15 feet).

Specify corrosion protection of the unbonded length by a sheath completely filled with corrosion inhibiting grease or grout, or a heat shrinkable tube with an elastic adhesive. If grease is used under the sheath, indicate on the plans how grease will be prevented from escaping at the ends of the sheath. Completely coat the tendon with grease and fill the void between the tendon and the sheath. Indicate on the plans how the transition between the bonded length and the unbonded length corrosion protection will be provided.

Provide a separate bondbreaker if the sheath is not fabricated from a smooth tube.

(h) Anchorage and Trumpet. Use nonrestressable anchorage devices except where otherwise indicated.

If specified, use restressable anchorages compatible with the post-tensioning system. Provide written recommendations from the supplier concerning the restressing of the tendons.

Size the bearing plates as follows:

1. Do not allow the bending stresses in the plate to exceed the yield strength of the steel when a load equal to 95% of the minimum GUTS of the tendon is applied.

2. Section 3.1.7 of the PTI, "Guide Specification for Post Tensioning Materials", 4th Edition.

Weld the trumpets to the bearing plates. Provide trumpets with an inside diameter equal to or larger than the hole in the bearing plates, and long enough to accommodate movement of the structure during testing and stressing. For strand tendons with encapsulation over the unbonded length, size the trumpet to enable the tendon to make the transition from its unbonded length diameter to its diameter at the anchor head, without damaging the encapsulation. For trumpets filled with corrosion-inhibiting grease, provide a permanent Buna-N rubber or approved equal seal between the trumpet and the unbonded length corrosion protection. For trumpets filled with grout provide a temporary seal between the trumpet and the unbonded length corrosion protection, or have the trumpet overlap the unbonded length corrosion protection by a minimum of 300 mm (1 foot), and fit tightly.

(i) Design wall with full height drains at each panel point. Specify 100 mm (4-inch) I.D. weep holes protected with a non-woven, needle-punched geotextile at the vertical drain. Connect weep holes to vertical drain.

IV. MATERIALS

(a) General. Submit certified mill test reports, for the anchor prestressing steel, the bearing plate steel, and the anchor assembly hardware and accessories, to the Engineer for review and approval. The Engineer will approve or reject the prestressing steel and bearing plate steel within 5 working days after receipt of the test reports. Do not use prestressing steel or bearing plates in the work without the Engineer's approval.

(b) Admixtures. Admixtures which control bleeding, improve flowability, reduce water content and retard set may be used in the grout subject to the written approval of the Engineer. Expansive admixtures may only be added to grout used for filling sealed encapsulations, trumpets and anchorage covers. No accelerators are permitted. Use admixtures compatible with prestressing steels and cement being used, and mix in accordance with the manufacturer's recommendations.

(c) Anchorage Covers. Fabricate anchorage covers from steel or ductile iron with a minimum wall thickness of 2.5 mm (0.10 inch). Attach cover securely to the bearing plate. Grease filled covers must form a permanent watertight enclosure for the anchorage device.

(d) Anchorage Devices. Design anchorage devices not to exceed 95% of the minimum Guaranteed Ultimate Tensile Strength (GUTS) of the device during testing. Conform to the static strength requirements of Section 3.1.6(1) and Section 3.1.8(1) of the PTI "Guide Specification for Post-Tensioning Materials", 4th Edition.

(e) Bearing Plates. Fabricate bearing plates from steel conforming to AASHTO-M183 unless otherwise specified.

(f) Bondbreaker. Provide a bondbreaker fabricated from a smooth plastic tube or pipe conforming to ASTM-D4101-82.

(g) Shells (Casings for Predrilled Holes). Section 1006.2(a)

(h) Grout. Nonmetallic, nonshrink or expansive. Use Type I, II or III Portland cement conforming to AASHTO-M85. Use Type II in detrimental environments, if indicated.

(i) Cement Concrete. Section 704.1. Furnish Class A encasement concrete for steel soldier pile sockets as indicated. Provide mix design for low strength encasement concrete above socket.

(j) Centralizers. Fabricate centralizers from plastic, steel or other material which is nondetrimental to the prestressing steel. Do not use wood. Position centralizer to provide a minimum of 13 mm (0.5 inch) of grout cover and to permit free flow of grout.

(k) Drilled Caissons. Section 1006.2. Adequately reinforce the entire caisson as required by the design.

(l) Fabricated Structural Steel. Section 1105.02

(m) Corrosion Inhibiting Grease. Use corrosion inhibiting grease conforming to the requirements of Section 3.2.5 of the PTI, "Specifications for Unbonded Single Strand Tendons", 4th Edition.

Do not exceed the following allowable content of deleterious substances in the grease:

Compound Test Method Maximum Quantity (PPM)

Chlorides ASTM-D572 10

Nitrates ASTM-D992 10

Sulfides APHA "Sulfides in Water" 10

(n) Joint Sealing Material. Section 705.4(c)

(o) Mortar. Section 1001.2(d)

(p) Piles. Section 1005.2

(q) Prestressing Steel. Section 1107.02(m)3., except ASTM-A421 prestressing wire; or steel bars conforming to AASHTO-M275, Type II (Deformed) or ASTM-A615, Gr. 60 (Deformed). Fabricate single or multi-element ground anchor tendons from these prestressing steels.

(r) Prestressing Steel Couplers. No couplers are allowed.

(s) Protective Coating for Reinforced Concrete Surfaces. Section 1019.2

(t) Reinforcement Bars. Section 709.1

(u) Sheath. Use a sheath as part of the corrosion protection system for the unbonded length portion of the tendon. Fabricate sheath from one of the following:

- A polyethylene (PE) tube pulled or pushed over a strand. Use polyethylene Type II, III or IV as defined by ASTM-D1248. Minimum wall thickness of 1.52 +/- 0.25 mm (60 +/- 10 mils) for tubing.
- A hot-melt extruded polypropylene tube applied over a corrosion inhibiting grease coated strand. Use polypropylene Type II 26500-D as defined by ASTM-D2146. Minimum wall thickness of 1.52 +/- 0.25 mm (60 +/- 10 mils) for tubing.
- A grout-filled corrugated tube conforming to the requirements for bond length encapsulation.

- A heat shrinkage polyolefin tube coated with an elastic adhesive. Provide tube having a nominal wall thickness of 0.6 mm (24 mils) prior to shrinking. Provide elastic adhesive inside tube with a nominal thickness of 0.5 mm (20 mils).

(v) Electrodes. Furnish E70XX low hydrogen electrodes (excluding E7014 and E7024).

(w) Spacers. Use spacers to separate elements of a multi-element tendon. Fabricate spacers from plastic, steel or other material which is nondetrimental to the prestressing steel. Do not use wood. A combination centralizer-spacer can be used.

(x) Tendon Bond Length Encapsulation. When plans require the tendon bond length to be encapsulated to provide additional corrosion protection, fabricate the encapsulation from one of the following:

- High density corrugated polyethylene (PE) tubing conforming to the requirements of AASHTO-M252 and having a minimum wall thickness of 0.76 mm (30 mls), or approved equal.
- Deformed steel tubing or pipe with a minimum wall thickness of 0.64 mm (25 mils).
- Corrugated, polyvinyl chloride (PVC) tubing as provided by Dywidag Systems International or approved equal. Dywidag Systems International's part numbers are 26E415, 32E415, 32E433 and 36E433.

Handle and store the tendons in such a manner as to avoid damage or corrosion. Damage to the prestressing steel as a result of abrasions, cuts, nicks, welds, and weld splatter is cause for rejection by the Engineer.

(y) Trumpet. Fabricate trumpet, which is used to provide a transition from the anchorage to the unbonded length, from a steel pipe or tube conforming to the requirements of ASTM-A53 for pipe or ASTM-A500 for tubing. Provide a minimum wall thickness of 5 mm (0.20 inch).

(z) Water. Section 720.1

(aa) Waterproofing. Section 680.2(a)

(bb) Steel Pipe. ASTM-A53

(cc) Epoxy Resin. ASTM-C881

(dd) Polyethylene Plastic Molding and Extrusion Materials. ASTM-D1248-81a

(ee) Polyvinyl Chloride (PVC) Plastic Pipe, Schedule 40, 80 and 120. ASTM-D1785-83

(ff) Propylene Plastic Injection and Extrusion Materials. ASTM-D4101

(gg) Geotextiles. Section 735

(hh) Epoxy Protection for Structural Steel. Section 1092

(ii) Welding. Section 1105.02(t)

(jj) Precast Concrete Face Panels/Concrete Lagging. Provide concrete with a 28 day minimum compressive strength of 28 MPa (4000 psi) as determined in accordance with PTM No. 604 and with an entrained air content of 6% in the plastic state within a tolerance of plus or minus 1.5% as determined in accordance with PTM No. 615.

(kk) Cast-in-Place Face Wall. Section 704.1. Furnish Class A Cement Concrete.

(II) Shotcrete. ACI Manual of Concrete Practice Part 5 - 1989; ACI 506R-85 and ACI 506.2-77. Use wet-mix method.

V. CONSTRUCTION

(a) General. Do not order material, or start work on any anchored wall system, until written approval of personnel qualifications and design plans is received.

Expect work suspension if unqualified personnel are substituted for approved personnel during construction.

Be fully liable for additional costs resulting from the suspension of work. No adjustment in contract time is permitted as a result of the suspension of work.

(b) Drilling Equipment. Use drilling rigs of the proper type and capacity for the proposed work and maintain in good operating condition to the satisfaction of the Engineer. When drilling through bedrock, use an auger head fitted with teeth specifically designed for cutting rock efficiently, or core the rock. Do not use shot drilling.

(c) Drilling. Use core drilling, rotary drilling, percussion drilling, auger drilling or driven casing. Locate drill holes within 300 mm (12 inches) of the location shown on the approved plans at ground surface. Drill holes plumb, or to the inclination shown on the approved plans, and within specified tolerances.

(d) Drilling for Piles. Unless otherwise specified or indicated, all piles will be drilled piles constructed in accordance with Section 1006.3 and as follows:

1. Functional Requirements for Prebored Holes. Drill all prebored holes of the diameter indicated on approved plans, into bedrock or soil to the minimum depths indicated, or to a greater diameter and/or depth as required by field conditions, so that a competent, non-yielding foundation socket for piles is assured. Socket is defined as the embedment length of the pile. Minimum required socket lengths will be indicated.

2. Drilling Procedure and Depth. Observe the drilling rate and resistance as the boring of each hole is advanced, and record the relative drilling rate. If a satisfactory socket length is not obtained when the bottom of pile elevation indicated by design is reached, continue drilling to a greater depth until a minimum satisfactory socket length is obtained. During the drilling of each pile socket, record any soft seams, discontinuities, or decreases in drilling resistance. Evaluate the capability of the pile socket to support the lateral and vertical design loads. Increase the socket length as required, subject to the acceptance of the Engineer, to assure that a competent, non-yielding foundation socket is developed.

3. Casing. Bored holes may require casings through fill or soil to prevent collapse of overburden, or, when necessary, to shut off seepage water. Keep the casing in place through the cleaning and inspection of the prebored holes, and withdraw either during or after concrete placement.

4. Cleaning of Predrilled Holes. After the holes have been drilled to the proper depth, remove all loose rock, earth, and debris and water from the bottom of the hole by approved methods acceptable to the Engineer. Make a complete check, and verify that all holes have been drilled to a sufficient depth to assure a competent, non-yielding socket foundation.

(e) Placing Piles. Set soldier piles or reinforcing steel, and fill holes with concrete, after drilling of each hole is complete.

If any water accumulates in the prebored holes after cleaning and inspection, prior to concrete encasement, remove the water by approved method, or, alternatively, place the concrete at the bottom of the hole below the accumulated water by tremie methods.

If driven piles are indicated, drive them to the specified depth. A tip elevation tolerance of +/- 300 mm (+/- 1 foot) is acceptable. Larger deviations must be approved by the Engineer. Vertical and horizontal tolerances are as specified on the plans.

(f) Drilled Holes for Anchors. Drill holes for anchors at the locations shown on the approved design drawings. Provide a hole diameter of 75 mm (3 inches) if the bond length is pressure grouted pressure 415 kPa or greater (pressure 60 psi or greater) and 100 mm (4 inches) if non-pressure grouted pressure 415 kPa or greater (pressure less than 60 psi). Provide casing where necessary to maintain an open hole until grouting begins. Extend the hole a minimum of 50 mm (2 feet) beyond the specified tendon length, but do not extend beyond the right-of-way limits shown on the approved plans unless otherwise directed by the Engineer. Drill holes to the inclination specified within a 3 degree tolerance. If this tolerance is not met, select another hole location within 300 mm (1 foot) of the original, or as directed by the Engineer, and provide computations to prove that the new location is adequate. Pressure grout the unused hole and have the grout attain the minimum required strength prior to drilling the new hole.

(g) Tendons. Fabricate tendons in the shop, or in the field, from prestressing steel and materials conforming to the requirements of the MATERIALS subsection of this specification. Fabricate tendons in accordance with approved details and free of dirt, detrimental rust, or other deleterious substances. Handle and store in a manner to avoid corrosion and physical damage. Damage such as abrasions, cuts, nicks, welds, weld splatters, or heavy corrosion and pitting, will be a cause for rejection of the tendon. Replace rejected tendons at no cost to the Department in terms of material replacement and/or resulting time delays. Remove grease from the bond length and clean it thoroughly prior to installation to ensure bonding with the grout.

Insert tendon into the drilled hole to the desired depth without obstruction. When the tendon cannot be completely inserted, remove the tendon from the drill hole and clean or redrill the hole to permit insertion. Do not drive or force tendon into the hole. Do not bend the tendon in order to enable the bearing plate to be connected to the supported structure.

Protect prestressing steel if welding is to be performed in the vicinity. Grounding of welding leads to the prestressing steel is prohibited. Protect prestressing steel from dirt, rust or deleterious substances. Heavy corrosion or pitting is cause for rejection by the Engineer. A light coating of surface rust is acceptable if it can be removed completely from the steel by wiping with a cloth.

Use care in handling and storing the tendons at the site. Examine prior to inserting a tendon into the drill hole. Examine the tendon for damage to the encapsulation and the sheathing. Repair damaged encapsulation in accordance with the supplier's recommendation. Repair damaged smooth sheathing with ultra high molecular weight polyethylene (PE) tape. Spirally wind the tape around the tendon so as to completely seal the damaged area. Pitch the spiral to ensure a double thickness at all points.

Provide equipment for fabricating, handling, and placing tendons such that it does not damage or deteriorate the prestressing steel or the anchorages.

(h) Grouting. Use a neat cement grout or a sand-cement grout. Do not use cement which contains lumps or other indications of hydration. Mix approved admixtures in accordance with Department specifications and/or the manufacturer's recommendations.

Submit the grout mix design and test results along with pressure gauge calibration data for acceptance 30 days prior to construction.

Use grouting equipment that produces a grout free of lumps and undispersed cement. Use a helical screw type grout pump. Equip the pump with a pressure gauge capable of measuring pressures of at least 1 MPa (150 psi), or twice the actual grout pressure used, whichever is greater. Size the grouting equipment to enable the grout to be pumped in one continuous operation. Provide mixer capable of continuously agitating the grout.

Inject grout from the lowest point in the drill hole. Pump grout through grout tubes or drill rods. Grout before or after insertion of the tendon as directed. Maintain a minimum grout pressure of 170 kPa (25 psi), or as directed by the Engineer. Record the quantity of grout and the grout pressures. Measure grout pressure at the top of the hole. Control grout pressures and grout takes to prevent excessive heave in cohesive soils, or fracturing of rock formations.

Use "Single Stage" grouting unless otherwise directed. Place grout above the top of the bond length at the same time as the bond length grout but do not place under pressure. Continue pumping grout until fresh grout flows from the top of the hole. Remove sufficient grout so as to prevent the grout at the top of the drill hole from contacting the back of the structure or the bottom of the trumpet.

Upon completion of grouting, the grout tube filled with grout may remain in the hole.

Do not load the tendon for a minimum of 3 days after grouting, or until the minimum required grout strength is achieved. Replace failed tendons.

(i) Precast Concrete Face Panels/Concrete Lagging. Section 714.4 thru 714.13 and as follows:

1. General. Submit shop drawings for the precast panels/lagging, and the design for any lifting lugs or erection bolts, for acceptance. Do not start fabrication until approval is obtained from the Engineer.

Submit the method of placement for acceptance.

Provide cast-in-place or precast copings as indicated.

Provide epoxy coated reinforcement bars in accordance with Design Manual Part 4, Section 3.7.1(b).

2. Testing and Inspection. Acceptability of the precast panels will be determined on the basis of entrained air in the concrete mixture, compression testing, and visual inspection. Furnish facilities and perform all necessary sampling and testing in an expeditious and satisfactory manner. Acceptance will be as herein specified.

The concrete panels will be accepted, with respect to compressive strength, on the basis of production lot sample test results.

Acceptance with respect to visual inspection will be based on compliance with the requirements of Section 713.2(d). In addition, units may be rejected for color variations on the front face due to excess form oil or for other reasons.

3. Concrete Finish. Provide a conventional surface finish for the front face, unless otherwise indicated or specified, and a floated surface finish for the rear face. Screed the rear face of the panel to eliminate open pockets of aggregate and surface distortions in excess of 6 mm (1/4-inch).

When a special or decorative surface finish is required, provide a typical sample of the face panel for approval, showing the color, texture and finish intended to be used.

4. Tolerances. Manufacture all units within the following tolerances:

- Do not exceed an angular distortion with regard to height of 5 mm (0.2 inch) in 1500 mm (5 feet).
- Panel Dimension. Panel connection devices to be within 25 mm (1 inch) of the specified position. All other dimensions to be within 5 mm (3/16-inch).
- Panel Squareness. Do not exceed 13 mm (1/2-inch) as determined by taking the difference between diagonal measurements.
- Panel Surface Finish. Measured over a length of 1500 mm (5 feet), defects on smooth formed surfaces not to exceed 3 mm (1/8-inch) and on texture finished surfaces not to exceed 8 mm (5/16-inch).

5. Panel Installation. Repair or replace any element damaged during handling, transporting, erecting, or backfilling or any element that cannot be satisfactorily placed in the wall.

Submit the method of placement for acceptance.

Place panels/lagging horizontally on a 25 mm (1-inch) minimum mortar levelling pad on top of the concrete pile encasement.

Ensure that cast-in-place concrete walers and cap beams have attained the required compressive strength before placing backfill or tensioning anchors. Form chamfers into the front face of cast-in-place wales such that the appearance of the wall will be the same as if precast wales were used.

Place all fill behind the lagging prior to anchor stressing. If anchors must be stressed prior to fill due to a special situation, protect anchors from any fill loads. Construction sequencing must be preapproved for any such special situation.

(j) Installation of Trumpet and Anchorage. Extend the corrosion protection surrounding the unbonded length of the tendon beyond the bottom seal of the trumpet, or 300 mm (1 foot) into the trumpet if no trumpet seal is provided. Extend the corrosion protection or lengthen the trumpet if the protection does not extend beyond the seal or sufficiently far enough into the trumpet.

Do not allow contact between the corrosion protection surrounding the unbonded length of the tendon and the bearing plate or the anchor head during testing and stressing. If too long, trim the corrosion protection to prevent contact.

Place the bearing plate and anchor head so that the axis of the tendon and the drill hole are both perpendicular to the bearing plate within 3 degrees, and the axis of the tendon passes through the center of the bearing plate.

Fill the trumpet completely with corrosion inhibiting grease or grout. Grease can be placed any time during construction. Place grout after the anchor has been tested. Demonstrate to the Engineer that the procedures selected for placement of either grease or grout will produce a completely filled trumpet.

Cover all anchorages permanently exposed to the atmosphere with a corrosion inhibiting, grease-filled or grout-filled cover. Demonstrate to the Engineer that the procedures selected for placement of either grease or grout will produce a completely filled cover. If the plans require restressable anchorages, use only corrosion inhibiting grease to fill the anchorage cover.

(k) Submit a report to the Engineer within 21 calendar days after completion of the ground anchor work containing:

- As-built drawings showing the location of the ground anchors, total anchor length, unbonded and bonded lengths.
- Mill test reports for the tendons used in the installation.
- Grouting record indicating the cement type, quantity injected, grout pressures, and grout strength.
- Load test results and graphs.
- Corrective procedures for failed anchors.
- Soldier Pile Log showing pile numbers, types, sizes, actual lengths before driving, driving dates, penetration rates, and final lengths.

V. TESTING AND STRESSING

(a) General. Submit, for review and approval, calibration data for each test jack, main pressure gauge, load cell and backup pressure gauge to be used. Calibration must have been certified within the last 30 days. The jack

and pressure gauges are to be tested together as a system. Allow 5 working days after receipt of the data for the Engineer's approval. Do not begin testing until the Engineer has approved the calibrations.

Test each anchor in the presence of the Inspector. The maximum test load is not to exceed 75% of the minimum GUTS. Apply the test load to the entire tendon. Do not stress single elements of multi-element tendons.

(b) Testing Equipment. Use dial gauge or vernier scale capable of measuring to 0.001 inch of ground anchor movement. Provide movement-measuring device having a minimum travel equal to the theoretical elastic elongation of the unbonded length plus one half the tendon bond length at the maximum test load plus 1 inch.

Use a hydraulic jack and pump to apply the test load. Use jack and a calibrated pressure gauge. Have jack and pressure gauge calibrated as a unit by an independent approved testing laboratory. Perform the calibration within 45 days of the test date. Do not begin testing until the Engineer has approved the calibration. Provide pressure gauges graduated to accurately read 1% of the maximum load to be applied to anchors. Do not allow the ram travel of the jack to be less than the theoretical elastic elongation of the unbonded length plus the tendon bond length at the maximum test load plus 25 mm (1 inch).

Calibrate the backup pressure gauge with the test jack and main pressure gauge.

Provide a calibrated load cell and readout to be used for all tests.

Place the stressing equipment over the anchor tendon in such a manner that the jack, bearing plates, load cells and stressing anchorage are axially aligned with the tendon, and the tendon is centered within the equipment.

(c) Performance Test. Performance test 5% of the ground anchors, or a minimum of 3 ground anchors, whichever is greater, from each load category in the presence of the Inspector. The Engineer will select the ground anchors to be Performance Tested. Test remaining ground anchors in accordance with the Proof Test procedure.

Conduct the Performance Test by incrementally loading and unloading the anchor in accordance with the following schedule. Raise the load from one increment to another as rapidly as possible. Measure and record the anchor movement to the nearest 25 μ m (0.001 inch), with respect to an independent fixed reference point, at the alignment loading and at each incremental loading. Place the backup pressure gauge in series with the main pressure gauge to monitor the load during each Performance Test.

Performance Test Schedule

LOAD

AL
0.25DL*
AL
0.25DL*
0.50DL*
AL
0.25DL
0.50DL
0.75DL*
AL
0.25DL*
0.50DL
0.75DL
1.00DL*
AL
0.25DL

0.50DL
0.75DL
1.00DL
1.25DL*
AL
0.25DL
0.50DL
0.75DL
1.00DL
1.25DL
1.50DL* Hold for creep test (Short Term).
Reduce to lock-off load

Where: AL - is the alignment load
DL - is the anchor design load
* - refers to paragraph below

Recalibrate, at no additional expense to the Department, the jack, main pressure gauge and backup pressure gauge if the load determined by the backup pressure gauge and the load determined by the main pressure gauge differ by more than 10%.

At load increments other than the maximum test load, hold the load just long enough to obtain the movement reading.

Hold the maximum test load for 10 minutes in a Performance Test. Start the load hold period as soon as the maximum test load is reached. Measure and record the anchor movement with respect to a fixed reference at 1 minute, 2, 3, 4, 5, 6 and 10 minutes. If the anchor movement between 1 minute and 10 minutes exceeds 1.02 mm (0.04 inch), hold the maximum test load for an additional 50 minutes. If the load hold is extended, record the anchor movement at 15 minutes, 20, 25, 30, 45 and 60 minutes (Short Term creep test).

Plot the anchor movement versus load for each load increment marked with an asterick (*) in the Performance Test Schedule, and plot the residual movement of the tendon at each alignment load verses the highest previously applied load using the attached Department approved forms.

(d) Proof Test. Perform the Proof Test on all anchors, in the presence of the Inspector, by incrementally loading the ground anchor in accordance with the following schedule. Raise the load from one increment to another as rapidly as possible. Measure and record the anchor movement to the nearest 25 um (0.001 inch), with respect to an independent fixed reference point, at the alignment loading and at each incremental loading. Place the backup pressure gauge in series with the main pressure gauge to monitor the load during each proof test.

Proof Test Schedule

LOAD

AL
0.25DL
0.50DL
0.75DL
1.00DL
1.25DL
1.50DL Hold for creep test(Short Term).
Reduce to lock-off load.

Where: AL - is the alignment load
DL - is the anchor design load

Recalibrate, at no additional expense to the Department, the jack, main pressure gauge and backup pressure gauge if the load determined by the backup pressure gauge and the load determined by the main pressure gauge differ by more than 10%.

At load increments other than the maximum test load, hold the load just long enough to obtain the movement reading.

Hold the maximum test load for 10 minutes in a Proof Test. Start the load hold period as soon as the maximum test load is reached. Measure and record the anchor movement with respect to a fixed reference at 1 minute, 2, 3, 4, 5, 6 and 10 minutes. If the anchor movement between 1 minute and 10 minutes exceeds 1.02 mm (0.04 inch), hold the maximum test load for an additional 50 minutes, and record the anchor movement at 15 minutes, 20, 25, 30, 45 and 60 minutes. (Short Term creep test).

Plot the anchor movement versus load for each load increment in the Proof Test using the attached Department approved forms.

(e) Creep Test (Long Term). Creep test 5% of the total anchors but not less than 2, or as directed by the Engineer.

Perform the Creep Test, in the presence of the Inspector, by incrementally loading and unloading the ground anchor in accordance with the Performance Test Schedule. At the end of each loading cycle, hold the load for the observation period indicated in the Creep Test Schedule below. The times for reading and recording the anchor movement during each observation period will be 1 minute, 2, 3, 4, 5, 6, 10, 15, 20, 25, 30, 45, 60, 75, 90, 100, 120, 150, 180, 210, 240, 270 and 300 minutes as appropriate. Each load hold period will start as soon as the test load is reached. In a Creep Test, use the main pressure gauge and back-up pressure gauge to measure the applied load, and use the load cell to monitor small changes in load during a constant load hold period. Repump the jack in order to maintain a constant load.

Creep Test Schedule

Load at End of Observation Period

Loading Cycle (Minutes)

AL
0.25DL 10
0.50DL 30
0.75DL 30
1.00DL 45
1.25DL 60
1.50DL 300
Reduce to lock-off

Plot the anchor movement and the residual movement measured in a Creep Test, as described for the Performance Test above, using the attached Department approved forms. Plot the creep movement for each load hold as a function of the logarithm of time using the attached Department approved forms.

(f) Ground Anchor Load Test Acceptance Criteria. A Performance or Proof Tested anchor, with a 10 minute load hold, is acceptable if the:

- Anchor carries the maximum test load with less than 1 mm (0.04 inch) of movement between 1 minute and 10 minutes;
- Total movement at any test load exceeds 80% of the theoretical elastic elongation of the unbonded length, calculated prior to testing and approved by the Engineer; and

- Total movement at the maximum test load does not exceed the theoretical elastic elongation of the unbonded length plus 50% of the theoretical elastic elongation of the bond length.

A Performance or Proof Tested anchor with a 60 minute load hold is acceptable if the:

- Anchor carries the maximum test load with a creep rate that does not exceed 2 mm (0.08 inch) per log cycle of time;
- Total movement at any test load exceeds 80% of the theoretical elastic elongation of the unbonded length at that loading; and
- Total movement at the maximum test load does not exceed the theoretical elastic elongation of the unbonded length plus 50% of the theoretical elastic elongation of the bond length.

A Creep Tested ground anchor is acceptable if the:

- Ground anchor carries the maximum test load with a creep rate that does not exceed 2 mm (0.08 inch) per log cycle of time;
- Total movement at any test load exceeds 80% of the theoretical elastic elongation of the unbonded length at that loading; and
- Total movement at the maximum test load does not exceed the theoretical elastic elongation of the unbonded length plus 50% of the theoretical elastic elongation of the bond length.

If approved, ground anchors which have a creep rate greater than 2 mm (0.08 inch) per log cycle of time can be incorporated in the finished work at a load equal to one-half of its failure load. The failure load is the load carried by the anchor after the load has been allowed to stabilize for 10 minutes.

When an anchor fails, modify the design and/or the construction procedures. Modifications can include, but are not limited to, installing replacement ground anchors, reducing the design load by increasing the number of anchors, modifying the installation method, increasing the bond length, or changing the anchor type. Any modification which requires changes to the structure must have prior approval of the Engineer. No change in the contract price or contract time is allowed.

Replace the anchor, at no additional cost to the Department, if the anchor fails to meet acceptance as determined by the Engineer.

(g) Lock-Off. Upon completion of the test, reduce the load to the lock-off load indicated on the plans and transferred to the anchored service. Unload the anchor completely prior to lock-off. Record the lift-off reading after transferring the load and prior to removing the jack. The lift-off reading must be within 10% of the specified lock-off load. If the load is not within 10% of the specified lock-off load, reset the anchorage and record another lift-off reading. Repeat this process until the desired lock-off load is obtained. If any criteria are not met, the capacity will be reduced and redesigned, as approved by the Engineer, at no additional cost to the Department.

Project Specific Details:

Special Provision: **N12501A - a12501 PRECAST MODULAR RETAINING WALL SYSTEMS**

Item(s) Associated:

Header:

PRECAST MODULAR RETAINING WALL SYSTEMS

Provision Body:

I. DESCRIPTION -

This work is the designing, furnishing, and erecting of precast modular systems used as retaining walls. These systems, some of which are proprietary, consist of modular precast concrete units erected to form a gravity retaining wall.

II. DESIGN -

Submit to the Engineer, for review and for approval, 4 sets of plans and design calculations for precast modular retaining walls, prepared in accordance with PennDOT Design Manual Part 4M (Design Manual Part 4). Allow a maximum of 30 calendar days from the day final plans are received by the Engineer for review and approval. Do not begin fabrication or perform any construction prior to approval of design and completed plans. Use mylar furnished by the Department.

Have a Professional Engineer, registered in the Commonwealth of Pennsylvania, sign and date the first sheet of the computations.

Include the following statement on the first sheet of the drawings above the P.E. seal:

"I hereby certify that all design assumptions have been validated either through construction details or notes on these drawings, or through the contract plans and provisions."

In the event certain design parameters, stresses, or specifications are in conflict, the following order of predominance will govern:

- Design requirements listed herein and in PART B, SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS", of the special provisions.
- Design related Strike-off letters in effect on the date of project advertisement. Refer to the list in PART B.
- PennDOT Design Manual Part 4M (Design Manual Part 4), "Structures"
- PennDOT Design Standards
- AASHTO Standard Specifications for Highway Bridges (date as indicated), and interim specifications

In the event that a clear order of predominance cannot be established, or a difference in the interpretation of the design cannot be resolved, the Chief Bridge Engineer will be arbiter and such decision will be final.

If weep holes are not indicated, and no other provision for subsurface drainage has been incorporated into the design but is required to validate design assumptions of lateral earth pressure from dry backfill, provide a weep hole in every other precast module exposed at ground elevation. Locate weep holes a minimum of 300 mm (1 foot) above finished ground elevation.

Provide cast-in-place or preapproved, precast parapets and barriers.

III. MATERIAL -

(a) Precast Concrete Modules (Units). Furnish precast modules in accordance with the requirements of Section 714, except provide concrete for precast modular units, filler panels, and end panels having a 28-day minimum

compressive strength of 35 MPa (5,000 psi) when tested in accordance with PTM No. 604.

Place reinforcement bars, PVC pipe for weep holes, and handling devices, to the dimensions and tolerances indicated or as approved by the Engineer, prior to casting.

1. Testing and Inspection. Acceptability of the precast modules will be determined on the basis of slump and entrained air content testing of the concrete mixture, compressive strength testing, and visual inspection. Furnish facilities for the Department to perform all necessary sampling and testing in an expeditious and satisfactory manner. Acceptance will be as herein specified.

Acceptance of precast concrete modules with respect to compressive strength will be based on the results of production lot testing. A production lot is defined as the modules represented by one day's production. Four cylinders per lot will be selected in accordance with PTM No. 1 and PTM No. 601. Cylinder specimens will be cured with the product and tested in accordance with PTM No. 611. Acceptance will be based on compliance with the requirements of Sections 714.4(b) and 714.7(a), except the lot compressive strength will be determined as the average of the compressive strength testing of 2 cylinders and no individual test result may be below 31 MPa (4500 psi).

Acceptance with respect to visual inspection will be based on compliance with the requirements of Section 713.2(d). In addition, precast modules may be rejected for color or texture variations on the front face due to excess form oil or other causes.

Completed precast units will be inspected before shipment, and cracked, damaged, or otherwise unsatisfactory units will be rejected. Properly patch all excessive voids and other defects on exterior surfaces in accordance with the approved Quality Control Plan.

Repairs and repair procedures require the approval of the Engineer. Mark rejected precast units with the words "Rejected for Department Use" using waterproof paint.

2. Forms. Construct forms of steel in a manner that assures the production of uniform units, and leave forms in place until they can be removed without damage to the unit.

Replace damaged forms or forms having a deteriorated surface.

3. Mixing and Placing Concrete. Mix and deliver concrete as specified in Section 704. For transporting, placement, and consolidation of concrete, use methods that will prevent segregation of concrete materials and displacement of steel reinforcement from its proper position in the form. Do not place concrete when ambient temperatures are below 4 C (40F) or above 38 C (100F). Do not use admixtures containing chlorides.

4. Casting. Carefully place concrete in the forms and vibrate sufficiently to produce a surface free from imperfections such as honeycombing, segregation, or cracking. Use clear form oil throughout the casting operation.

5. Finish. Provide a conventional surface finish unless otherwise indicated. When a special or decorative surface finish is required, display for approval a typical sample of the modular unit, showing the color, texture, and finish intended to be used, prior to standard production of units.

6. Curing. Cure units in accordance with Section 1001.3(p) for the period of time required for the concrete to obtain the specified minimum compressive strength. Control curing until a compressive strength of 21 MPa (3000 psi) is achieved.

7. Tolerances. Manufacture all units within the following tolerances:

- Face of Module. Length or height, +/- 5 mm (+/- 3/16-inch).

- Deviation From Square. Not to exceed 13 mm (1/2-inch), as determined by the difference between two diagonals.
- Thickness. - 6 mm (1/4-inch), + 13 mm (1/2-inch)
- Location of Reinforcement Steel. Cover: - 6 mm (1/4-inch), + 13 mm (1/2-inch); otherwise within + 13 mm (1/2 inch).
- Surface Finish. Surface defects, measured over a length of 1500 mm (5 feet), not to exceed 3 mm (1/8-inch) on smooth formed surfaces and, on texture finished surfaces, not to exceed 8 mm (5/16-inch).
- Bearing Surfaces. Finish to within 3 mm (1/8-inch) when tested with an 2450 mm (8-foot) straightedge.

8. Marking. Clearly scribe or paint with waterproof paint, on the interior surface of each unit, the date of manufacture, lot production number, piece mark, and inspection date and stamp.

9. Handling, Storing and Shipping. Handle, store, and ship all units in such a manner as to eliminate the danger of chipping, cracking, fracture, and excessive handling stress.

Do not ship units until the 28-day minimum compressive strength is attained. Provide 24-hour advance notice of loading and shipping schedule.

Repair or replace any unit damaged during handling, transporting, erecting, or backfilling, or any unit that cannot be placed satisfactorily in the wall, in accordance with the approved Quality Control Plan.

(b) Reinforcement Bars. Grade 400 (60), Section 709.1(a)1., except No. 10 (No. 3) stirrup bars may be Grade 300 (40). Provide epoxy coated reinforcement bars, as specified in Section 709.1(d), for cast-in-place or precast parapets, barrier, curbs, and copings and precast modules, if indicated or specified.

(c) Cast-in-Place Concrete. Section 704. Provide Class A Cement Concrete for footings and leveling pads and Class AA Cement Concrete for curbs, parapets, and backwalls above bridge seats.

(d) Joint Filler.

- For vertical joints, joint filler is not required.
- For horizontal joints, provide Type II preformed cork conforming to AASHTO-M153 and a premium grade, closed cell, polyethylene foam backer rod as detailed on the approved shop drawings.
- Provide rubber pads having a Durometer Hardness of 75 +/- 5 between modules that are not placed in quick set mortar. If specified, use quick set mortar meeting the requirements of Section 1001.2(d) for setting precast units.

(e) Granular Fill Material for Precast Modules. Provide crushed or natural sand, crushed or uncrushed gravel, blasted limestone, blasted sandstone, and/or Type C coarse aggregate meeting the following gradation as determined in accordance with AASHTO-T27:

Sieve Size Percent Passing

75mm (3 inches) 100
 19 mm (3/4 inch) 20 - 100
 450 um (# 40) 0 - 60
 75 um (# 200) 0 - 10

Furnish Type C coarse aggregate meeting the requirements of Section 703.2, except having a maximum of 2% deleterious shale and an allowable total of deleterious shale, clay lumps, friable particles, and coal or coke of 2%, maximum.

Have all granular fill material conform to the following additional requirements:

- Furnish material having a minimum dry weight density of 1921 kg per cubic meter (120 lb per cubic foot) when compacted to 95% of AASHTO-T99 at optimum moisture content.
- Do not use metallurgical slag or cinders.
- Furnish material exhibiting an angle of internal friction consistent with that used in design but not less than 34 degrees as determined, in accordance with AASHTO-T236, on the portion finer than the 2 mm (#10) sieve compacted to 95% of AASHTO-T99, Method C or D (with oversize correction as outlined), at optimum moisture content, except for coarse aggregate meeting the requirements of Section 703.2.

Direct shear testing may be performed on samples containing material larger than the #10 sieve, if the shear device conforms with AASHTO-T236, Sections 5.4 and 5.5.

(f) Polyvinyl Chloride (PVC) Pipe. Section 610.2(a)4.

(g) Geotextiles. Class 1, Section 735

(h) Certification. Certify as specified in Section 106.03(b)3. Furnish a copy of Form CS-4171 with each shipment of precast products.

IV. CONSTRUCTION -

(a) Shop Drawings. Prior to fabrication, submit and obtain approval for shop drawings. Show complete fabrication details and dimensions, as well as handling, transportation, and construction procedures for all wall elements.

(b) Excavation and Foundations. Grade the structure foundation level, or to the indicated slope, for the width required or as indicated. Prior to wall construction, except where constructed in rock, compact the foundation with a smooth wheel vibratory roller. Remove any foundation soils found to be unsuitable and replace with granular material. Excavate, in accordance with Section 204, to the limits and construction stages indicated.

Do not begin wall erection until the foundation has been approved.

Construct cast-in-place footings and leveling pads as specified in the applicable portions of Section 1001.3, to the dimensions and details indicated and within the right of way, prior to placement of precast wall units. Provide a wood float finish and cure in accordance with Section 1001.3(p). Construct in conformance with the grades and cross slopes indicated. Do not allow grades and cross slopes to vary by more than 3 mm in 3000 mm (1/8-inch in 10 feet) when tested with a 3000 mm (10-foot) straightedge.

Place bottom of footing and/or leveling pad at a minimum depth equal to prevailing frost depth but not less than 900 mm (3 feet) below finished ground elevation, unless otherwise indicated.

(c) Wall Erection. Install precast modular units as shown on the approved shop drawings. Take special care to set the bottom course of modules to true line and grade.

Install drainage system behind the wall as indicated or as shown on the approved shop drawings.

Interlock all modular units from course to courses. Stagger vertical joints with each successive course, as indicated. Do not exceed 19 mm (3/4-inch) for the vertical joint openings on the front face of the wall. Install joint filler in the horizontal joints on the front face of the wall. Close joints at corners or angle points in

accordance with the manufacturer's recommendations. Cover all vertical joints on the back side of the front face of the wall with geotextile fabric. Provide geotextile fabric having a minimum width of 300 mm (12 inches), and overlap fabric a minimum of 100 mm (4 inches). Place rubber bearing pads under each module, throughout the wall, or set modules in a quick set mortar bed, depending on wall type and manufacturer's recommendations.

Have repairs made, at the job site, by experienced personnel utilizing methods and materials recommended by the manufacturer. Do not patch unless conditions exist which assure that the repaired area will conform to the remainder of the work with respect to appearance, strength, and durability.

(d) Backfilling. Fill the interior of each precast modular unit with the specified granular fill material, as each successive course is set. Fill units in 600 mm (2-foot) maximum lifts and thoroughly compact each lift with a vibratory tamping device. Place specified backfill material behind the wall within the limits shown on the Standard Drawings, as indicated or directed, in accordance with the requirements of Section 1001.3(t), except the 10-day waiting period is not required.

Where modules are open and tiered in construction and plant growth is planned, topsoil may be placed at the outer front edge of each tier to a maximum depth of 150 mm (6 inches).

When erecting a battered wall, place backfill behind the wall to closely follow the erection of successive courses of precast units.

At the end of each day, slope the last level of backfill away from the wall in order to rapidly direct runoff away from the wall face. In addition do not allow surface runoff from adjacent areas to enter the wall construction site.

At no time allow the difference in elevation between the backfill and the top of the last erected course to exceed 1800 mm (6 feet).

(e) Dewatering. Furnish, install, operate, and maintain satisfactory dewatering systems as required to maintain the site in a dry and workable condition. Include all equipment and materials, and continue as long as necessary.

(f) Technical Assistance. Arrange for a company representative to be present at the project site to assist the fabricator, Contractor, and Engineer until they are familiar and confident in casting, installation, and erection procedures. Arrange for monthly visits to the project site by a company representative/engineer during wall construction. Provide a technical representative to assist in the event unusual problems or special circumstances arise.

Project Specific Details:

Special Provision: **N13101B - a13101 CONSTRUCTION PROJECT TRAFFIC
BARRIER PRE-INSTALLATION REVIEW**

Item(s) Associated:

Header:

CONSTRUCTION PROJECT TRAFFIC BARRIER PRE-INSTALLATION REVIEW

Provision Body:

Notify the Inspector-in-Charge of the proposed schedule for Traffic Barrier installation, a minimum of two weeks before beginning installation. The Inspector-in-Charge will contact the District Guide Rail Mentor to

schedule the pre-installation review. Contractor attendance at the pre-installation review is required.

Before the review, place temporary markings (paint, stakes, or flags) indicating planned locations of all permanent traffic barrier to be installed as part of the project. The term Traffic Barrier includes all types of permanent barrier including, but not limited to, W-beam guide rail, concrete median barrier, cable barrier, end treatments, and impact attenuating devices.

Do not install any Traffic Barrier on the project before receiving written authorization from the Inspector-in-Charge.

Costs associated with placement of the temporary markings, and attendance at the Pre-Installation Review are considered incidental to other items of work, and no separate payment will be made. Revisions to contract quantities of Traffic Barrier will be paid in accordance with Section 110.

Project Specific Details:

Special Provision: **D29890C - a29890 SPECIAL BIDDING – DESIGN-BUILD**

Item(s) Associated:

Header:

SPECIAL BIDDING – DESIGN-BUILD

Provision Body:

This project will utilize the Low Bid Design-Build method of contracting. The contract for this project will be between the Department and the successful Bidder.

I. ACTIONS REQUIRED BY THE BIDDER AT THE BIDDING STAGE AND BEFORE AWARD

When signing and submitting the bid, the Bidder is required to certify the following for all professional service firms (firms) performing activities listed in Section IV – Design Activities:

- that, if applicable, the Bidder either (a) has obtained assurance that all firms being used have no adverse interests as defined in the State Adverse Interest Act and fully comply with this Special Provision or (b) has faxed a letter to the Contract Awards Officer at (717) 705-1504 disclosing any potential conflicts;
- that, if applicable, the Bidder (a) has obtained assurance that all firms being used have no organizational conflicts of interests and fully comply with this Special Provision or (b) has faxed a letter to the Contract Awards Officer at (717) 705-1504 disclosing any potential conflicts;
- that, if applicable, the Bidder (a) has obtained assurance that all firms being used have fully complied with Section III of this Special Provision or (b) will email or fax a completed "Request for Consideration of Professional Services Involvement Restrictions" form to the District Project Manager indicated in the Section V - Review Submission Contacts of this Special Provision; and
- that, if applicable, the Bidder has obtained assurance that all firms being used are familiar with the necessary AASHTO, PennDOT, and other applicable design criteria, standards, and construction specifications required to complete the related portion of their associated work.

State Adverse Interest Act – Where required, fully disclose any potential conflict with the State Adverse Interest Act as State Advisor or State Consultant. If there is no adverse interest, certify as such.

Organizational Conflict of Interest – Where required, fully disclose all relevant facts concerning any past, present, or currently planned interests that may present an Organizational Conflict of Interest. This disclosure

must state how their interests or those of their chief executives, directors, key project personnel, or any proposed firm could be viewed as, an Organizational Conflict of Interest. If there is no Organizational Conflict of Interest, certify as such. Note: An Organizational Conflict of Interest is defined in 23 *CFR* 636 as a conflict “that because of other activities or relationships with other persons, a person is unable or potentially unable to render impartial assistance or advice to the owner, or the person’s objectivity in performing the contract work is or might be otherwise impaired, or a person has an unfair competitive advantage.”

Professional Services Involvement Restrictions – Where required, indicate that involvement in such firms can be avoided, neutralized, or mitigated by completing the following:

- present these involvements on the "Request for Consideration for Professional Services Involvement Restrictions" form, located in ECMS File Cabinet (in the References Tab); and
- email or fax this form immediately upon ECMS email notification of apparent low bidder status to the District Project Manager indicated in Section V – Review Submission Contacts of this Special Provision.

The District Project Manager will notify the apparent low bidder of the result.

II. ACTION TO BE TAKEN BY THE BIDDER AFTER AWARD

Design Activity Firm Identification and Qualifications

The awarded bidder is required to complete the form, “Design-Build Design Activities Firm Identification and Qualifications”. This form is located in ECMS File Cabinet (in the References Tab).

Email or fax the completed form to the District Project Manager indicated in the Section V - Review Submission Contacts of this Special Provision within 3 calendar days after the award of the contract.

Include on this form the name and design activity performed by each firm performing activities listed in Section IV Design Activities of this Special Provision. Include with this form resumes for the:

- Lead Design Engineer Project Manager;
- Quality Control (QC) Manager and Alternate QC Manager;
- Quality Assurance (QA) Manager (if applicable) and Alternate QA Manager; and
- Secondary Design Services Professionals (if applicable) Project Manager.

These resumes should show the experience and expertise required by the project special provisions for the applicable design activities listed in Section IV – Design Activities of this Special Provision. At a minimum, these resumes should show experience and expertise during the last 7 years, of two similar projects of comparable complexity on Pennsylvania's State Highway, Pennsylvania Turnpike, or local system. Non-Turnpike projects must have been funded with Federal Aid Highway Funds. Also, include an affidavit stating that the Lead Design Engineer is familiar with AASHTO, the Department, and other applicable design criteria, standards, and construction specifications. Additional design qualifications may be listed in other Design-Build Special Provisions included in this Contract.

All engineering firms must have a current Annual Qualification Package on file with the Bureau of Project Delivery's Contract Management Section and be registered business partners in ECMS. In addition, engineering firms’ business partner relationship in ECMS must include both Consultant and Construction Contractor relationships. The ECMS USER ID security must include Construction Contractor security groups such as "Contractor Principal." Firms must be listed as a Prequalification Exempt Service Provider in the subcontractor database with the Department’s Prequalification Office. These requirements also apply to all subconsultants, including Disadvantaged Business Enterprises, Minority Business Enterprises, and Women-Owned Business Enterprises.

For projects that include Right-of-Way Acquisition services, the right-of-way firm must be pre-approved to provide Right-of-Way Acquisition Services through ECMS.

All firms must comply with the restrictions listed in 23 CFR 636.116 titled *What organizational conflict of interest requirements apply to design-build projects?*

If a firm included in the submission does not meet the necessary requirements indicated in this Special Provision and in the project special provisions for the applicable design activities listed in Section IV – Design Activities of this Special Provision, the Department reserves the right to disallow the firm for this contract. Firms identified on a "Request for Consideration for Professional Services Involvement Restrictions" form that has been submitted but not approved will be disallowed. A notification will be given to the Contractor within 8 calendar days from the time and date of submission indicating the Department approval or disallowance, and justification thereof, of each firm listed on the “Design-Build Design Activities Firm Identification and Qualifications” form. A firm cannot begin work on this contract until approval is received from the Department. Unless indicated otherwise by the Department in writing, the disapproval of any firm will not allow the extension of the contract completion date or price adjustments to any items in the contract.

III. PROFESSIONAL SERVICES INVOLVEMENT RESTRICTIONS

All firms performing activities listed in Section IV – Design Activities of this Special Provision must be in compliance with the following paragraphs and the Professional Services Involvement Restrictions – Design Activities of this Special Provision for Design-Build Contracts charts [Table A and Table B].

- Any Consultant that provided or is providing any design work and services to the Department for the preparation of this design-build bid package will not be eligible to provide any design work and services to the Contractor for the design-build contract.
- Any Consultant performing design work or services to the Contractor for this design-build contract, such as Lead Design Engineer, Quality Control Reviewer, Secondary Design Service Professionals, or Quality Assurance Reviewer (if applicable), is not eligible for any involvement under a Department Agreement on that contract.

DEFINITIONS:

PRIME CONSULTANT (Department agreement) – The contractual party providing design consultant work and services pursuant to an Agreement with the Department. The Consultant may be an individual, partnership, corporation, or joint venture.

SUB-CONSULTANT (Department agreement) - The party providing design work and services to the Prime Consultant (which is providing consultant work and services pursuant to an agreement with the Commonwealth) pursuant to an agreement with the Prime Consultant to which the Department is not a party.

LEAD DESIGN ENGINEER (LDE) (design-build contract) – The design consultant engineering firm or Contractor’s personnel that are responsible for the design portion of the design-build contract.

QUALITY CONTROL REVIEWER (QC-R) (design-build contract) - The design consultant engineering firm or individuals that are responsible to manage the quality control of the design-build contract, including the Quality Control Manager and the Alternate Quality Control Manager. The design Quality Control Reviewer is allowed to be the same firm as the Lead Design Engineer.

QUALITY ASSURANCE REVIEWER (QA-R) (Department agreement or design-build contract, if applicable)– The design consultant engineering firm or individuals functioning as Department and FHWA (as appropriate) representatives who check the validity of the Contractor’s Quality Plan to ensure all work is done in accordance with the contract documents. Quality Assurance Reviewer may be Department and/or FHWA personnel, consultants under a Department agreement, or a firm providing design services to the design-build Contractor (if included as a design activity in Section IV Design Activities of this Special Provision, as “Quality Assurance by Peer Review). The Quality Assurance Reviewer may not be the same firm as the Contractor, the Lead Design Engineer, or the Quality Control Reviewer.

SECONDARY DESIGN SERVICE PROFESSIONALS (SDSP) (design-build contract)– Other design consultant engineering firms or professional service firms providing professional services to the design-build Contractor beyond roles of Lead Design Engineer or design Quality Control Reviewer.

PROFESSIONAL SERVICES INVOLVEMENT RESTRICTIONS - DESIGN ACTIVITIES FOR DESIGN-BUILD CONTRACTS:

TABLE A: INVOLVEMENT AS PRIME OR SUB CONSULTANT TO THE DEPARTMENT

PROJECT INVOLVEMENT (Prime Consultant/Sub-consultant in Department Agreement)	DESIGN ACTIVITY RESTRICTIONS
Feasibility Studies, Traffic Studies, Mapping Services	No restrictions if no recommendations to the Department made by the Consultant
Preliminary Engineering, Preliminary Engineering Constructability Reviews, and Environmental Studies Anticipating a CEE	Not eligible to perform any design work or services to the Contractor for the design-build contract. Exception (1) – See “Sub-consultant Exception” below.
Preliminary Engineering, Preliminary Engineering Constructability Reviews, and Environmental Studies Anticipating an EA/ EIS	Not eligible to perform any design work or services to the Contractor for the design-build contract. Exception (1) – See “Sub-consultant Exception” below.
Conceptual Design / Bid Package Preparation for Design-Build Project	Not eligible to perform any design work or services to the Contractor for the design-build contract. Exception (1) – See “Sub-consultant Exception” below.
Final Design	Not eligible to perform any design work or services to the Contractor for the design-build contract.
Preliminary Engineering-Design Management, Review Note: This includes consultants performing reviews for a District or Central Office Agreement, including an Open End Agreement.	Not eligible to perform any design work or services to the Contractor for the design-build contract. Exception (1) – See “Sub-consultant Exception” below.
Final Design Management, Review Note: This includes consultants performing reviews for a District or Central Office Agreement, including an open-end agreement.	Not eligible to perform any design work or services to the Contractor for the design-build contract.
Department Review (Any design review completed as a representative of the Department, including Quality Assurance Reviews)	Not eligible to perform any design work or services to the Contractor for the design-build contract.
Construction Management Support (Any construction activity completed as a representative of the Department other than construction inspection, or services during construction)	Not eligible to perform any design work or services to the Contractor for the design-build contract
Services during Construction (Any design support services/reviews conducted during construction)	Not eligible to perform any design work or services to the Contractor for the design-build contract.
Construction Inspection	Not eligible to perform any design work or services to the Contractor for the design-build contract.

(1) Sub-consultant Exception – A Sub-consultant performing certain activities under a Department agreement containing multiple “projects,” which are let under separate construction contracts, can perform design activities as part of the design-build contract provided that the design activities for the design-build contract is for a “project” in which the sub-consultant did not participate in ANY work for the Department.

See Table A.1: Department Agreement Containing Multiple Projects – Sub-consultant Eligibility.

TABLE A.1: DEPARTMENT AGREEMENT CONTAINING MULTIPLE PROJECTS – SUB-CONSULTANT ELIGIBILITY

Sub-consultant Performed Work Only on Project A (under Department Agreement)	Design Activities for Design-Build Contract (under Design-Build Contract)			
	Project A		Project B	
	LDE, QC-R, or SDSP	QA-R ¹	LDE, QC-R, or SDSP	QA-R ¹
Preliminary Engineering Activities (Does not include Bid Package Prep)	N	N	Y*	Y*
Conceptual Design/Bid Package Preparation	N	N	Y*	Y*
Department Review (includes Quality Assurance Review)	N	N	N	N
Construction Management or Construction Inspection	N	N	N	N

Note: Project A and Project B represent multiple projects under one engineering agreement that are bid under separate construction contracts.

N - Sub-consultant is not eligible to perform service.

Y*- A sub-consultant firm, that worked on the preliminary design or the Conceptual Design/Bid Package Prep for Project A, can function as EITHER a Quality Assurance Reviewer (if applicable) OR function as a Lead Design Engineer, Quality Control Reviewer, or Secondary Design Service Provider on Project B.

¹ If applicable

TABLE B: INVOLVEMENT INCLUDES PERFORMING DESIGN ACTIVITIES FOR DESIGN-BUILD CONTRACT

PROJECT INVOLVEMENT (Performance of Design Activities in Design-Build Contract)	RESTRICTIONS
LDE	Not eligible for any future involvement under a Department Agreement for project(s) included in design-build contract, including Department Review, Quality Assurance Review, Construction Management, and Construction Inspection services. Not eligible to perform Quality Assurance Reviews (if applicable).
QC-R	Not eligible for any future involvement under a Department Agreement for project(s) included in

	<p>design-build contract, including Department Review, Quality Assurance Review, Construction Management, and Construction Inspection services.</p> <p>Not eligible to perform Quality Assurance Reviews (if applicable)</p>
SDSP	<p>Not eligible for any future involvement under a Department Agreement for project(s) included in design-build contract, including Department Review, Quality Assurance Review, Construction Management, and Construction Inspection services.</p> <p>Not eligible to perform Quality Assurance Reviews (if applicable).</p>
QA-R (if applicable)	<p>Not eligible to function as Lead Design Engineer, Quality Control Reviewer, or Secondary Design Services Professionals.</p> <p>Not eligible for any future involvement under a Department Agreement for project(s) included in design-build contract, including Department Review, Construction Management, and Construction Inspection services.</p>

IV. DESIGN ACTIVITIES

Design activities include:

- Roadway Design, *(delete if not needed)*
- Bridge/Structural Design, *(delete if not needed)*
- Quality Assurance Review, *(delete if not needed)*
- Maintenance and Protection of Traffic Design, *(delete if not needed)*
- Utility Coordination, *(delete if not needed)*
- Right-of-Way Design and Acquisition Services, *(delete if not needed)*
- Permitting, *(delete if not needed)*
- Other Design Activities required to satisfactorily complete the project. *(specify, delete if not needed, add additional activities, if required)*

V. REVIEW SUBMISSION CONTACTS

Include all design activities, submission dates, and review periods in the construction schedule. Include the submission schedule in the Quality Plan.

(Select one of two methods: (a) make all submissions to the District Project Manager, or (b) make submissions to one of the five contacts and copy the District Project Manager. Delete the method not used. If (a) is selected, delete all text from (b) up to Section VI. If (b) is used, delete all of (a) up to (b).)

(a) Make all required submissions for each design activity to the Department's Project Manager.

- Department Project Manager

(identify name of project manager)

Phone number: *(indicate contact phone number)*

Fax number: *(indicate fax number)*

Email address: *(indicate email address)*

Interim (partial) submissions: *(indicate submission location (i.e. District X-0 Office – see address below or PennDOT Project Collaboration Center))*

Address for final submissions: District Office – see location information below

(b) Copy the Department’s Project Manager on all submission correspondences.

- Department Project Manager

(identify name of project manager)

Phone number: *(indicate contact phone number)*

Fax number: *(indicate fax number)*

Email address: *(indicate email address)*

Address: District Office –location information listed in Section VI of this Special Provision

Make all required submissions for each design activity to the following contacts:

(Delete elements that are not included in contract)

Roadway Design *(delete if not needed)*

- Pavement Design
- Environmental/Permits
- Erosion and Sediment Pollution Control Plan
- National Pollutant Discharge Elimination System Permit
- Geotechnical Investigation – Draft Exploration Plan and Schedule of Borings
- Geotechnical Engineering Report for Final Design
- Pavement Marking Design and Signing
- Pre-Final Plans
- Roadway Plans (and associated Supplemental Plans (Final and “As-Built”))

Contact: *(indicate contact person or position)*

Phone number: *(indicate contact phone number)*

Email address: *(indicate email address)*

Interim (partial) submissions: *(indicate submission location (i.e. District X-0 Office –address below or PennDOT Project Collaboration Center))*

Address for final submissions: District Office –location information listed in Section VI of this Special Provision

- *Submissions other than to the Department:*

(Specify county(ies)) Conservation District –location information listed in Section VI of this Special Provision

Department of Environmental Protection (DEP) – *(Specify DEP Regional Office or delete if not needed)* location information below

United States Army Corp of Engineers (ACOE) – *(Specify ACOE District Office, or delete if not needed)* location information listed in Section VI of this Special Provision

Bridge/Structural Design *(delete if not needed)*

- Hydrologic and Hydraulics Report
- Final TS&L
- Waterway Permits/Permit Amendments
- Foundation Submission
- Final Structure Plans (Includes Substructure, Superstructure, and As-Built Plans)

Contact: *(indicate contact person or position)*

Phone number: *(indicate contact phone number)*

Email address: *(indicate email address)*

Interim (partial) submissions: *(indicate submission location (i.e. District X-0 Office – address listed in Section VI of this Special Provision or PennDOT Project Collaboration Center))*

Address for final submissions: District Office –location information listed in Section VI of this Special Provision

o *Submissions other than to the Department:*

DEP – *(Specify DEP Regional Office, or delete if not needed)* location information listed in Section VI of this Special Provision.

Quality Assurance Review

- Quality Plan

Contact: *(indicate contact person or position, usually District PM)*

Phone number: *(indicate contact phone number)*

Email address: *(indicate email address)*

Interim (partial) submissions: *(indicate submission location (i.e. District X-0 Office – address listed in Section VI of this Special Provision or PennDOT Project Collaboration Center))*

Address for final submissions: District Office –location information listed in Section VI of this Special Provision

Maintenance and Protection of Traffic Design: *(delete if not needed)*

- Traffic Control Plan (Preliminary and Final Plans)
- Transportation Management Plan and Incident Management Plan *(delete if not needed)*

Contact: *(indicate contact person or position)*

Phone number: *(indicate contact phone number)*

Email address: *(indicate email address)*

Interim (partial) submissions: *(indicate submission location (i.e. District X-0 Office – address listed in Section VI of this Special Provision or PennDOT Project Collaboration Center))*

Address for final submissions: District Office – location information listed in Section VI of this Special Provision

Utility Coordination *(delete if not needed)*

- Utility Relocation Coordination/Utility Reimbursement Documentation

Contact: *(indicate contact person or position)*

Phone number: *(indicate contact phone number)*

Email address: *(indicate email address)*

Interim (partial) submissions: *(indicate submission location (i.e. District X-0 Office – address listed in Section VI of this Special Provision or PennDOT Project Collaboration Center))*

Address for final submissions: District Office –location information listed in Section VI of this Special Provision

Right-of-Way Design and Acquisition *(delete if not needed)*

- Right-of-Way Plans
- Right-of-Way Appraisals and Negotiations

Contact: *(indicate contact person or position)*

Phone number: *(indicate contact phone number)*

Email address: *(indicate email address)*

Interim (partial) submissions: *(indicate submission location (i.e. District X-0 Office – address listed in Section VI of this Special Provision or PennDOT Project Collaboration Center))*

Address for final submissions: District Office –location information listed in Section VI of this Special Provision

(add other design activities, deliverables, and corresponding contacts if included in Section IV and not covered in the foregoing)

VI. LOCATION INFORMATION:

Pennsylvania Department of Transportation

District *(insert District number)* Office

Mailing Address: *(specify- i.e. PO Box 1234)*

Street Address: *(specify)*

(city, state, ZIP)

(If Design Roadway requires coordination with County Conservation District(s) or DEP, include the following, as appropriate:)

(Specify county) County Conservation District *(delete if not needed, add additional info for additional counties)*

(Specify full address)

Department of Environmental Protection – *(specify DEP Regional Office - delete if not needed)*

Specify address)

United States Army Corp of Engineers – *(specify ACOE District Office - delete if not needed)*

(Specify address)

(Insert the following if submittals will be made through PennDOT Project Collaboration Center.)

The PennDOT Project Collaboration Center (PPCC) will be used for the purposes of distributing electronic plan submissions to and from reviewing parties as identified in Section V - Review Submission Contacts of this Special Provision. Details will be provided prior to the Preconstruction Conference.

VII. SUBMISSION REQUIREMENTS/REVIEW TIMES:

The following table provides the required number of plans and/or documents and the schedule of review times for complete submissions. Partial submissions, where specified, will be reviewed in the time specified below **for each submission**. Partial submissions will require the submission of the number of plan sets and calculations specified below for the applicable design activity. Be responsible for reproduction costs for submissions and final drawings, including providing the Department with *(Specify number of full and/or half-size sets)* of all final drawings for use during construction, in addition to any copies specified below.

(Instructions: Complete the “Plan Sets” and “Sets of Calculations” columns indicating number of sets required for each submission when not using PPCC. When using PPCC, indicate “PPCC” in each column except for Final submissions, where the number of sets for signature is to be indicated. Delete rows that are not needed. Add rows for other submissions included in design activities but not listed.)

(Note: It is strongly recommended that the review times shown not be modified. Review times will need to be modified to incorporate additional time for Central Office and FHWA reviews. Items will require an additional 10 working days of review time (both initial and subsequent submissions) if Central Office review is required or an additional 20 days of review time if Central Office and FHWA review is required.)

Item	Plan Sets	Sets of Calculations	Initial Submission Review Time (working days)	Subsequent Submission Review Time (working days)
Roadway Design				
Quality Plan			10	5
Pavement Design			10	5
Environmental/Permits			10	5

(PennDOT review)				
Permit Review - DEP			*	*
Permit Review - ACOE			*	*
Erosion and Sediment Pollution Control Plan (County Conservation District Review)			*	*
Erosion and Sediment Pollution Control Plan (DEP Review)			*	*
NPDES Permit (PennDOT review)			10	5
NPDES Review (County Conservation District Review)			*	*
NPDES Review (DEP Review)			*	*
Draft Exploration Plan and Schedule of Borings			10	5
Geotechnical Design			10	5
Pavement Marking Design and Signing			10	5
Pre-Final Plans			10	5
Final Roadway Plans			10	5
As-Built Roadway Plans			10	5
Bridge/Structural Design				
Hydraulics and Hydrologic Report			10	5
Final TS&L			10	5
Waterway Permits/Permit Amendments			10	5
Foundation Submission			10	5
Final Structure Plans			10	5
gINT Project File			10	5
As-Built Plans			10	5
Maintenance and Protection of Traffic Design				
Transportation Management Plan			10	5
Incident Management Plan			10	5
Preliminary Plan			10	5
Final Plan			10	5
Utility Coordination				
Utility Relocation Highway Occupancy Permits			30	15

Utility Reimbursement Documentation			30	15
ROW Activities				
Preliminary Right-of-Way Plan			10	5
Appraisals			10	5
Final Right-of-Way Plans			10	5
Modified Final Right-of-Way Plans			10	5
Curb Ramp Design				
Traffic Signal Permit Plan revisions			10	5
Technical Infeasibility Forms			10	5
Curb Ramp Designs			10	5

**** - Review times will be in accordance with the regulations of the reviewing agency.**

Review times begin and end when a submission is logged in and out, respectively, by all designated reviewers. The login time will be taken as the latest date in which the submission is received by the reviewers. Submittals received after 11:00 a.m. will be logged in as the next working day following receipt of the submission. For electronic submissions, the login time will be taken when the appropriate reviewer and District Project Manager receive an email stating a submission is ready for review. Logout time occurs when the reviewer sends an email to the Contractor with an approval and/or comments. If a submission is incomplete or otherwise requires additional information or data to complete the review properly, the review time will begin as specified for the submission when all required information is received.

Additional contract time or price adjustment to any contract items will not be considered due to failure to obtain approvals within the specified review times resulting from incomplete or non-conforming submissions. Working days are weekdays, Monday through Friday, excluding official Department holidays.

Include all review periods identified above as activities in the project schedule.

(Optional submission interim milestone dates. Delete the following text and table (up to Section VIII) if no milestones will be included. If desired, include the following text and table and identify the date by which the submission is to be received in the right column next to the appropriate submission. Delete rows where no submission milestone is to be identified. Add rows to match any added in the preceding Submission Requirement/Review Time matrix.)

The following table specifies Submission Interim Milestones. For those submissions identified below, provide the Department with the full submission as specified in the appropriate Design Activities special provision by the Milestone date. If the submittal is not logged in, as described in these special provisions, on or before the Milestone date, the Initial Submission Review Time for that submittal identified in the table above will increase by ***(insert number of working days of increase in review time, for example, if the review time will increase from 10 to 15 working days, state "5")*** working days. Include all Submission Interim Milestones in the project schedule.

Item	Initial Submission Interim Milestone
Roadway Design	

Pavement Design	
Environmental/Permits (PennDOT review)	
Permit Review - DEP	
Permit Review - ACOE	
Erosion and Sediment Pollution Control Plan (County Conservation District Review)	
Erosion and Sediment Pollution Control Plan (DEP Review)	
NPDES Permit (PennDOT review)	
NPDES Review (County Conservation District Review)	
NPDES Review (DEP Review)	
Draft Exploration Plan and Schedule of Borings	
Geotechnical Design	
Pavement Marking Design and Signing	
Pre-Final Plans	
Final Roadway Plans	
As-Built Roadway Plans	
Bridge/Structural Design	
Hydrologic and Hydraulic Report	
Final TS&L	
Waterway Permits/Permit Amendments	
Foundation Submission	
Final Structure Plans	
gINT Project File	
As-Built Plans	
Maintenance and Protection of Traffic Design	
Transportation Management Plan	
Incident Management Plan	
Preliminary Plan	
Final Plan	
Utility Coordination	
Utility Relocation Highway Occupancy Permits	
Utility Reimbursement Documentation	
ROW Activities	
Preliminary Right-of-Way Plan	
Appraisals	
Final Right-of-Way Plans	
Modified Final Right-of-Way Plans	
Curb Ramp Design	
Traffic Signal Permit Plan revisions	
Technical Infeasibility Forms	

VIII. GENERAL DESIGN REQUIREMENTS

Have the design completed by a Professional Engineer licensed in the State. Have all surveys completed by a Professional Land Surveyor licensed in the State.

Provide the Design Engineer's P.E. seal, the date signed, and business name and address on the first sheet of all computations, including computations for partial submissions. Provide the appropriate seal and signature on plan sheets in accordance with the Department's Design Manuals. Also, provide the Design Engineer's P.E. seal, signature, and date signed on the first sheet of all computations, including computations for partial plans submissions.

Provide all Professional Engineer's seals in accordance with Pa. Code § 37.59.

Designs copied directly from Department Standard Drawings need not be documented through independent computations. List such designs on the submission by referencing the drawing number of the applicable standard, and the sheet number, table, or graph.

Experimental or demonstration-type design concepts, products, structures, or elements not pre-approved by the Department for general usage at the time of bid, will not be allowed.

If Right-of-Way Design and Acquisition Services has not been identified as Design Activity in Section IV of this Special Provision, no additional Right-of-Way may be acquired and no changes to the recorded Right-of-Way Plan will be permitted.

Value engineering construction proposals are allowed, provided that the proposal does not require approval of a Design Exception.

Designs that take advantage of any errors and/or omissions in the following requirements will not be accepted. In the event any such error, omission, or discrepancy is discovered, immediately notify the Department. Failure to notify the Department will constitute a waiver of all claims for misunderstanding, ambiguities, or other situations resulting from the error, omission, or discrepancy.

Final Plans must include a note on all tabulation of quantities sheets included therein that states "Item numbers and descriptions listed in Tabulations are solely for the purposes of identifying the specified units of work and locations, and are not to be construed as contract or pay items."

Design and construct any support of excavation required by any Design Activities identified in Section IV of this Special Provision in accordance with the Special Provision titled TEMPORARY EXCAVATION SUPPORT AND PROTECTION REPORT. *(Delete if not applicable.)*

Design Specifications

Perform the design activities identified in Section IV, Design Activities, in accordance with the latest published edition of all Department Standards, Specifications, Regulations, Strike-off Letters, and other industry standards, at the time of advertisement, unless directed otherwise, or as identified in the bid package. These include, but are not limited to the following:

- Special Provisions;
- Publication 408, *Specifications*
- Publication 72M, *Standards for Roadway Construction*
- Publication 218M, *Standard Drawings for Bridge Design*
- Publication 219M, *Standard Drawings for Bridge Construction*

- Publication 10 Design Manual Part 1 – *Transportation Program Development and Project Delivery Process*
- Publication 10A Design Manual Part 1A – *Pre-TIP and TIP Program Development Procedures*
- Publication 10B Design Manual Part 1B – *Post-TIP NEPA Procedures*
- Publication 10C Design Manual Part 1C – *Transportation Engineering Procedures*
- Publication 10X Design Manual Part 1X – *Appendices to Design Manuals 1, 1A, 1B, and 1C*
- Publication 13M Design Manual Part 2 – *Highway Design*
- Publication 14M Design Manual Part 3 – *Plans Presentation*
- Publication 15M Design Manual Part 4 – *Structures*
- Publication 16M Design Manual Part 5 – *Utility Relocation*
- Publication 584, *Drainage Manual*
- Publication 46, *Traffic Engineering Manual*
- Publication 149, *Traffic Signal Design Handbook*
- Publication 35, *Approved Construction Materials*
- Publication 203, *Work Zone Traffic Control*
- Publication 213, *Temporary Traffic Control Guidelines*
- Publication 222, *Subsurface Boring, Sampling, and Testing Contract*
- Publication 293, *Geotechnical Engineering Manual*
- Publication 378, *Right-of-Way Manual*
- Pa Code Title 67, Chapter 204, *Guidelines to Implement Act 229 of 2002, Additional Traffic Control Devices in Highway Work Zones, Statement of Policy*
- Pa Code Title 67, Chapter 212, *Official Traffic Control Devices* (Publication 212)
- Publication 236M, *Handbook of Approved Signs*
- Publication 242, *Pavement Policy Manual*
- Publication 281, *Waste Site Evaluation Procedures for Highway Project Development Process*;
- Publication 371, *Grade Crossing Manual*
- Publication 122M, *Surveying and Mapping Manual*
- Publication 111, *Traffic Control – Pavement Markings and Signing Standards*
- Publication 148, *Traffic Standards – Signals*
- Publication 611, *Waste Management Guidance Manual*
- *Manual on Uniform Traffic Control Devices* (FHWA)
- *A Policy on Geometric Design of Highway and Streets*, AASHTO "Green Book"
- *A Policy on Design Standards – Interstate System* (AASHTO)
- *AASHTO Guide Specifications for Horizontally Curved Highway Bridges*
- *AASHTO LRFD Bridge Design Specifications* or, when applicable, *AASHTO Standard Specifications for Highway Bridges*

In the event that a clear order of predominance cannot be established, or a difference in interpretation of the design cannot be resolved, the Assistant District Executive-Design will be the arbiter and his/her decision will be final.

For bridge/structures related design activities, refer to the "Bridge/Structures Related Effective Policy Letters" for additional design policy Strike-Off Letters that are applicable to the structure design.

In the event that certain design parameters, stresses, or specifications are in conflict regarding bridge/structures related design activities, the following order of predominance governs:

1. Design requirements listed herein and addenda (addendum) to the proposal.
2. Design related Strike-Off Letters in effect on the date of project advertisement.
3. Publication 15M Design Manual Part 4, *Structures*
4. Publications 218M and 219M *Standard Drawings for Bridge Design and Bridge Construction*
5. *AASHTO LRFD Bridge Design Specifications* or, when applicable, *AASHTO Standard Specifications for Highway Bridges*

In the foregoing instances, in the event that a clear order of precedence cannot be established, or a difference in the interpretation of the design criteria, standards, specifications, or methodology cannot be resolved, the Chief Bridge Engineer will be the arbiter and whose decision will be final.

IX. SCHEDULE OF VALUES

Where indicated, partial payment for lump sum design-build items will be made on Current Estimate Payments in accordance with Section 110.05 based on the amount of work completed during the estimate period based on a payout schedule (Schedule of Values). The Department will base amount of the partial payments on the total value of the work performed to the date of the estimate cut-off, less payments previously made, in accordance with the approved Schedule of Values.

Prepare a Schedule of Values for each lump sum Item associated with the design or construction of the Design Activities identified in Section IV of this Special Provision, where the Special Provision for that "Design" or "Construct" Item indicates lump sum measurement and payment by Schedule of Values, using the attached Schedule of Values template as a guide. Hereinafter, Design Items are defined as the Contract Item associated with the Design Activities identified in Section IV, and Construct Items are defined as the Contract Item associated with the construction of the Design Activities identified in Section IV. Distribution of payments among Schedule of Values Components must bear a reasonable resemblance to the actual value of work.

(a)For Design items, if a Component is not applicable, indicate 0%; otherwise do not indicate values less than 5% in any Component. Include those Schedule of Values Components identified in the associated Design Item Special Provisions. Payment for Design Item Schedule of Values Components will be made in the amount of the approved percentage upon completion of the identified task. When Schedule of Values Components are identified in the Special Provisions with "Approval" in the Schedule of Values Component title, 75% of the approved percentage may be paid on the next estimate following login of that submission, and the remaining 25% of the approved percentage will be paid following approval of that submission. Otherwise, no partial payment will be made for Design Item Components.

(b)For Construct Item, include Schedule of Values Components relevant to the scope of work of the particular item, using the attached Schedule of Values template as a general guide. No partial payment will be made for Construct Item Schedule of Values Components. Accordingly, develop the Schedule of Values to include Schedule of Values Components in sufficient numbers and detail to be payable upon semi-monthly estimates throughout the duration of the Contract.

Submit the Schedules of Values to the Department for review and approval. No estimate will be processed until all Schedules of Values are approved.

X. CONSTRUCTION CONTACT

The Department's contact for Current Estimate Payments as defined in Section 110.05 will be:

(select either of the following:

The Project Manager identified in Section V of this Special Provision.

or

(identify name of construction contact)

Phone number: *(indicate contact phone number)*

Fax number: *(indicate fax number)*

Email address: *(indicate email address)*

XI. FILES AVAILABLE AFTER AWARD *(Delete if not applicable.)*

Microstation CADD files (*insert: "and electronic hydraulic modeling files" when appropriate*) will be made available to the successful bidder. After Award, submit a request to the District Executive agreeing to the terms and conditions for the release of the electronic files.

The following information will be made available for viewing at the District Office after award:

- Complete permit documents
- Preliminary Geotechnical Engineering Report (*delete if not applicable*)
- Foundation Report (*delete if not applicable*)

Contact the Project Manager identified in Section V of this Special Provision to arrange for viewing the documents.

Project Specific Details:

Special Provision: **D29895C - a29895 TEMPORARY EXCAVATION SUPPORT AND PROTECTION SYSTEM FOR DESIGN-BUILD PROJECTS**

Item(s) Associated:

Header:

TEMPORARY EXCAVATION SUPPORT AND PROTECTION SYSTEM FOR DESIGN-BUILD PROJECTS

Provision Body:

I. DESCRIPTION - This work is the design and construction of a temporary excavation support and protection system or appropriately designed open cut excavation, in locations as required by the Final Designs prepared in conformance with the Contract Special Provisions for the Design Activities identified in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD.

II. MATERIAL - Provide certification or laboratory test results verifying material properties. For used steel, the salvage design values from AASHTO Guide Design Specification for Bridge Temporary Works (AASHTO Guide Spec) may be used as an alternate to testing to determine grade of steel. Materials need not be new but must be in serviceable condition as determined by the Representative. Temporary material used does not have to be from a Bulletin 15 source, but must meet the following:

- Structural Steel..... AASHTO M 270 (ASTM A709M/A709) Grade 36, Grade 50 or Grade 50W, ASTM A992, ASTM A588, Section 1105
- Steel Sheet Piling..... ASTM A328, ASTM A572, Section 1105
- Steel H-Piles..... AASHTO M 270 (ASTM A709M/A709), Grade 36 or ASTM A572 Grade 50, Section 1105
- Wood Lagging..... Rough Cut Species in AASHTO Guide Spec, Appendix A and AASHTO Construction Handbook for Bridge Temporary Works Appendix C
- Cement..... AASHTO M85 and AASHTO M240, Section 701
- Pre-Stressing Steel..... ASTM A416 Grade 270, Section 1107
- Welded Wire Fabric..... ASTM A1064, Section 709
- Reinforcement Bars..... AASHTO M 31 (ASTM A615), ASTM A616 Grade 60, ASTM A706 Grade 60, Section 615 and/or Section 709
- Other Material..... As specified in applicable Sections of Publication 408

III. DESIGN - Design the temporary excavation support and protection system according to current AASHTO LRFD Bridge Design Specifications, Design Manual Part 4, FHWA guidelines, and AASHTO Guide Spec. Design temporary excavation support and protection system for final condition and all construction conditions, including surcharge loads due to vehicle traffic and construction equipment. Submit design calculations and completed detailed drawings signed and sealed by a Professional Engineer registered in the Commonwealth of Pennsylvania to the District Executive or Representative via the PennDOT Project Collaboration Center for review. Include in the design calculations all material properties, design loads, and design assumptions. Include on the completed

detailed drawings all design dimensions, limits of work, elevations, material, member sizes and construction sequence. Provide cutoff elevation of steel and wooden components for work in streambed. Include specific installation procedures and testing requirements as part of the submittal. Allow 14 days for the review by the Department.

Ensure that temporary excavation support and protection system design and construction conforms to the following:

(a) Open cut excavations are allowed provided they meet OSHA requirements, the safety of the traveling public, the approved traffic control plan, the support and safety of the existing structure is assured, and they stay within the legal right-of-way lines. Cuts can extend beyond legal right-of-way lines only with the written approval of the Department and written permission of the property owners. Ensure environmental compliance if cut extends beyond area cleared by the Department.

(b) Temporary embankment or soil cut slopes that do not require a stability analysis must have the following required subsurface information available from existing subsurface exploration or as supplemented by additional subsurface investigation as a minimum:

- Soil and rock (if applicable) strata and orientation/slope of strata
- In-situ soil testing (Standard Penetration Testing (SPT) and/or Cone Penetration Testing (CPT)) for applicable soil layers
- Groundwater level(s)
- Laboratory classification test results including natural moisture content, sieve and hydrometer analyses, and Atterberg limits
- Laboratory testing for shear strength parameters is to be performed whenever practical. For critical situations and conditions, laboratory testing of representative project specific materials to determine shear strength parameters is mandatory.
- Meet OSHA requirements for Type C soil, or better

b.1. A slope stability analysis is not required for temporary embankment slopes that meet all the following requirements:

- The proposed embankment is 20 feet or less in height measured vertically from the toe to the top of proposed embankment
- Proposed slope is 1.5H:1V or flatter
- Embankment will be constructed as specified in Publication 408, Section 206
- Estimated friction angle of foundation material to a depth of at least the height of the embankment is at least 30 degrees
- Ground slope beneath the embankment and 20 feet beyond the toe of the embankment is 4H:1V or flatter
- A structure is not proposed or currently within or above the slope
- For slope widening, in addition to above, the existing slope is 1.5H:1V or flatter, the existing embankment will be benched before fill placement, the estimated friction angle of the existing embankment is at least 30 degrees, and the existing embankment shows no indication of instability.
- Meet OSHA requirements for Type C soil, or better
- Conform to OSHA requirements, including, but not limited to, placement of spoil, ingress or egress, and inspection.

b.2. A slope stability analysis is not required for temporary soil cuts and soil cut widenings that meet all the following requirements:

- Proposed cut is 20 feet or less in height measured vertically from toe to top of proposed cut
- Proposed slope is 1.5H:1V or flatter
- Estimated friction angle of soil from top of cut to a depth of at least the height of the cut below the toe of cut is at least 30 degrees.
- Ground slope above the top of cut is 10H:1V or flatter and ground slope beyond the toe of the cut slope is less than 4H:1V.
- Groundwater level is at or below the toe of the proposed cut
- A structure is not proposed or currently within or above the slope
- For cut slope widening, the existing cut slope is as steep or steeper than the proposed cut and shows no indication of instability.
- Meet OSHA requirements for Type C soil, or better
- Conform to OSHA requirements, including, but not limited to, placement of spoil, ingress or egress, and inspection.

(c) A slope stability analysis is required when:

- a temporary soil cut is required to build a structure, install a utility,
- an embankment is steepened for maintenance and protection of traffic, or
- if a structure is proposed or currently within or above the slope.

Use a minimum factor of safety of 1.2 for slopes less than 20 feet in height that do not have a structure within or on top of the slope and have high quality subsurface data. For slopes that do not meet those requirements, use a minimum factor of safety of 1.3.

Use Department approved software for slope stability analysis.

(d) Select the appropriate temporary excavation support and protection system to be used. Examples include anchored walls, mechanically stabilized earth walls, prefabricated modular walls, cantilever walls, cofferdams, and soil nailing walls. These systems may be comprised of one or more of the following: Soldier Piles, Timber Lagging, Steel Sheet Piling, Caissons, Slurry Walls, Tiebacks, Soil Nails, Shotcrete, Deadman Anchors, Wales, Cross lot Bracing, Raker Braces, Precast Concrete, Precast Lagging, Soil Cement Lagging, Cement Bentonite, Gabions, Micropiles, Concrete Reaction Blocks, Mechanically Stabilized Earth Walls or other methods.

(e) Design temporary excavation support and protection system based on the following soil parameters (see *Project Specific Details for following parameters*):

Effective angle of friction _____
Moist unit weight of soil _____
Saturated unit weight of soil _____
Effective cohesion _____
Static groundwater level at elevation _____
Undrained shear strength of cohesive soil _____
Shear strength for rock mass _____

Provide other soil and rock properties with test data needed in the design of the temporary excavation support and protection system.

(f) Ensure that all components stay within the legal right-of-way unless an easement is obtained by the Contractor.

IV. CONSTRUCTION - Install temporary excavation support and protection system as specified in applicable Sections of Publication 408. Be responsible for adequacy, safety and compliance with Traffic Control Plan. Ensure that the design is compliant with the approved Traffic Control Plan. All steel and wooden components may remain in place to pavement subgrade or 2 feet below finish grade, whichever is the higher elevation. Treated wood is not required unless it is within 6 feet of finish grade and is to remain in place. Pressure treat to American Wood Preservers Association (AWPA) Standard U1. Finish grade is defined as top of pavement when a roadway is behind the temporary excavation support and protection system. Have a Professional Engineer, registered in the Commonwealth of Pennsylvania; certify that the temporary excavation support system or open cut excavation has been installed as shown on the Professional Engineer's signed and sealed drawings. Submit the certification to the Representative within 3 working days of completion of the system. Treat field cuts in accordance with AWPA Standard M4.

V. QUALIFICATIONS - The work must be supervised by a superintendent or foreperson who is experienced in the construction of temporary excavation support and protection system proposed. If the design height of the temporary excavation support and protection system exceeds 20 feet, provide the following with the design submission:

- For the superintendent or foreperson who will supervise the work, submit a list containing at least five projects which demonstrate a minimum of 3 years experience in the construction of the temporary excavation support and protection system proposed. Include a brief description of each project and the name and phone number of the owner's representative knowledgeable in each project listed.
- The name of the Professional Engineer, registered in the State and having at least 3 years experience in the design and construction of temporary excavation support and protection systems, who will design and specify the sequence of construction of the temporary excavation support and protection of system.

VI. MEASUREMENT AND PAYMENT – Incidental to the design and construction activities listed in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD.

Project Specific Details:

The Soil Parameters as indicated in III.(e) are:

- Effective angle of friction: (fill in here)
- Moist unit weight of soil: (fill in here)
- Saturated unit weight of soil: (fill in here)
- Effective cohesion: (fill in here)
- Static groundwater level at elevation: (fill in here)
- Undrained shear strength of cohesive soil: (fill in here)
- Shear strength of rock mass: (fill in here)

D29898A - a29898 QUALITY PLAN WITH QUALITY

Special Provision:

ASSURANCE REVIEW BY PEER REVIEW - LOW BID DESIGN

Item(s) Associated:

Header:

QUALITY PLAN WITH QUALITY ASSURANCE REVIEW BY PEER REVIEW - LOW BID DESIGN

Provision Body:

I. DESCRIPTION - This item consists of developing, furnishing, executing, and maintaining a Quality Plan for the Design Activities listed in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD and establishing controls to ensure compliance with all contract documents for those design activities. The Department and FHWA (as appropriate) will provide a Quality Assurance Review.

II. DEFINITIONS.

a. Quality Plan – The plan prepared for managing quality during final plan development for Design Activities as identified in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD that addresses key staff, responsibilities, milestones, monitoring budgets and schedules, communication efforts, Quality Control/Quality Assurance efforts and tracking procedures as a minimum. It should include a detailed description of the Quality Control staff, design procedures, and design review procedures

b. Quality Control (QC) – All processes and activities performed on the Contract to assess and control the accuracy and completeness of the design, to ensure Contract compliance.

c. Quality Control Reviewer – The design consultant engineering firm or individuals that are responsible to manage the quality control of the design-build contract, including the Quality Control Manager and the Alternate Quality Control Manager.

d. Quality Control Staff – The design consultant team or individuals that are responsible to manage the quality control of the design-build Contract. The QC Staff includes the QC Manager, Alternate QC Manager, and sufficient number of qualified personnel to ensure Contract compliance. The QC Staff may include personnel from the same firm as the Lead Design Engineer, as defined in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, but may not be involved with other design activities on the contract.

e. Quality Assurance (QA) – The planned and systematic actions that are necessary to provide adequate confidence that a product or facility complies with Federal and State requirements. QA is the performance of a high level review of each product to confirm quality, economy, and compliance with Contract requirements.

f. Quality Assurance Reviewer (QA-R) – An independent, third-party engineering firm engaged by the Contractor to check the validity of the Quality Plan to confirm that the work is done in accordance with the Contract documents. The QA-R is subject to the restrictions identified in Section III of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD. Also QA-R in this instance is also referred to as the Peer Reviewer

g. Quality Assurance Review – A detailed review by the QA Reviewer of the plans, specifications, and calculations developed by the Lead Design Engineer for the Design Activities as identified in the Design Activities Section of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD to confirm that the project's approved design criteria are being followed as well as the plan development and associated calculations.

h. Owner's Perspective Review – Limited review by Department and FHWA (as appropriate) to determine that the plans and calculations have been developed in conformance with Department criteria and standards and a QA review was performed by the Peer Reviewer in conformance with the approved Quality Plan. Unless discrepancies are found in the plans, calculations, or QC/QA process, the review is not to be an in-depth review of the actual design.

III. QUALITY PLAN

(a) Quality Plan Requirements.

1. Quality Control Requirements. Identify and discuss the procedures that will be used to review, modify, and approve plan documents and associated permits. Include methods and procedures to control, document, and accept the quality of the design activities listed in Section IV of the Special Provision titled Special Bidding – Design-Build. Include the following quality control items as a minimum.

a. Control.

- (1) Procedures to control the quality of the final design.
- (2) Methodology used to determine design criteria to be used to develop design.
- (3) Proposed design criteria for design.
- (4) Guidelines for submission review including approach for addressing partial submissions.
- (5) A general outline of the Lead Design Engineer's document control.
- (6) Copies of the Lead Design Engineer's quality control forms and/or checklists.
- (7) Incorporate design submission deadlines, Peer Review and Department review cycle-times into the CPM Schedule.

b. Records.

- (1) Method of recording stages of design development.
- (2) System of maintaining a design submission/review/acceptance status log.
- (3) Method for updating and tracking submission status for all aspects of the design including partial submissions and permits.
- (4) Systems by which the Lead Design Engineer internally checks calculations and the Contract documents.
- (5) Records of submission reviews, approvals, and permits granted.
- (6) Records of design revisions during construction.

c. Acceptance.

- (1) Procedures to obtain acceptance and construction release by the Department through Quality Assurance review.
- (2) Method of documenting and recording acceptance and construction release by the Department.

2. Quality Control Staffing. Maintain the QC Staff at approved Quality Plan levels at all times until project completion. The Lead Design Engineer Project Manager is responsible to review all design submissions,

signing and sealing as appropriate, and then submit the design to the Department as defined in the Special Provision titled Special Bidding – Design-Build.

Provide an organization chart showing lines of authority and contact information of the key staff of the Contractor, Lead Design Engineer, and the QC Staff.

Provide the following information in the Quality Plan:

a. Lead Design Engineer. The Lead Design Engineer (LDE) consists of a Lead Design Engineer Project Manager and sufficient design personnel to ensure contract compliance. Lead Design Engineer personnel will report directly to the Lead Design Engineer Project Manager. The Lead Design Engineer Project Manager will report directly to the contractor. The Quality Plan must include, but not be limited to, the following:

- (1) Provide an organization chart showing lines of authority and contact information of the Lead Design Engineer personnel.
- (2) Include resumes, qualifications, duties, responsibilities, and certifications, of all design personnel. Provide a letter from a principal of the Lead Design Engineer firm to the Lead Design Engineer Project Manager that clearly describes their responsibilities and provide delegation of authority to stop work on any elements that do not comply with the contract documents.
- (3) Identify the Lead Design Engineer Project Manager. The Lead Design Engineer Project Manager must meet the minimum requirement of being a Professional Engineer (PE) registered in the State with a minimum of 7 years of experience managing and supervising the design of roadway and/or structure projects.
- (4) Provide a letter from an authorized official of the Contractor to the Lead Design Engineer Project Manager that clearly describes their responsibilities and provides delegation of authority to stop work on any elements that do not comply with the Contract.

b. Quality Control Staff. The QC Staff consists of a QC Manager, Alternate QC Manager, and sufficient number of qualified personnel to ensure Contract compliance. QC Staff personnel will report directly to the QC Manager. The QC Manager will report directly to the Contractor. The Quality Plan must include, but not be limited to, the following:

- (1) Provide an organization chart showing lines of authority and contact information of the Quality Control Staff personnel.
- (2) Include resumes, qualifications, duties, responsibilities, authorities, and certifications of all QC Staff personnel.
- (3) Identify the QC Manager and Alternate QC Manager. The Alternate QC Manager is responsible to manage the QC effort during periods when the QC Manager is absent. In no instance will the QC Manager be absent from project responsibilities and the alternate manager serve for more than a continuous two-week period without written permission from the Department.
- (4) The QC Manager and Alternate QC Manager must meet the minimum requirement of being a Professional Engineer (PE) registered in the State

with a minimum of 7 years of experience managing and supervising the design of roadway and/or structure projects.

(5) Provide a letter from an authorized official of the Contractor to the QC Manager that clearly describes the responsibilities and delegates the authority to stop work on any elements that do not comply with the Contract. The QC Manager will issue a letter of direction to all other Quality Control representatives outlining duties, authorities, and responsibilities. Include copies of these letters in the Quality Plan.

c. Quality Assurance Review Staff. The QA-R Staff consists of a QA-R Manager and sufficient number of qualified personnel to confirm contract compliance. QA-R Staff personnel will report directly to the QA-R Manager. The QA-R Manager reports to the LDE only with respect to coordination of submittal review schedule and review times. Otherwise, the duty of the QA-R is to act on behalf of the Department in performing QA Reviews. Regarding the QA-R, include the following in the Quality Plan:

(1) Include resumes, qualifications, duties, responsibilities, authorities, and certifications of all QA-R Staff personnel.

(2) Identify the QA-R Manager.

(3) The QA-R Manager must meet the minimum requirement of being a registered Professional Engineer (PE) in civil or structural engineering in the Commonwealth of Pennsylvania with a minimum of 7 years of experience managing and supervising the design of roadway and/or structure projects.

(4) Provide a letter from an authorized official of the Contractor to the QA-R Manager that clearly describes the responsibilities and delegates the authority to review on behalf of the Department. Include copies of these letters in the Quality Plan.

The Department reserves the right to reject any design or Peer Review consultant staff if adequate experience and expertise is not demonstrated. Unless indicated otherwise by the Department in writing, any staff disapproval will not permit the extension of the construction completion date or price adjustments to any items in the contract.

(b) Quality Plan Submittal. Clearly describe the approach to quality management and development of the Quality Plan. The discussion of the Quality Plan will address all activities listed in the Special Provision titled Special Bidding – Design-Build. Describe in detail the plans, procedures, references, organization, and documents required to ensure that all work complies with contract documents. Include control measures, documentation procedures, records, and forms. Where Partial Submissions are allowed, address all specified partial submission requirements, list all partial submission components, and describe the schedule of partial submissions.

Submit the Quality Plan to the Department by the 5th working day after receiving approval of the QC Reviewer. The Department will provide comments on the Quality Plan at the Quality Coordination Meeting.

(c) Quality Coordination Meeting. Hold a Quality Coordination Meeting with the Department either as part of the pre-construction meeting, or as a separate meeting, and discuss the Quality Plan. Attendance by the Contractor, QC Manager, Alternate QC Manager, Lead Design Engineer, and the QA Reviewer are mandatory at this meeting. The Department reserves the right to designate attendance by additional personnel. The meeting must be held within 10 working days following the date of the Notice to Proceed. During the meeting, a mutual agreement of the details to be included in the final Quality Plan will be developed including the forms for recording the operations, control activities, administration of the Quality Plan, and the interrelationship of the

Quality Plan. Minutes of the coordination meeting must be prepared by the Lead Design Engineer, signed by the Contractor and the Department, and recorded. The Quality Coordination Meeting minutes must be incorporated as part of the final Quality Plan.

(d) Quality Plan Approval. Within 10 working days after the Quality Coordination Meeting, submit the final Quality Plan for approval based on comments received during the Quality Coordination Meeting. Include an updated CPM Schedule in the submission. Include time in the Schedule for the Owner's Perspective review and oversight of the Peer Review (10 day minimum) by the Department.

No payment will be made for design activities listed in Section IV of the Special Provision titled Special Bidding – Design-Build without an approved Quality Plan. Upon acceptance, the entire Quality Plan will become part of the contract documents. Once work begins under the approved Quality Plan, continuously evaluate the work in accordance with the Quality Plan. Do not implement any changes without prior acceptance by the Department.

(e) Design Activity Submissions Monthly Report. In addition to the records required by Section III(a)1.b of this Special Provision, maintain the status of all submissions associated with the design activities listed in Section IV of the Special Provision titled Special Bidding – Design-Build on the form titled "Design Activity Submissions Monthly Report." This form is located in ECMS File Cabinet (in the References Tab). Submit this form within 30 calendar days following approval of the Quality Plan, and submit an updated version every 30 calendar days thereafter until the Final Drawings have been released for construction.

(f) Quality Assurance Review. Have the QA-R perform a detailed QA review of the plans, specifications, and calculations to confirm that the Department's approved design criteria are being followed. The detailed QA review consists of a minimum of the following:

- (1) Evaluation of design methods and design assumptions.
- (2) Review for compliance with Department criteria and standards and project specifications.
- (3) Verify that the computer program utilized in bridge/structure design is in accordance with Publication 15M, Design Manual Part 4.
- (4) Check of manual calculations.
- (5) Check of construction methods, including applicable safety regulations, when required, to confirm that the intent of the design can be realized.
- (6) Check of erection stresses, where applicable.
- (7) Check of plans to confirm that design information is presented adequately and correctly.
- (8) Check of construction dimensions is not required, except as in (7) above.
- (9) Check quantities.
- (10) Project coordinates to benchmarks
- (11) Constructability check is required for review of the Final Design.

Have the Lead Design Engineer address all comments of the QA-R. Upon completion of the QA review and satisfactory resolution of the QA review comments, have the QA-R sign and seal the first sheet of the plans as having been reviewed by the Peer Review consultant. Include the following statement with the review block:

"The Quality Assurance Review is a detailed review for compliance with the contract documents, the Department's design and construction criteria and standards, and for proper development and presentation of the plans in preparation for construction as part of the design-build Contract. It is not intended to relieve the Contractor of full responsibility for the proper development and presentation of the design, the accuracy and completeness of the plans, or for the complete compliance with the Contract Documents."

For review of each structure design item, have the QA-R sign and seal the first sheet of each set of structure drawings per Publication 15M, Design Manual Part 4, *Structures*, Policy and Procedures Section 1.3.4.

The QA-R then returns the submittal to the Department with a QA report summarizing the review issues and their resolution. The Department with FHWA (as appropriate) will perform the Owners Perspective Review. Upon its completion, the plans will be issued to the Contractor by letter by the Department identifying the specific plans covered by the review. Plans issued will be stamped with the following statement:

"Quality Assurance Review was conducted. Released for Construction."

Upon completion of an Owners Perspective Review of partial submissions, where permitted in the Special Provisions, plans will be issued to the Contractor by letter by the Department identifying the limitations of the review, and the limitations of the work released for construction. Plans issued will be stamped with the following statement:

"Quality Assurance Review was conducted. Released for Construction."

(g) Infractions. Any infractions of the Contract requirements, which are not monitored sufficiently by the Lead Design Engineer, the QC Reviewer, or the QA Reviewer will result in any and all payments related to design activities listed in the special provision entitled "Special Bidding – Design-Build" being withheld until infractions are corrected.

Such action may result in the District Executive giving a written order for the dismissal and replacement of the Lead Design Engineer, the QC Reviewer, and/or the QA Reviewer. An extension of contract time or request for additional costs will not be considered when a delay or suspension occurs due to such infractions.

Be advised that any deliberate omissions or deliberate cover-ups will be grounds for default of the Contract.

IV. MEASUREMENT AND PAYMENT

Incidental to the design activities listed in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD.

Project Specific Details:

Special Provision: **D29899A - a29899 QUALITY PLAN WITH QUALITY ASSURANCE REVIEW BY DEPARTMENT - LOW BID DESIGN**

Item(s) Associated:

Header:

Quality Plan with Quality Assurance Review by Department - Low Bid Design

Provision Body:

I. DESCRIPTION - This item consists of developing, furnishing, executing, and maintaining a Quality Plan for the Design Activities listed in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD and establishing controls to ensure compliance with all contract documents for those design activities. The Department and FHWA (as appropriate) will provide a Quality Assurance Review.

II. DEFINITIONS.

a. Quality Plan – The plan prepared for managing quality during final plan development for Design Activities as identified in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD that addresses key staff, responsibilities, milestones, monitoring budgets and schedules, communication efforts, Quality Control/Quality Assurance efforts and tracking procedures as a minimum. It should include a detailed description of the Quality Control staff, design procedures, and design review procedures

b. Quality Control (QC) – All processes and activities performed on the Contract to assess and control the accuracy and completeness of the design, to ensure Contract compliance.

c. Quality Control Reviewer – The design consultant engineering firm or individuals that are responsible to manage the quality control of the design-build contract, including the Quality Control Manager and the Alternate Quality Control Manager.

d. Quality Control Staff – The design consultant team or individuals that are responsible to manage the quality control of the design-build Contract. The QC Staff includes the QC Manager, Alternate QC Manager, and sufficient number of qualified personnel to ensure Contract compliance. The QC Staff may include personnel from the same firm as the Lead Design Engineer, as defined in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, but may not be involved with other design activities on the contract.

e. Quality Assurance (QA) - The planned and systematic actions that are necessary to provide adequate confidence that a product or facility complies with Federal and State requirements. QA is the performance of a high level review of each product to confirm quality, economy, and compliance with Contract requirements.

f. Quality Assurance (QA) Team - The Department and FHWA (as appropriate) representatives who check the validity of the Quality Plan to confirm that the work is done in accordance with the Contract documents.

g. Quality Assurance Review - A review of the plans, specifications, and calculations by the Department and FHWA (as appropriate) to confirm that the project's approved design criteria are being followed.

III. QUALITY PLAN

(a) Quality Plan Requirements.

1. Quality Control Requirements. Identify and discuss the procedures that will be used to review, modify, and approve plan documents and associated permits. Include methods and procedures to control, document, and accept the quality of the design activities listed in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD. Include the following quality control items as a minimum:

a. Control.

- (1) Procedures to control the quality of the final design.
- (2) Methodology used to determine design criteria to be used to develop design.
- (3) Proposed design criteria for design.
- (4) Guidelines for submission review including approach for addressing partial submissions.

- (5) A general outline of the Lead Design Engineer's document control.
- (6) Copies of the Lead Design Engineer's quality control forms and/or checklists.
- (7) Incorporate design submission deadlines and Department review cycle-times into the CPM Schedule.

b. Records.

- (1) Method of recording stages of design development.
- (2) System of maintaining a design submission/review/acceptance status log.
- (3) Method for updating and tracking submission status for all aspects of the design including partial submissions and permits.
- (4) Systems by which the Lead Design Engineer internally checks calculations and the Contract documents.
- (5) Records of submission reviews, approvals, and permits granted.
- (6) Records of design revisions during construction.

c. Acceptance.

- (1) Procedures to obtain acceptance and construction release by the Department through Quality Assurance review.
- (2) Method of documenting and recording acceptance and construction release by the Department.

2. Quality Control Staffing. Maintain the QC Staff at approved Quality Plan levels at all times until project completion. The Lead Design Engineer Project Manager is responsible to review all design submissions, signing and sealing as appropriate, and then submit the design to the Department as defined in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD.

Provide an organization chart showing lines of authority and contact information of the key staff of the Contractor, Lead Design Engineer, and the QC Staff.

Provide the following information in the Quality Plan:

a. Lead Design Engineer. The Lead Design Engineer (LDE) consists of a Lead Design Engineer Project Manager and sufficient design personnel to ensure contract compliance. Lead Design Engineer personnel will report directly to the Lead Design Engineer Project Manager. The Lead Design Engineer Project Manager will report directly to the contractor. The Quality Plan must include, but not be limited to, the following:

- (1) Provide an organization chart showing lines of authority and contact information of the Lead Design Engineer personnel.
- (2) Include resumes, qualifications, duties, responsibilities, and certifications, of all design personnel. Provide a letter from a principal of the Lead Design Engineer firm to the Lead Design Engineer Project Manager that clearly describes their responsibilities and provide delegation of authority to stop work on any elements that do not comply with the contract documents.

(3) Identify the Lead Design Engineer Project Manager. The Lead Design Engineer Project Manager must meet the minimum requirement of being a Professional Engineer (PE) registered in the State with a minimum of 7 years of experience managing and supervising the design of roadway and/or structure projects.

(4) Provide a letter from an authorized official of the Contractor to the Lead Design Engineer Project Manager that clearly describes their responsibilities and provides delegation of authority to stop work on any elements that do not comply with the Contract.

b. Quality Control Staff. The QC Staff consists of a QC Manager, Alternate QC Manager, and sufficient number of qualified personnel to ensure Contract compliance. QC Staff personnel will report directly to the QC Manager. The QC Manager will report directly to the Contractor. The Quality Plan must include, but not be limited to, the following:

(1) Provide an organization chart showing lines of authority and contact information of the Quality Control Staff personnel.

(2) Include resumes, qualifications, duties, responsibilities, authorities, and certifications of all QC Staff personnel.

(3) Identify the QC Manager and Alternate QC Manager. The Alternate QC Manager is responsible to manage the QC effort during periods when the QC Manager is absent. In no instance will the QC Manager be absent from project responsibilities and the alternate manager serve for more than a continuous 2-week period without written permission from the Department.

(4) The QC Manager and Alternate QC Manager must meet the minimum requirement of being a Professional Engineer (PE) registered in the State with a minimum of 7 years of experience managing and supervising the design of roadway and/or structure projects.

(5) Provide a letter from an authorized official of the Contractor to the QC Manager that clearly describes the responsibilities and delegates the authority to stop work on any elements that do not comply with the Contract. The QC Manager will issue a letter of direction to all other Quality Control representatives outlining duties, authorities, and responsibilities. Include copies of these letters in the Quality Plan.

(b) Quality Plan Submittal. Clearly describe the approach to quality management and development of the Quality Plan. The discussion of the Quality Plan will address all activities listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD. Describe in detail the plans, procedures, references, organization, and documents required to ensure that all work complies with Contract documents. Include control measures, documentation procedures, records, and forms. Where Partial Submissions are allowed, address all specified partial submission requirements, list all partial submission components, and describe the schedule of partial submissions.

Submit the Quality Plan to the Department by the 5th working day after receiving approval of the QC Reviewer. The Department will provide comments on the Quality Plan at the Quality Coordination Meeting.

(c) Quality Coordination Meeting. Hold a Quality Coordination Meeting with the Department either as part of the pre-construction meeting, or as a separate meeting, and discuss the Quality Plan. Attendance by the Contractor, QC Manager, Alternate QC Manager, Lead Design Engineer, and the QA Team are mandatory at this meeting. The Department reserves the right to designate attendance by additional personnel. The meeting must be held within 10 working days following the date of the Notice to Proceed. During the meeting, a mutual agreement of the details to be included in the final Quality Plan will be developed including the forms for

recording the operations, control activities, administration of the Quality Plan, and the interrelationship of the Quality Plan. Minutes of the coordination meeting must be prepared by the Lead Design Engineer, signed by the Contractor and the Department, and recorded. The Quality Coordination Meeting minutes must be incorporated as part of the final Quality Plan.

(d) Quality Plan Approval. Within 10 working days after the Quality Coordination Meeting, submit the final Quality Plan for approval based on comments received during the Quality Coordination Meeting. Include an updated CPM in the submission.

No payment will be made for design activities listed in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD without an approved Quality Plan. Upon acceptance, the entire Quality Plan will become part of the Contract documents. Once work begins under the approved Quality Plan, continuously evaluate the work in accordance with the Quality Plan. Do not implement any changes without prior acceptance by the Department.

(e) Design Activity Submissions Monthly Report. In addition to the records required by Section III(a)1.b of this Special Provision, maintain the status of all submissions associated with the design activities listed in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD on the form titled "Design Activity Submissions Monthly Report." This form is located in ECMS File Cabinet (in the References Tab). Submit this form within 30 calendar days following approval of the Quality Plan, and submit an updated version every 30 calendar days thereafter until the Final Drawings have been released for construction.

(f) Quality Assurance Review. The Department and FHWA (as appropriate) will perform a QA review of the plans, specifications, and calculations to confirm that the Department's approved design criteria are being followed.

Upon successful completion of the QA review, the plans will be issued to the Contractor by letter by the Department identifying the specific plans covered by the review. Plans issued will be stamped with the following statement:

"Quality Assurance Review was conducted. Released for Construction."

Upon successful completion of QA review of partial submissions, where permitted in the Special Provisions, plans will be issued to the Contractor by letter by the Department identifying the limitations of the review, and the limitations of the work released for construction. Plans issued will be stamped with the following statement:

"Quality Assurance Review was conducted. Released for Construction."

(g) Infractions. Any infractions of the Contract requirements, which are not monitored sufficiently by the Lead Design Engineer and the QC Reviewer, will result in any and all payments related to design activities listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD being withheld until infractions are corrected.

Such action may result in the District Executive giving a written order for the dismissal and replacement of the Lead Design Engineer and/or the QC Reviewer. An extension of Contract time or request for additional costs will not be considered when a delay or suspension occurs due to such infractions.

Be advised that any deliberate omissions or deliberate cover-ups will be grounds for default of the Contract.

IV. MEASUREMENT AND PAYMENT

Incidental to the design activities listed in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD.

Project Specific Details:

P1061B - b01061 Electronic Submission of Material Certifications through ECMS

Special Provision:

Item(s) Associated:

Header:

Section 106 - Electronic Submission of Material Certifications through ECMS

Provision Body:

SECTION 106—CONTROL OF MATERIAL

- **Section 106.03(b)3 Revise to read as follows:**

3. Compliance Certification of Bulletin Materials. The Contractor is responsible for the control and quality of all materials, both Bulletin and non-Bulletin materials, arriving at the project. Each Bulletin material must be certified to be from a Bulletin source and to be in compliance with the specification requirements for the material. A properly completed and submitted Form CS-4171, Certificate of Compliance, is the means for certification of Bulletin materials. Bulletin materials are defined in Section 106.02(a)1. The Department will review properly completed and submitted Certificates of Compliance and supplemental or alternate certification as specified in 106.03(b)3.c within 3 work days of submission in ECMS.

Manufacturers, producers, and suppliers of materials; and all prime contractors and subcontractors must use the automated Materials Certification process in ECMS. Material certifications to be submitted electronically using PDF certification forms only. Individuals completing the certification forms must register for a digital signature with the Department. Digital signature registration applications along with instructions on completion of the application will be provided by the Department. Contact Department resource account via email at econstruct@pa.gov to initiate the process.

Contractors to contact and ensure manufacturers, producers, suppliers and subcontractors providing materials or working on this project have been informed of this requirement.

The Department reserves the right to sample and test any material for verification that specification requirements are met. Materials of questionable quality delivered to the project will be sampled, tested, and approved by LTS before incorporation in any work. Materials on a reduced certification level may be required to be sampled, tested, and approved by LTS before incorporation in any work. Random field verification samples of the material may be taken by the Representative at the material source, from delivered project material, or at the place of the last manufacturer, fabricator, or producer before delivery. Random QA samples may also be taken by the Representative from delivered project material, at the place of supply, or at the place of the last manufacturer, fabricator, or producer before delivery. The random samples will be sent to the LTS for testing.

3.a Form CS-4171 Completion. Form CS-4171 is completed electronically by the manufacturer, fabricator, or producer (Producer) of Bulletin material provided to the project. The Producer submits the original Form CS-4171 electronically within ECMS and provides a copy of Form CS-4171 with each direct shipment to the project.

When a Producer sells a Bulletin 15 material to a distributor/supplier (shipper), the Producer provides a copy of Form CS-4171 with each delivery to the shipper. When a shipper provides Bulletin 15 material directly to the project, the shipper completes and signs a new Form CS-4171 electronically within ECMS and provides a copy with each direct shipment to the project. The shipper will maintain the copy of the Producer's Form CS-4171 that they have received. Form CS-4171 must be properly signed electronically by a legally responsible company official.

3.b Form CS-4171 Submission for Project Shipments. Ensure that Form CS-4171 is received for each project shipment of Bulletin material. Electronically submit a properly completed and signed copy of Form CS-4171 for each project shipment. Do not incorporate any Bulletin material in the work until certification is approved in ECMS, unless

otherwise approved by the Representative. Payment for material will be withheld until proper certification documentation is received.

Form CS-4171 must be submitted to the Department electronically.

3.c Supplemental or Alternate Certification. Certain Bulletin materials require the submission of supplemental CS-4171 certification in addition to Form CS-4171, to provide traceability of materials in multi-step manufacturing processes. Form CS-4171F and Form CS-4171LA must be submitted electronically within ECMS.

- Epoxy coated or galvanized reinforcement steel requires the submission of supplemental certification Form CS-4171C (Epoxy Coating or Galvanizing Facility) and/or Form CS-4171F (Fabrication Facility).
- Structural steel, aluminum, or precast/prestressed concrete products, produced in a Bulletin 15 approved facility with an on-site Inspector or a Representative, must be stamped with an approved inspection stamp at the plant and certified with a Form CS-4171.
- Steel products containing foreign steel require the submission of supplemental Form CS-4171S.

Certain Bulletin materials require a form of certification other than the Form CS-4171, as identified in the particular material specification.

- Section 701 and Section 702 materials require a properly completed vendor bill of lading.
- Certification of daily bituminous mixtures by submission of Form CS-4171B.
- Certification of locally approved non-Bulletin materials by submission of Form CS-4171LA.

Organize and submit only Forms CS-4171 and supplemental or alternate certifications for material supplied to the project. Submissions containing irrelevant forms or documentation for materials not incorporated into the project will not be accepted.

3.d Not Used

3.e Levels of Certification for Bulletin 15 Producers. The BOPD determines the Level of Certification for each Producer based on the Producer's ability to comply with the material specifications. The Levels of Certification are defined in Table C. Bulletin 15 will indicate if a Producer is at a certification level other than Level 1. Material provided by Producers listed in Bulletin 15 is approved for use only in its intended application(s).

TABLE C

Levels of Certification for Bulletin 15 Producers		Producer Material Shipment Procedure	Producer Additional Requirements
Level 1	Standard Certification	Ship on Certification with Form CS-4171*	None
Level 2	Standard Certification - Reduced	Ship on Certification with Form CS-4171*	See Section 106.03(b)3.e.2
Level 3	Lot Approval Certification	Ship only after Material Lot Approval using Modified Certification, with Form CS-4171*	See Section 106.03(b)3.e.3
Suspension or Removal	<p>According to the State's Contractor Responsibility Program:</p> <ul style="list-style-type: none"> • Producer may be suspended or removed from Bulletin 15 for any of the reasons stated in the Bulletin 15 Preface, regardless of Producer certification level. • Failure of Producer to advance above Certification Level 3 will result in PennDOT's initiating action for suspension or removal from Bulletin 15. 		

* Certain Bulletin materials require supplemental or alternate forms of certification, as specified in Section 106.03(b)3.c. All Form CS-4171, Form CS-4171F, and Form CS-4171LA must be submitted electronically within ECMS.

3.e.1 LEVEL 1 (Standard Certification).

- Initial Level of Certification typically issued to Bulletin 15 listed Producers.
- Material is produced and tested in accordance with the Producer's approved QC Plan.
- No known material performance or quality issues exist that warrant a reduced level of certification.
- Material is shipped on certification after submitting Form CS-4171 electronically.

3.e.2 LEVEL 2 (Standard Certification - Reduced).

- Reduced Level of Certification issued to Bulletin 15 listed Producers who have exhibited minor/moderate material performance or quality issues.
- Producer is required to work with PennDOT on submission of an improvement plan that may include, but is not limited to, any or all of the following items: a revised QC Plan, a failure analysis/action plan to assess why failures are occurring and how to prevent these failures from occurring in the future, correlation testing between in-house and independent lab testing to assist with validating results.
- Material is produced and tested in accordance with the improvement plan approved by PennDOT.
- Material is shipped on certification after submitting Form CS-4171 electronically.

3.e.3 LEVEL 3 (Lot Approval Certification).

- This Level of Certification is issued to Bulletin 15 listed Producers who have exhibited major material performance or quality issues.
- Producer is required to work with PennDOT on an improvement plan as defined in Level 2.
- Material cannot be shipped to projects using the standard CS-4171 certification process.
- Producer must arrange for independent, in-plant acceptance testing (IPAT) that will be conducted side-by-side with "in-house" Producer testing at the designated frequencies in the revised QC plan. IPAT will be at the Producer's expense. PennDOT's LTS must approve the Producer's proposed IPAT provider, before it begins.
- Any material lot to be used on a project must be tested and approved by the IPAT as meeting the required PennDOT specification prior to shipment to the project.
- Each material lot meeting the specification may be shipped to a project using a modified certification process as follows: submit electronically, Form CS-4171 along with a signed letter from the IPAT (on their official letterhead) indicating that the material lot meets testing and specification requirements.
- Correlate results from parallel "in-house" Producer testing and IPAT testing, and submit to the LTS on a monthly basis.

Project Specific Details:

Special Provision: **P1062B - b01062 Electronic Submission of Material Certifications through ECMS for Lump Sum Component items**

Item(s) Associated:

Header:

Section 106 - Electronic Submission of Material Certifications through ECMS

Provision Body:

SECTION 106—CONTROL OF MATERIAL

- **Section 106.03(b)3 Revise to read as follows:**

3. Compliance Certification of Bulletin Materials. The Contractor is responsible for the control and quality of all materials, both Bulletin and non-Bulletin materials, arriving at the project. Each Bulletin material must be certified to be from a Bulletin source and to be in compliance with the specification requirements for the material. A properly completed and submitted Form CS-4171, Certificate of Compliance, is the means for certification of Bulletin materials. Bulletin materials are defined in Section 106.02(a)1. The Department will review properly completed and submitted Certificates of Compliance and supplemental or alternate certification as specified in 106.03(b)3.c within 3 work days of submission in ECMS.

Manufacturers, producers, and suppliers of materials; and all prime contractors and subcontractors must use the automated Materials Certification process in ECMS. Material certifications to be submitted electronically using PDF certification forms only. Individuals completing the certification forms must register for a digital signature with the Department. Digital signature registration applications along with instructions on completion of the application will be provided by the Department. Contact Department resource account via email at eConstruct@pa.gov to initiate the process.

Contractors to contact and ensure manufacturers, producers, suppliers and subcontractors providing materials or working on this project have been informed of this requirement.

The Department reserves the right to sample and test any material for verification that specification requirements are met. Materials of questionable quality delivered to the project will be sampled, tested, and approved by LTS before incorporation in any work. Materials on a reduced certification level may be required to be sampled, tested, and approved by LTS before incorporation in any work. Random field verification samples of the material may be taken by the Representative at the material source, from delivered project material, or at the place of the last manufacturer, fabricator, or producer before delivery. Random QA samples may also be taken by the Representative from delivered project material, at the place of supply, or at the place of the last manufacturer, fabricator, or producer before delivery. The random samples will be sent to the LTS for testing.

3.a Form CS-4171 Completion. Form CS-4171 is completed electronically by the manufacturer, fabricator, or producer (Producer) of Bulletin material provided to the project. The Producer submits the original Form CS-4171 electronically within ECMS and provides a copy of Form CS-4171 with each direct shipment to the project.

When a Producer sells a Bulletin 15 material to a distributor/supplier (shipper), the Producer provides a copy of Form CS-4171 with each delivery to the shipper. When a shipper provides Bulletin 15 material directly to the project, the shipper completes and signs a new Form CS-4171 electronically within ECMS and provides a copy with each direct shipment to the project. The shipper will maintain the copy of the Producer's Form CS-4171 that they have received.

Form CS-4171 must be properly signed electronically by a legally responsible company official.

3.b Form CS-4171 Submission for Project Shipments. Ensure that Form CS-4171 is received for each project shipment of Bulletin material. Electronically submit a properly completed and signed copy of Form CS-4171 for each project shipment. Do not incorporate any Bulletin material in the work until certification is approved in ECMS, unless otherwise approved by the Representative. Payment for material will be withheld until proper certification documentation is received.

Form CS-4171 must be submitted to the Department electronically.

3.c Supplemental or Alternate Certification. Certain Bulletin materials require the submission of supplemental CS-4171 certification in addition to Form CS-4171, to provide traceability of materials in multi-step manufacturing processes. Form CS-4171F and Form CS-4171LA must be submitted electronically within ECMS.

- Epoxy coated or galvanized reinforcement steel requires the submission of supplemental certification Form CS-4171C (Epoxy Coating or Galvanizing Facility) and/or Form CS-4171F (Fabrication Facility).

- Structural steel, aluminum, or precast/prestressed concrete products, produced in a Bulletin 15 approved facility with an on-site Inspector or a Representative, must be stamped with an approved inspection stamp at the plant and certified with a Form CS-4171.
- Steel products containing foreign steel require the submission of supplemental Form CS-4171S.

Certain Bulletin materials require a form of certification other than the Form CS-4171, as identified in the particular material specification.

- Section 701 and Section 702 materials require a properly completed vendor bill of lading.
- Certification of daily bituminous mixtures by submission of Form CS-4171B.
- Certification of locally approved non-Bulletin materials by submission of Form CS-4171LA.

Organize and submit only Forms CS-4171 and supplemental or alternate certifications for material supplied to the project. Submissions containing irrelevant forms or documentation for materials not incorporated into the project will not be accepted.

3.d Not Used

3.e Levels of Certification for Bulletin 15 Producers. The BOPD determines the Level of Certification for each Producer based on the Producer's ability to comply with the material specifications. The Levels of Certification are defined in Table C. Bulletin 15 will indicate if a Producer is at a certification level other than Level 1. Material provided by Producers listed in Bulletin 15 is approved for use only in its intended application(s).

TABLE C

Levels of Certification for Bulletin 15 Producers		Producer Material Shipment Procedure	Producer Additional Requirements
Level 1	Standard Certification	Ship on Certification with Form CS-4171*	None
Level 2	Standard Certification - Reduced	Ship on Certification with Form CS-4171*	See Section 106.03(b)3.e.2
Level 3	Lot Approval Certification	Ship only after Material Lot Approval using Modified Certification, with Form CS-4171*	See Section 106.03(b)3.e.3
Suspension or Removal	According to the State's Contractor Responsibility Program: <ul style="list-style-type: none"> • Producer may be suspended or removed from Bulletin 15 for any of the reasons stated in the Bulletin 15 Preface, regardless of Producer certification level. • Failure of Producer to advance above Certification Level 3 will result in PennDOT's initiating action for suspension or removal from Bulletin 15. 		

* Certain Bulletin materials require supplemental or alternate forms of certification, as specified in Section 106.03(b)3.c. All Form CS-4171, Form CS-4171F, and Form CS-4171LA must be submitted electronically within ECMS.

3.e.1 LEVEL 1 (Standard Certification).

- Initial Level of Certification typically issued to Bulletin 15 listed Producers.
- Material is produced and tested in accordance with the Producer's approved QC Plan.
- No known material performance or quality issues exist that warrant a reduced level of certification.
- Material is shipped on certification after submitting Form CS-4171 electronically.

3.e.2 LEVEL 2 (Standard Certification - Reduced).

- Reduced Level of Certification issued to Bulletin 15 listed Producers who have exhibited minor/moderate material performance or quality issues.
- Producer is required to work with PennDOT on submission of an improvement plan that may include, but is not limited to, any or all of the following items: a revised QC Plan, a failure analysis/action plan to assess why failures are occurring and how to prevent these failures from occurring in the future, correlation testing between in-house and independent lab testing to assist with validating results.
- Material is produced and tested in accordance with the improvement plan approved by PennDOT.
- Material is shipped on certification after submitting Form CS-4171 electronically.

3.e.3 LEVEL 3 (Lot Approval Certification).

- This Level of Certification is issued to Bulletin 15 listed Producers who have exhibited major material performance or quality issues.
- Producer is required to work with PennDOT on an improvement plan as defined in Level 2.
- Material cannot be shipped to projects using the standard CS-4171 certification process.
- Producer must arrange for independent, in-plant acceptance testing (IPAT) that will be conducted side-by-side with “in-house” Producer testing at the designated frequencies in the revised QC plan. IPAT will be at the Producer’s expense. PennDOT’s LTS must approve the Producer’s proposed IPAT provider, before it begins.
- Any material lot to be used on a project must be tested and approved by the IPAT as meeting the required PennDOT specification prior to shipment to the project.
- Each material lot meeting the specification may be shipped to a project using a modified certification process as follows: submit electronically, Form CS-4171 along with a signed letter from the IPAT (on their official letterhead) indicating that the material lot meets testing and specification requirements.
- Correlate results from parallel “in-house” Producer testing and IPAT testing, and submit to the LTS on a monthly basis.

Project Specific Details:

Special Provision: **P2061A - b02061 SECTION 206 - EMBANKMENTS
INCORPORATING CRUSHED GLASS**

Item(s) Associated:

Header:

SECTION 206 - EMBANKMENTS INCORPORATING CRUSHED GLASS

Provision Body:

I. DESCRIPTION - This work is the construction of embankments incorporating crushed glass.

II. MATERIAL - Section 206.2 change and add the following:

Change Section 206.2 (a):

1.b Crushed Glass

1.b.1 Provide crushed glass as defined by Act 101 "Post Consumer Material" and/or having a coproduct determination in accordance with Pennsylvania Department of Environmental Protection regulations. Do not

accept crushed glass derived from sources that include automobile glass, lead crystal, TV monitors, lighting fixtures and electronics applications. Provide glass of any color, free of toxic materials and hypodermic needles meeting the following specifications:

- Quality requirements - Section 703.2(a), Table B; Type C. Glass particles can be up to 100 percent by weight.
- Non-Glassy Material - 5 percent by weight, maximum, excluding ceramics and pottery.
- Gradation - 100 percent of glass particles must pass the 9.5 mm (3/8-inch) sieve. Less than 5 percent must pass the 75 um (No. 200) sieve.

(b) Embankment material - Section 206.2

III. CONSTRUCTION - Section 206.3 and as follows:

Do not use 100 percent crushed glass for final grade, slopes, and in sliver fills. Bench 100 percent crushed glass fill sections into existing slopes for sidehill fills.

(a) Provide a minimum of 300 mm (12-inch) cover of embankment on top slopes over single fill sections (Type 1a) and layered systems (Type 1b) using 100 percent crushed glass. Provide a minimum of 1 m (36 inches) of embankment material on exposed side slopes over Type 1a and Type 1b configurations using 100 percent crushed glass. Provide drainage as indicated.

(b) Use crushed glass uniformly blended with other embankment materials (Type 2) in all aspects of embankment construction except in top and side slopes as described in (a), and as directed by the Engineer.

IV. MEASUREMENT AND PAYMENT - Section 205.4, add the following:

Provide copies of certified scale receipts for all crushed glass to the Engineer for forwarding to the PENNDOT SEM Program Office.

Project Specific Details:

Special Provision: **S4003E - b04003 SUPERPAVE ASPHALT MIXTURE DESIGN, STANDARD AND RPS CONSTRUCTION OF PLANT-MIXED ASPHALT**

Item(s) Associated:

Header:

SUPERPAVE ASPHALT MIXTURE DESIGN, STANDARD AND RPS CONSTRUCTION OF PLANT-MIXED ASPHALT PAVEMENT COURSES WITH DEPARTMENT LOCAL ACCEPTANCE, AND PAYMENT BY PERCENT WITHIN LIMITS (PWL-HOLA)

Provision Body:

SUPERPAVE ASPHALT MIXTURE DESIGN, STANDARD AND RPS CONSTRUCTION OF PLANT-MIXED ASPHALT PAVEMENT COURSES WITH DEPARTMENT LOCAL ACCEPTANCE, AND PAYMENT BY PERCENT WITHIN LIMITS (PWL-HOLA)

I. DESCRIPTION—This work is the Standard and RPS construction of plant-mixed asphalt mixtures on a prepared surface using a volumetric mixture design developed with the Superpave Gyratory Compactor (SGC). Acceptance of the work is based on test results using Local Acceptance (LA), Independent Assurance (IA) Testing and statistical evaluation of test results by PWL procedures. Acceptance testing along with Theoretical Maximum Specific Gravity (Gmm) Verification testing is performed locally at the Contractor's designated laboratory by the Department's Representative. This applies to all asphalt paving items of Sections 309, 311, 316, 409, 410, and 411 and is not applicable to paving items of other Sections.

II. MATERIALS—Section 409.2 with additions and modifications as follows:

(e) Mixture Composition for Standard and RPS Construction.

1. Virgin Material Mixtures. Section 409.2(e)1. Replace the first three paragraphs with the following:

Size, uniformly grade, and combine aggregate fractions in proportions to produce a JMF that conforms to the material, gradation, and volumetric Superpave Asphalt Mixture Design requirements as specified in Bulletin 27, Chapter 2A, for the specified Nominal Maximum Aggregate Size (NMAS) and design Equivalent Single Axle Loads (ESAL).

Submit a copy of each completed JMF, signed by a certified Bituminous Level 2 Plant Technician, to the DME/DMM at least 3 weeks before the planned start of mixture production. Include a list of all material sources and the asphalt mixture producer in the JMF. For each JMF to be tested according to PTM No. 757, submit the calibration factors (C_f and $200 C_f$) for the JMF which are specific to each ignition furnace to be used for the testing. Provide calibration factors that were determined within the preceding 12 month period. The Department reserves the right to verify Contractor provided calibration factors (C_f and $200 C_f$), when deemed necessary. Do not start mixture production until after the DME/DMM reviews and signs-off on the JMF.

Submit a new JMF with a change in material sources or if a new JMF is necessary to produce a mixture conforming to this specification.

1.b Plant Technicians. Section 409.2(e)1.b. Replace with the following:

1.b Plant Technicians. During mixture production, provide a certified Bituminous Level 1 Plant Technician at the plant and an on-call certified Bituminous Level 2 Plant Technician, both meeting the requirements outlined in Publication 351. Instruct and train the certified technicians to perform all tests and to control plant operations. All technicians must carry a valid certification card during mixture production.

The Department's Representative will be a certified Bituminous Level 1 or Level 2 Plant Technician. The Representative will be properly trained and meet the requirements outlined in Publication 351.

III. CONSTRUCTION—Section 409.3 with additions and modifications as follows:

(a) Preplacement Requirements. Section 409.3(a). Add the following subsection:

3. Local Acceptance Quality Control (LA QC) Plan. Submit a separate LA QC Plan to the DME/DMM for review and sign-off. Ensure that the LA QC Plan details the methods and procedures to be used by the Contractor for sampling, packaging, transporting, handling, and securing the mixture and density samples used for acceptance. Include the location of the designated Contractor or Producer laboratory testing facility in the LA QC Plan. Submit the QC plan at least 3 weeks before the planned start of paving. Do not start work until the DME/DMM has reviewed and signed-off on the LA QC Plan.

Should the Representative determine that the LA QC Plan is not being followed; the Representative will direct the Contractor to immediately stop all paving operations and LA sample testing. The Representative may direct an investigation into the cause of the LA QC Plan not being followed, require the performance of corrective actions to the satisfaction of the Representative, and require a revision to the LA QC Plan if necessary. If the

Representative is not satisfied, the Department may discontinue testing of LA samples and begin Department testing and lot acceptance by LTS. When the Representative is satisfied with the corrective actions, resume testing of LA samples.

(c) Asphalt Mixing Plant. Section 409.3(c). Add the following subsection:

3. Laboratory Testing Facility. For testing of LA samples by the Department, identify a laboratory testing facility where the local testing is to be performed. Identify either the laboratory located at the asphalt mixture production plant or where the plant production mixture is being tested for QC if a laboratory does not exist at the production plant. Identify a laboratory testing facility which has demonstrated testing proficiency through an AASHTO re:source (formerly AMRL) On-Site Laboratory Assessment performed within the last 2 years prior to the LA sample testing. The AASHTO re:source On-Site Laboratory Assessment must have been completed on the equipment proposed for utilization by the Department. The Department may consider other testing proficiency qualification processes, but only under extreme circumstances and only when a AASHTO re:source On-Site Laboratory Assessment cannot be performed.

At the project preconstruction meeting, submit the identified laboratory testing facility location, AASHTO re:source On-Site Laboratory Assessment report, and any necessary corrective action documentation to correct any deficiencies on the Laboratory Assessment report for review by the Representative. The Representative will review the laboratory testing facility location and AASHTO re:source assessment documentation and, if acceptable, designate the laboratory testing facility for the project. Use the designated laboratory for testing all LA samples.

If a change in the designated laboratory testing facility is necessary, submit the new laboratory testing facility location at least 2 weeks in advance of the proposed change. Include the AASHTO re:source On-Site Laboratory Assessment report for the new laboratory testing facility and any necessary corrective action documentation for any deficiencies noted by the AASHTO re:source On-Site Laboratory Assessment report. The Representative will review the new laboratory testing facility and AASHTO re:source assessment documentation and, if acceptable, designate the new laboratory testing facility for the project. If an acceptable laboratory facility cannot be identified and agreed to, acceptance testing will be performed by LTS.

The Representative will specifically review the testing facility equipment to ensure it meets the required test method requirements, manufacturer installation requirements, standardization or calibration requirements and frequency, manufacturer maintenance requirements and frequency, maintenance log record requirements, and the facility plan requirements for removing equipment from service should it fail to meet any requirements, requires standardization or calibration, becomes inoperable or requires repair/maintenance.

Provide dedicated laboratory testing equipment for Department use at the designated laboratory testing facility as required in the specified test methods and as modified in Bulletin 27 for properly testing mixture and density LA samples. The Representative may reject the proposed laboratory facility if it is determined that sufficient equipment is not available to ensure priority of the local acceptance testing. Additional equipment other than the minimum required equipment listed in Bulletin 27 may be required to properly run some of the referenced procedures.

(h) Spreading and Finishing.

2.a Lots and Sublots. Replace the first two paragraphs with the following:

Material will be accepted in the field on a lot by lot basis. Lots will be established cumulatively and will be specific for each JMF. Each lot consists of five equal sublots ($n=5$). A completed subplot has a mixture acceptance box sample as specified in Section III.(h)2.b and either a core collected according to PTM No. 1 and PTM No. 729, or other density acceptance as specified in Section III.(j).

A normal lot size is 2,500 tons with five, 500 ton sublots ($n=5$), unless operational conditions or project size dictate otherwise. If operational conditions or project size dictate, readjustment of the lot will be made as

specified in Table D. Breakdowns or stoppages of short periods due to such causes as weather or equipment failure will not be considered as reason to adjust the lot size. The original lot will be continued when work resumes after short stoppages of less than 5 days. If a lot is terminated due to a stoppage of 5 days or more, adjust the lot size and number of sublots as specified in Table D. If work stoppages exceed 5 days, a new lot will be established upon resumption of work.

To terminate a lot without a work stoppage of 5 days or more, stop paving operations and notify the Inspector-in-Charge in writing of the lot termination and include the reason for termination. Do not begin paving again until the Inspector-in-Charge authorizes paving activities to resume. If a lot is terminated when quantities exceed a normal size lot of 2,500 tons, the work will be considered two separate lots, a normal size lot and a terminated lot. The terminated lot will be only that portion of the work which exceeds the 2,500 ton normal sized lot up to the point the paving operations were stopped.

A terminated lot will be evaluated based on the samples obtained before the lot was terminated. For terminated lots with three or more sublots, acceptance will be determined using PWL pay factor adjustments. Terminated lots with two or fewer sublots will be evaluated according to Section 409.3(h)2.a.1. For terminated lots where density acceptance is by pavement cores, if the first randomly selected coring location was not yet reached at the time the lot was terminated, the Inspector will recalculate one new sample location according to PTM No. 1, PTM No. 729, and PTM No. 746 from the pavement placed. For terminated lots where mixture acceptance is by loose boxes, if the first randomly selected loose mixture sample location was not reached at the time the lot was terminated, the Inspector will recalculate one new pavement core sample location according to PTM No. 1, PTM No. 729, and PTM No. 746 from the pavement placed to represent the mixture.

The payment for any terminated lot the Contractor elects to terminate will be 95% of the contract unit price or the payment value determined by evaluating the samples tested, whichever is less. Remove and replace terminated lot pavements when test results indicate defective work. The District Executive (DE) will not consider requests for reduced payment on terminated lots when test results indicate defective work.

- **Revise Table E to read as follows:**

TABLE E

Density Limits for Partially Completed Lots

MIXTURE NMAS	DENSITY LIMITS
All RPS 9.5 mm, 12.5 mm, 19 mm, and 25 mm Wearing or Binder Courses	≥ 92.0 and ≤ 98.0
All Standard 9.5 mm, 12.5 mm, 19 mm, and 25 mm Wearing or Binder Courses	≥ 91.0 and ≤ 98.0
All 25 mm and 37.5 mm Base Courses	≥ 90.0 and < 100.0

- **Revise Section 409.3(h)2.a.2 for JMFs placed in quantities less than 2,500 tons to read as follows:**

2.a.2 For JMFs placed in quantities less than 2,500 tons. For JMFs placed in quantities of greater than 500 tons and less than 2,500 tons, the tonnage will be considered a lot. The lot will be divided into five equal sublots.

For JMFs placed in quantities of 500 tons or less, mixture acceptance will not be applicable for PWL pay factor adjustments and will be accepted by certification. If density acceptance is by pavement cores, the tonnage will be considered a lot and the lot will be divided into three equal sublots. Density acceptance will be determined using PWL pay factor adjustments.

2.b Mixture Acceptance Samples. Section 409.3(h)2.b. Replace with the following:

2.b Mixture Acceptance Samples.

2.b.1 Mixture Samples for Local Acceptance (LA). The Inspector will select different sample locations in each subplot according to PTM No. 1 and PTM No. 746. In the presence of the Inspector, obtain one loose mixture sample according to PTM No. 746 for each subplot directly from the uncompacted mixture placed by the paving equipment specified in Section 409.3(e) and immediately package. For 19 mm and smaller NMA mixtures, package individual subplot samples in cardboard boxes dimensioned approximately 3 3/4 inches x 4 3/4 inches x 9 1/2 inches. For 25 mm and larger NMA mixtures, package individual subplot samples in cardboard boxes dimensioned approximately 5 inches x 5 1/2 inches x 9 inches. Do not package samples in cardboard boxes with any one dimension greater than 10 1/4 inches or any one dimension smaller than 3 1/2 inches.

Immediately after packaging, the Inspector will take possession of the sample and will identify the sample by ECMS project number, lot and subplot number, location (station and offset), date of placement, mixture type, and as LA samples (Sample Class AS).

Provide a sufficient number of containers of adequate size to contain at least five mixture LA samples from the mixture acceptance lot. Containers may be sized large enough to also contain any pavement core density acceptance samples. If multiple containers are needed, the Inspector will identify containers as being from the same lot and containing LA samples. Do not package LA samples from more than one lot in the same container. The Inspector will inspect the containers. Repair, modify or replace any containers determined to be inadequate or that are not able to be sufficiently secured. Provide newly purchased and unopened padlocks to the Inspector for securing the containers. If the containers cannot be secured with keyed padlocks, the Department will provide individually numbered security ties, security tape or other security devices for securing the containers. The Inspector will properly secure the containers with a security device before the containers are turned over to the Contractor for immediate transport to the designated testing laboratory. If the container or samples show any evidence of their security being compromised, the Department may reject them for testing, suspend paving operations, and require additional samples to be taken for acceptance.

For QC purposes, a maximum of one loose mixture sample per subplot may be obtained. No loose mixture or core samples may be taken by the Contractor for mixture composition testing after the mixture acceptance samples are obtained. Do not obtain any other pavement samples, except those which are directed by and surrendered to the Department, unless allowed in writing from the DE.

If other loose mixture samples are taken by the Contractor for QC testing purposes, keep these samples completely separated from the mixture samples for LA. Do not combine, replace or otherwise intermingle QC samples with LA samples.

2.b.2 Mixture Samples for Independent Assurance (IA). For IA, the Department will select the initial lot and a minimum of one out of every ten lots thereafter for IA.

For each lot selected by the Inspector and with the Inspector present, obtain two mixture samples from each subplot at the location determined in accordance with Section III.(h)2.b.1. Package individual samples as specified in Section III.(h)2.b.1. For each subplot, the Inspector will select one packaged sample as the LA sample, and one sample as the IA sample.

Immediately after selection of each subplot IA sample, the Inspector will take possession of each subplot IA sample and will identify each sample by ECMS project number, lot and subplot number, location (station and offset), date of placement, mixture type, and as an IA sample (Sample Class IA). Leave at least one side of the cardboard sample box free of any writing or marking for LTS use in testing the sample.

The Inspector will submit the IA sample from each subplot within the lot to LTS for testing by delivering them to the shipping point within 3 days of receipt.

2.b.3 Theoretical Maximum Specific Gravity (Gmm) Verification Samples. For lots where density acceptance is by pavement cores, the Inspector will select the same sample locations chosen for LA in each subplot. In the presence of the Inspector, obtain one loose mixture sample for each subplot at each sample location

directly from the uncompacted mixture placed by the paving equipment specified and immediately package. Package individual samples as specified in Section III.(h)2.b.1. The loose mixture samples will be used to determine the Gmm and corresponding theoretical maximum density (pounds per cubic foot) values. Immediately after packaging, the Inspector will take possession of the samples and will identify the samples by ECMS project number, lot and subplot number, location (station and offset), date of placement, mixture type, and as Gmm verification samples (Sample Class FV). Leave at least one side of the cardboard sample box free of any writing or marking for Department use in testing the samples. The Inspector will inspect the container. Repair, modify or replace any container determined to be inadequate or that are not able to be sufficiently secured. Provide newly purchased and unopened padlocks to the Inspector for securing the container. If the container cannot be secured with keyed padlocks, the Department will provide individually numbered security ties, security tape or other security devices for securing the container. The Inspector will properly secure the container with a security device before the container is turned over to the Contractor for immediate transport to the designated testing laboratory. If the container or sample shows any evidence of their security being compromised, the Department may reject them for testing, suspend paving operations, and require additional samples to be taken.

For QC purposes, a maximum of one loose sample per subplot may be obtained. No loose mixture or core samples may be taken by the Contractor for mixture composition testing after the Gmm verification samples are obtained. Do not obtain any other pavement samples, except those which are directed by and surrendered to the Department, unless allowed in writing from the DE.

2.b.4 Mixture Samples for Theoretical Maximum Specific Gravity (Gmm) Independent Assurance (IA). Section III.(h)2.b.2

2.c Mixture Acceptance Sample Testing. Section 409.3(h)2.c. Replace with the following:

2.c Mixture Acceptance Sample Testing. LA testing by the Representative will be utilized for acceptance purposes unless otherwise directed.

2.c.1 Testing of Local Acceptance (LA) Mixture Samples. Before any testing, the Representative will examine the containers and samples for any evidence of their security being compromised. No testing will be performed on any samples if the Representative determines that the security of the LA samples has been compromised. Testing of LA samples will not begin prior to completion of the lot and will begin immediately after the Representative arrives at the testing location and determines the samples to be secure. LA samples are the top priority for testing over all other testing upon the Representative arriving at the designated testing laboratory to test the LA samples. Do not discard any LA samples used for lot acceptance until directed by the Representative. The Department will retain all paperwork used in the LA sample testing for a period of not less than 3 years from the date of testing.

2.c.1.a Department Testing. At the designated LA laboratory testing facility, the Representative will test each subplot mixture LA sample according to PTM No. 757 or PTM No. 702, Modified Method D, if previously identified problematic aggregates are used in the mixture to determine Asphalt Content (AC), percent passing the 75 μ m (No. 200) sieve, and the percent passing the Primary Control Sieve (PCS).

The Contractor's technician may be present to witness the testing performed by the Representative. The technician must bring to the immediate attention of the Representative any deviation in performing the test according to the specified test method. If deviations are not noted at the time they occur, the test results will be considered accurate.

For individual increment test results outside of the single sample (n=1) tolerances in Table A, the Department will analyze the test results for extreme values according to PTM No. 4 at the 5% significance level. If the discarding of an extreme value reduces a lot to less than three remaining test results, the Department will accept the lot as specified in Section 409.3(h)2.a.1. The Department will determine mixture acceptance, as specified in Section IV.(a)4.a.3. If acceptance test results indicate a defective lot (remove and replace) or a lot with an

Overall Lot Pay Factor (OLPF) < 90, the Contractor may request in writing that the Department retest the lot in accordance with Section IV.(a)4.b.

If the Asphalt Content, the percent passing the 75 μ m (No. 200) sieve, or percent passing the PCS does not achieve an OLPF \geq 100 for two consecutive lots or a total of three lots, stop all production of the JMF as directed. Determine the cause of the problem and provide a proposed solution to the Department. Do not resume production of the JMF until the representative reviews the proposed solution and authorizes production to continue.

2.c.2 LTS Testing of Independent Assurance (IA) Mixture Samples. The LTS will test the mixture samples for IA according to PTM No. 757 or PTM No. 702, Modified Method D, if previously identified problematic aggregates are used in the mixture, to determine AC and the percent passing the 75 μ m (No. 200) sieve. The LTS will use the calibration factors (C_f and 200 C_f) provided with the JMF for PTM No. 757.

2.c.2.a Mixture IA Sample Test Result Analysis. LTS IA sample test results will be compared to the LA Acceptance Sample test results on the same lot. If the difference in the average LA and IA test results meet the Independent Assurance tolerances in Table E-1, the Department will continue with IA testing at a minimum of one out of every ten lots thereafter.

Table E-1

Independent Assurance Tolerances on Lot Averages

Testing Criteria	Max. Difference Between Average Test Results ($n \geq 3$)
Asphalt Content for 9.5 mm and 12.5 mm NMAS Mixtures	$\pm 0.3\%$
Asphalt Content for 19 mm, 25 mm, and 37.5 mm NMAS mixtures	$\pm 0.4\%$
Percent Passing the No. 8 sieve for 9.5 mm and 12.5 mm NMAS mixtures	$\pm 4\%$
Percent Passing the No. 4 sieve for 19 mm, 25 mm, and 37.5 mm NMAS mixtures	$\pm 5\%$
Percent Passing the No. 200 sieve for all mixtures	$\pm 1.2\%$

If the difference between the lot averages of IA sample test results and LA sample test results exceeds the maximum IA tolerances in Table E-1, specific calibration factors (C_f and 200 C_f) will be determined for each ignition furnace used for testing the IA samples and LA samples according to PTM No. 757 (LTS and Contractor or Producer ignition furnaces) and additional IA samples will be collected in accordance with Section III.(h)2.b.2 from the project directly behind the paving equipment for IA comparison. If the IA tolerances in Table E-1 are still exceeded, the Representative will perform an investigation as to the cause for the non-comparison of the test results. Provide information to the Representative, as requested, on the integrity of samples and on the testing equipment used in the sample testing. The Representative will also review personnel and test methods used in the LA testing. Implement corrective measures for any noted deficiencies to ensure the tests are performed according to the prescribed procedures. The Representative will record the LA sample test results, the IA sample test results and any applicable corrective measures in the Field Inspector's Diary. The Representative will select the next lot on the project for IA and will submit the IA samples to LTS for testing. If the difference between subsequent IA sample test results and LA sample test results exceeds the IA tolerances in Table E-1, the Department may discontinue testing of LA samples and begin LTS testing of the mixture acceptance samples for the remainder of the project and continue to Section IV for measurement and payment. If the difference between subsequent IA sample test results and LA sample test results meets the IA

tolerances in Table E-1, the Department may continue testing of LA samples with IA testing at a minimum of one out of every ten lots.

(j) Mat Density Acceptance.

4.c Density Acceptance Samples. Section 409.3(j)4.c. Replace with the following:

4.c Density Acceptance Samples.

4.c.1 Density Samples for Local Acceptance (LA). The Inspector will select different sample locations in each subplot according to PTM No. 1, PTM No. 729, and PTM No. 746. With the Inspector present, drill 6-inch diameter cores as soon as possible but no later than the day following placement. The core at each location will be used to determine the bulk specific gravity (Gmb) and density (pounds per cubic foot) of the compacted mix. Do not compress, bend, or distort samples during cutting, handling, transporting, and storing. If samples are damaged, immediately obtain replacement samples, as directed by the Inspector, from within 12 inches of the original sample location. Within 24 hours after coring, backfill the hole with mixture of the same JMF or with mixture used for subsequent courses and compact and seal the mixture.

The Inspector will identify the samples by ECMS project number, lot and subplot number, location (station and offset), date of placement, mixture type, and as LA samples (Sample Class AS). Provide the daily theoretical maximum specific gravity value from Section 409.2(e)1.d.4 for the density calculation of the lot. If density samples from the lot are taken from more than 1 day's placement, the daily theoretical maximum specific gravity values from each production day will be used to calculate the percent of theoretical maximum density for each individual density acceptance core placed on that production day subject to Gmm verification as described in Section 409.3(j)4.d.1.b. Provide sample containers of sufficient strength to prevent samples from being damaged during transport. The Inspector will submit samples for one lot in one container. The Inspector will properly secure the containers with a security device before being immediately transported to the designated testing laboratory. If the container or samples show any evidence of their security being compromised, the Department may reject them for testing, suspend paving operations and require additional samples to be taken for acceptance. Provide adequate facilities at all times to maintain the samples in a proper environment to prevent degradation.

For QC purposes, a maximum of one pavement core per subplot beyond the pavement cores obtained for LA may be obtained unless the Inspector allows additional cores. The test results from the density LA samples can be used for QC purposes. No pavement cores may be taken by the Contractor after the pavement core LA and IA samples are obtained. Do not obtain any other pavement cores, except those which are directed by and surrendered to the Department, unless allowed in writing by the DE.

If other pavement core samples are taken by the Contractor for QC testing purposes, keep these samples completely separated from the pavement core samples for LA and IA. Do not combine, replace or otherwise intermingle QC samples with LA and IA samples.

4.c.2 Density Samples for Independent Assurance (IA). For IA, the Department will select the initial lot and a minimum of one out of every ten lots thereafter for IA. The Inspector will identify a LA sample from Section III.(j)4.c.1 to also serve as an IA sample. Cores coated with paraffin wax according to PTM No. 716 are omitted from IA testing.

With the Inspector present, identify the samples by ECMS project number, lot and subplot number, location (station and offset), date of placement, mixture type, and as AS/IA samples (Sample Class AS/IA). Provide the daily theoretical maximum specific gravity value from Section 409.2(e)1.d.4 for the density calculation of the lot. Immediately after identifying, submit the density samples to the Inspector as specified in Section III.(j)4.c.1. Upon testing of the sample for LA in accordance with Section III.(j)4.d.1, the Inspector will package the density IA samples in the containers and submit the IA samples to LTS for testing.

4.d Acceptance Sample Testing. Section 409.3(j)4.d. Replace with the following:

4.d Acceptance Sample Testing. These procedures apply to standard and RPS construction.

4.d.1 Testing of Local Acceptance (LA) Density Samples. Before any testing, the Representative will examine the containers and samples for any evidence of their security being compromised. No testing will be performed on any samples until the Representative has determined the samples to be secure. Testing of samples will not begin prior to completion of the lot and will begin immediately after the Representative arrives at the testing location. LA samples are the top priority for testing over all other testing upon the Representative arriving at the designated testing laboratory to test the LA density samples.

Do not discard any LA samples used for lot acceptance until directed by the Representative. The Contractor's technician will package the tested samples for dispute resolution and submit to the inspector to properly secure the containers with a security device before transport to an adequate facility to maintain the samples in a proper environment to prevent degradation.

The Department will retain all paperwork used in the LA sample testing for a period of not less than 3 years from the date of testing.

4.d.1.a Department Testing. At the designated LA laboratory testing facility, the Representative will test each density acceptance sample according to PTM No. 715, and if necessary PTM No. 716, to determine the bulk specific gravity (Gmb) and bulk density (pounds per cubic foot) of the compacted mixture. The Contractor's technician may be present to witness the testing performed by the Representative. The technician must bring to the immediate attention of the Representative any deviation in performing the test according to the specified test method. If deviations are not noted at the time they occur, the test results will be considered accurate.

For individual increment test results outside of the lower and upper specification limits in Table I, the Department will analyze the bulk density test results for extreme values according to PTM No. 4 at the 5% significance level. If discarding an extreme value reduces a lot to less than three remaining test results, the Department will accept the lot as specified in Section 409.3(h)2.a.1. Individual subplot density values will be calculated and then rounded to the nearest tenth of a percent of theoretical maximum density according to ASTM E29. Lot average density will subsequently be calculated from the individual subplot values and then rounded to the nearest tenth of a percent of theoretical maximum density according to ASTM E29. The Department will accept lots with three or more test results as specified in Section IV.(a)4.a.3. If acceptance test results indicate a defective lot (remove and replace) or a lot with an OLPF < 90, the Contractor may request in writing that the Department retest the lot in accordance with Section IV.(a)4.b.

If cores are not taken within 1 day after placing the mixture, or if the density for two consecutive lots or for a total of three lots does not result in a payment factor for in-place density of ≥ 100 , stop paving operations for the project as directed. Review and evaluate the operation and determine the cause of the problem. Do not resume paving until after the Representative reviews the proposed solution and authorizes paving to continue.

4.d.1.b Gmm Verification Testing. At the designated LA laboratory testing facility, the Representative will then randomly select one of the Gmm verification loose mixture samples obtained as specified in Section III.(h)2.b.3 from the lot. The Representative will test the randomly selected Gmm verification loose mixture sample to determine the Gmm of the compacted mixture according to AASHTO T 209 as modified in Bulletin 27, with the following exception:

- the samples will be obtained as specified in Section III.(h)2.b.3

The Representative will compare the randomly selected Gmm verification sample test result with the Contractor's daily Gmm value for that same production or placement date. If the Department and Contractor Gmm values do not differ by more than ± 0.030 , the Contractor's daily Gmm values in the whole lot will be considered verified and the Contractor's daily Gmm values will be used to determine the percent of theoretical maximum density for each density acceptance sample placed on that date. If the initial randomly selected Department Gmm verification sample test result differs from the Contractor's daily Gmm value for that same production or placement date by more than ± 0.030 , the Department Gmm test result value will be used as the

acceptance Gmm value to determine the percent of theoretical maximum density for the individual density acceptance cores produced or placed on that same date. The Department reserves the right to select more than one Gmm verification sample from the lot representing the same production or placement date and to select other Gmm verification samples from the lot representing different production or placement dates to verify the Contractor's daily Gmm values. When more than one Gmm verification sample is selected from the lot representing the same production or placement date, the Department Gmm test results will be averaged and the average will be used to verify to the Contractor's daily Gmm value for that same production and placement date.

The Department will determine acceptance, with respect to density, as specified in Section IV.(a)4.a or Section IV.(a)4.b.

4.d.2 LTS Testing of Independent Assurance (IA) Density Samples. The LTS will test the density samples for IA according to PTM No. 715, and if necessary PTM No. 716, to determine the percent compaction. The LTS will test the Gmm samples for IA according to AASHTO T 209 as modified in Bulletin 27.

4.d.2.a Density IA Sample Test Result Analysis. LTS IA density sample test results will be compared to the LA density sample test results on the same lot. If the difference in the average test results of the LA and IA meet the IA tolerances in Table E-2, the Department will continue with IA testing at a minimum of one out of every ten lots thereafter.

Table E-2

Independent Assurance Tolerances on Lot Averages

Testing Criteria	Max. Difference Between Test Results (n≥3)
PTM No. 715 or PTM No. 716, Gmb	0.020
AASHTO T 209 as modified in Bulletin 27	0.030

If the difference between the lot averages of IA sample test results and LA sample test results exceeds the maximum IA tolerances in Table E-2, the Representative will perform an investigation as to the cause for the non-comparison of the test results. Provide information to the Representative, as requested, on the integrity of samples and on the testing equipment used in the sample testing. The Representative will also review personnel and test methods used in the LA testing. Implement corrective measures for any noted deficiencies to ensure the tests are performed according to the prescribed procedures. The Representative will record the LA Sample test results, the IA sample test results and any applicable corrective measures in the Field Inspector's Diary. The Representative will select the next lot on the project for IA and will submit the IA companion density samples to LTS for testing. If the difference between subsequent IA sample test results and LA sample test results exceeds the IA tolerances in Table E-2, the Department may discontinue testing of LA samples and begin LTS testing of the acceptance samples for the remainder of the project and revert to Section IV for measurement and payment. If the difference between subsequent IA sample test results and LA sample test results meets the IA tolerances in Table E-2, the Department may continue testing of LA samples with IA testing at a minimum of one out of every ten lots.

IV. MEASUREMENT AND PAYMENT—Sections 409.4 and 411.4 with modifications and additions as follows:

- **Revise title of Section 409.4(a)3 Mixture Acceptance by Certification and Density Acceptance by Non-Movement, Optimum-Rolling Pattern, or Pavement Cores. To read as follows:**

3. Mixture Acceptance by Certification and Density Acceptance by Non-Movement and Optimum-Rolling Pattern. Section 409.4(a)3.

- **Revise Table H to read as follows:**

TABLE H**Contract Unit Price Adjustments - Mixture Acceptance by Certification**

Mixture NMAS	Test Criteria	Test Value		Pay Factor
Asphalt Content				
All sizes	Printed Tickets	At least 90% of Daily Printed Tickets Within 0.2% of JMF		100
		Less than 90% of Daily Printed Tickets Within 0.2% of JMF		85
19.0 mm and smaller	QC Sample Testing**	Single Sample (n=1)	Multiple Samples (n≥2)	
		±0.7%	±0.5%	100
		±0.8% to 1.0%	±0.6%	85
		> ±1.0%	≥ ±0.7%	*
25.0 mm and larger	QC Sample Testing**	±0.8%	±0.6%	100
		±0.9% to ±1.2%	±0.7%	85
		> ±1.2%	≥ ±0.8%	*
Gradation				
		Single Sample (n=1)	Multiple Samples (n≥2)	
All sizes	QC Sample Testing for % Passing 75 μm (No. 200) Sieve**	±3.0%	±2.1%	100
		±3.1% to ±4.0%	±2.2% to ±2.7%	85
		> ±4.0%	≥ ±2.8%	*
All sizes	QC Sample Testing for % Passing 2.36 mm (No. 8) Sieve**	±6%	±4%	100
		±7% to ±8%	±5%	85
		> ±8%	≥ ±6%	*
In-Place Density				
All sizes	Non-Movement	Section 409.3(j)2.		100
	Optimum-Rolling Pattern	Section 409.3(j)3.		100
Sizes from Table I	Acceptance Sample Testing of Pavement Cores	As outlined in Table I		Section 409.4(a)4.a.1
* Defective pavement. Remove and replace or, when allowed by the DE in writing, leave in place and the Department will pay 70% of the contract unit price.				
** For these test criterion, the daily Pay Factor will be determined by the single sample test result from the daily QC sample. If more than one QC sample test result is available for a day, the Pay Factor will be determined based on the average of the results using multiple sample tolerances. If corrective action is taken, Pay Factors will be independently determined for material placed before and after the corrective action.				

4. Mixture Acceptance by Lot and Density Acceptance by Non-Movement, Optimum Rolling Pattern, or Pavement Cores. Section 409.4(a)4. Replace completely with the following:

4. Mixture Acceptance by Lot and Density Acceptance by Non-Movement, Optimum Rolling Pattern, or Pavement Cores. The Department will pay on a lot-by-lot basis at the contract unit price, adjusted for Pay Factors (PF) as specified. For the PF based on Percent Within Limits (PWL), the Department will determine the individual PWL values for in-place density (PWL_D), asphalt content (PWL_{AC}), percent passing the 0.75 μ m (No. 200) sieve (PWL_{200}), and for percent passing the primary control sieve (PWL_{PCS}) according to Section 106.03(a)3, using the upper and lower specification limits in Table I. The Department will determine each PF for in-place density, asphalt content, percent passing the 0.75 μ m (No. 200) sieve, and for percent passing the primary control sieve according to Section IV.(a)4.a. The Department will determine the Overall Lot Pay Factor (OLPF) according to Section IV.(a)4.a.2.

4.a Pay Factors

4.a.1 Pay Factors for In-Place Density (PF_D), Asphalt Content (PF_{AC}), and Percent Passing 75 μ m (No.200) Sieve (PF_{200}) and Primary Control Sieve (PF_{PCS}). For lots with density acceptance by non-movement or optimum-rolling pattern, $PF_D = 100.00$.

The Department will determine PFD for lots with density acceptance by pavement cores and PF_{AC} , PF_{200} , and PF_{PCS} , for all lots according to the following:

4.a.1.a All PWL Parameters Greater Than or Equal to 50. When PWL_D , PWL_{AC} , PWL_{200} , and PWL_{PCS} are each greater than or equal to 50, the Department will determine the pay factor for each PWL according to one of the following equations as appropriate.

When PWL is ≥ 90 , determine the pay factor for the specific pay parameter according to the following equation:

$$PF_X = 100 + 0.4(PWL_X - 90)^*$$

Where,

PF_X = Pay Factor of the individual pay parameter (PF_D , PF_{AC} , PF_{200} , or PF_{PCS})

PWL_X = Percent within Limits of the individual pay parameter (PWL_D , PWL_{AC} , PWL_{200} , or PWL_{PCS})

* For 9.5 mm and 12.5 mm courses with average density < 93.0, the maximum $PF_D = 100$

When PWL is <90 and ≥ 50 , or when PWL_{200} is less than 50 and the average percent passing the 0.75 μ m (No. 200) sieve is within $\pm 2.0\%$ from the JMF, determine the pay factor for the specific pay parameter according to the following equation:

$$PF_X = 70 + 0.75(PWL_X - 50)$$

Where,

PF_X = Pay Factor of the individual pay parameter (PF_D , PF_{AC} , PF_{200} , or PF_{PCS})

PWL_X = Percent within Limits of the individual pay parameter (PWL_D , PWL_{AC} , PWL_{200} , or PWL_{PCS})

4.a.1.b One PWL Parameter Less Than 50. When either PWL_D or PWL_{AC} is less than 50, the lot is defective. When PWL_{200} is less than 50, the lot is defective when the average percent passing the 0.75 μm (No. 200) sieve is greater than $\pm 2.0\%$ from the JMF. When PWL_{PCS} is less than 50, the $PF_{PCS} = 60.00$. For defective lots, the DE will direct one of the following:

- Leave the lot in place. The DE will apply an OLPF of 70.
- Remove and replace the entire lot. The DE will direct removal and replacement of the entire lot at no additional cost to the Department with new lot acceptance sampling and testing.

4.a.1c Two PWL Parameters Less Than 50. When two or more of PWL_D , PWL_{AC} , or PWL_{200} with the average percent passing the 0.75 μm (No. 200) sieve greater than $\pm 2.0\%$ from the JMF are less than 50, the lot will be considered defective and the DE will direct removal and replacement of the entire lot with new acceptance sampling and testing.

4.a.2 Overall Lot Pay Factor (OLPF). The Department will determine the OLPF according to the following equation and then will round the resulting OLPF to the nearest whole number according to ASTM E29:

$$OLPF = (0.50 \times PF_D) + (0.30 \times PF_{AC}) + (0.10 \times PF_{200}) + (0.10 \times PF_{PCS})$$

Where,

PF_D = Pay Factor for In-Place Density

PF_{AC} = Pay Factor for Asphalt Content

PF_{200} = Pay Factor for Percent Passing the 75 μm (No. 200) Sieve

PF_{PCS} = Pay Factor for Percent Passing the Primary Control Sieve (PCS)

TABLE I

Upper and Lower Specification Limits for Calculating Percent Within Limits

	Testing Criteria	
Mixture NMAS	Lower Specification Limit (L)	Upper Specification Limit (U)
	Asphalt Content from JMF Value, %	
9.5 mm, 12.5 mm	-0.4	+0.4
19 mm	-0.5	+0.5
25 mm and 37.5 mm	-0.6	+0.6
	Percent Passing the 75 μm (No. 200) sieve from JMF Value, %	
All sizes	-1.5	+1.5
	Percent Passing the Primary Control Sieve from JMF Value, %	
9.5 mm (PCS = 2.36 mm (No. 8) sieve)	-5	+5

12.5 mm (PCS = 2.36 mm (No. 8) sieve)	-5	+5
19 mm (PCS = 4.75 mm (No. 4) sieve)	-8	+8
25 mm (PCS = 4.75 mm (No. 4) sieve)	-9	+9
37.5 mm (PCS = 4.75 mm (No. 4) sieve)	-9	+9
	Mat Density*	
All 9.5 mm, 12.5 mm wearing courses	92.0	98.5
All 19 mm courses, 25 mm binder courses	91.0	98.0
All 25 mm and 37.5 mm base courses	90.0	no upper limit
* Where Limits = The Percent of Theoretical Maximum Density		

4.a.3 Lot Payment. The Representative will compute the percent of the contract unit price paid as follows:

$$\text{Lot Payment} = C_p(\text{OLPF})/100$$

Where,

C_p = Contract unit price per lot (unit price times lot quantity)

OLPF = Overall Lot Pay Factor

4.a.4 Evaluation of Overall Lot Pay Factor and Payment of Incentive / Disincentive.

Dollar

The proposal will include a contract item and a predetermined amount of money for Evaluation of Overall Lot Pay Factor and Payment of Incentive. The contract item will have a unit of measure of DOLLAR, a unit price of \$1.00, and a quantity equal to the predetermined amount.

Due to the incentive status of the payment being made, the provisions of Section 110.02(d) are not applicable to this item.

The Evaluation of Overall Lot Pay Factor and Payment of Incentive contract item will be measured and paid as follows:

- **Incentive.** When bituminous pavement evaluation indicates that an incentive adjustment is applicable, the appropriate amount will be paid under this contract item.
- **Disincentive.** When bituminous pavement evaluation indicates that a disincentive adjustment is applicable, the appropriate amount will be deducted from money due or to become due to the Contractor through the processing of a Contract Adjustment.

4.b Dispute Resolution. For mixture acceptance testing or density acceptance testing, the Contractor may request, in writing, that the Department retest a lot if the initial test results indicated a defective lot (remove and replace) or a lot with an OLPF < 90.00, the asphalt content pay factor for the lot is < 80.00, or the density pay factor for the lot is < 80.00, except for density when one or more density acceptance cores in the lot were coated with paraffin wax as a result of PTM No. 716 during the original density acceptance testing. Provide

written retest requests to the DE within 1 week of the date the test results are released. Provide in the written request the preferred test method for asphalt content determination (PTM No. 757 or PTM No. 702), Modified Method D. Retests will not be allowed if a written retest request is not received within 1 week of the date the test results are released. Provide quality control test results and control charts, companion sample test results (if available), test data trend evaluation, and any other pertinent information to justify the retest request. The Department will evaluate the information and may allow retesting if the information submitted provides a reasonable basis to conclude that the failing test results may not represent the in-place material. The LTS will perform the retest with the Contractor present, unless otherwise agreed to in writing with the Contractor.

For retesting of materials for asphalt content, percent passing the 75 μm (No. 200) sieve, or percent passing the PCS, the Inspector will identify the locations where the original box samples were collected. The Inspector will select retest sample locations 24 inches from the original sample locations longitudinally in the direction of traffic. If the 24 inch offset causes the retest sample location to fall outside of the subplot, the Inspector will select the retest sample location 24 inches from the original sample location longitudinally in the opposite direction from traffic.

With the Inspector present, provide appropriate traffic control and drill 6-inch diameter cores for retesting purposes according to the procedure for drilling in PTM No. 729. Ensure drilling procedures include washing off and towel drying the core samples immediately after drilling. Within 24 hours after coring, backfill the hole with mixture of the same JMF or with mixture used for subsequent courses and compact and seal the mixture. Provide traffic control, core, and backfill the core holes at no cost to the Department. The test method used for asphalt content determination during the original acceptance testing (PTM No. 757 or PTM No. 702), Modified Method D) will be used by the LTS for the retest, unless the DME/DMM grants written approval for a change in test method. The oven correction factors provided with the JMF will be utilized by the LTS. If required to separate the applicable pavement course lift from other pavement courses, the cores will be saw cut at the course lift line(s) as determined by the LTS. The results determined by LTS of the retest cores will be used to calculate payment for asphalt content, percent passing the PCS, and percent passing the 75 μm (No. 200) sieve for the lot.

For retesting of density acceptance, the Inspector will forward the original density acceptance cores to the LTS to be utilized. The LTS will retest each original density acceptance core according to PTM No. 715 and PTM No. 716, as necessary, to determine the Gmb and bulk density values. The LTS will not retest a lot for density acceptance when one or more density acceptance cores in the lot were coated with paraffin wax as a result of PTM No. 716 during the original density acceptance testing. The LTS will not perform Gmm testing for lots where the Contractor's Gmm value was previously considered verified according to Section III.(j)4.d.1.b. After Gmb testing is completed, for lots where the Contractor's Gmm value was not verified, the LTS will select one original density acceptance pavement core from each production or placement date represented by the density acceptance cores in the lot. Each core selected will be the core with the highest bulk density for that production or placement date from the retest results (e.g., if a lot was placed over three production days, and the lot density acceptance cores include at least one core from each production or placement day, the original density cores selected during a density retest to perform Gmm testing will be three; one from each production or placement date). The LTS will perform Gmm testing on the selected cores according to AASHTO T 209 as modified in Bulletin 27, with the following exceptions:

- The samples will be obtained as specified in Section 409.3(j)4.c.1,
- No conditioning, only drying, will be performed on the sample,
- The minimum sample size will be waived, as necessary, to use the 6-inch diameter pavement core sample, and
- The supplemental procedure for mixtures containing porous aggregate will only be performed when either the coarse aggregate or fine aggregate in the mixture has a water absorption value $\geq 1.5\%$ as indicated on the JMF and then only when the calculated percent

of theoretical maximum density indicates any one individual failing subplot which results in a density pay factor less than 100.00.

The LTS Gmm value(s) determined will be the Gmm values used to determine the percent of theoretical maximum density for the cores represented by the applicable production or placement dates in the lot. Either the previously verified Contractor's Gmm value(s) or the newly tested LTS Gmm value(s) will be used for acceptance to determine the percent theoretical maximum density for each subplot core in the lot. Upon completing the retesting of the original density acceptance cores, the retest values determined by LTS will be used to determine the final payment factor percentage for density.

The Department will deduct from the overall lot payment the cost per lot associated with conducting a retest as shown in Table J:

TABLE J
Dispute Resolution Retest Cost Table

Test Method	Mixture Acceptance Retest Cost if Retest Results Indicate	Mixture Acceptance Retest Cost if Retest Results Indicate
	≥100% Pay Factor(s)*	<100% Pay Factor(s)*
PTM No. 702/739	\$900	\$3,500
PTM No. 757	\$500	\$2,000
	Density Acceptance Retest Cost if Retest Results Indicate a Lack of Repeatability	Density Acceptance Retest Cost if Retest Results are Repeatable
PTM No. 715, or PTM No. 716 only	\$200	\$750
PTM No. 715, or PTM No. 716, and AASHTO T 209 as specified in Section 409.3(j)4.d.1.b	\$1,100	\$4,000

* For lots where the original test results indicated a defective lot, only the pay factor(s) where original test results indicated a PWL < 50 for asphalt content, percent passing the 75 µm (No. 200) sieve, or density will be utilized to determine the retest cost. If no original test results indicated PWL < 50 for lots where OLPF < 90, then all pay factors will be utilized to determine the retest cost.

Project Specific Details:

Special Provision: **S4131A - b04131 SUPERPAVE MIXTURE DESIGN, STANDARD AND RPS CONSTRUCTION OF PLANT-MIXED ASPHALT COURSES WITH**

Item(s) Associated:

Header:

b04131 SUPERPAVE MIXTURE DESIGN, STANDARD AND RPS CONSTRUCTION OF PLANT-MIXED ASPHALT COURSES WITH PERCENT WITHIN LIMITS AND HANDS-ON LOCAL ACCEPTANCE (HOLA) TESTING (PWL-HOLA)

Provision Body:

SUPERPAVE MIXTURE DESIGN, STANDARD AND RPS CONSTRUCTION OF PLANT-MIXED ASPHALT COURSES WITH PERCENT WITHIN LIMITS AND HANDS-ON LOCAL ACCEPTANCE (HOLA) TESTING (PWL-HOLA)

I. DESCRIPTION—This work is the Standard and RPS construction of a plant-mixed, dense-graded, asphalt pavement course on a prepared surface using a volumetric asphalt mixture design developed with the Superpave Gyratory Compactor (SGC), using prescribed manufactured additives or modifiers, and/or plant process modifications. Acceptance of the work is based on testing of field samples using Local Acceptance (LA) and statistical evaluation of sample test results by Percent Within Limits (PWL) procedures.

For federally funded projects and projects on the National Highway System (NHS), the Department Representative must conduct the local acceptance sample testing and local Theoretical Maximum Specific Gravity (Gmm) verification sample testing. LTS will test Independent Assurance (IA) samples required for federally funded projects and projects on the NHS. On all other projects, the Department reserves the right to have acceptance testing performed by the Contractor in the presence of the Department's Representative who will witness the acceptance testing.

II. MATERIALS – Section 413.2 with additions and modifications as follows:

(e) Mixture Composition for Standard and RPS Construction.

1. Virgin Material Mixtures. Section 413.2(e)1. Replace the first three paragraphs with the following:

Size, uniformly grade, and combine aggregate fractions, asphalt binder, and either WMA Technology additive(s) or modifier(s) in proportions to produce a JMF that conforms to the material, gradation, and volumetric Superpave Asphalt Mixture Design requirements according to Bulletin 27, Chapter 2A. Produce an asphalt mixture for the specified nominal maximum aggregate size and design ESALs except as procedurally modified by the WMA Technology Manufacturer Technical Representative (Technical Representative) to address laboratory procedures when preparing, compacting and testing asphalt mixtures to achieve a uniform blend. Special additive(s) or modifier(s) need not be used if mixture temperature, workability, and compaction can be achieved solely through plant mechanical modification to produce foamed asphalt. Do not incorporate the WMA Technology additive, modifier or process during the volumetric asphalt mixture design process, so that the JMF volumetrics and material percentages are based on a mixture with no WMA Technology. Only use the WMA Technology additive, modifier or process to evaluate results from moisture susceptibility testing during the mix design process. Develop an asphalt mixture JMF, then incorporate the WMA Technology additive, modifier, or process into that JMF during production. Create an asphalt JMF cover sheet (Form TR-448A) for approval containing the WMA Technology used, additive dosage rate or percent water added for foaming, material code, and the TSR data from the moisture susceptibility testing. Submit a copy of each completed JMF, signed by a certified Asphalt Level 2 Plant Technician, to the DME/DMM at least 3 weeks before the planned start of mixture production. Include a list of all material sources and the asphalt mixture producer in the JMF. For each JMF to be tested according to PTM No. 757, submit the calibration factors (C_f and $200 C_f$) for the JMF which are specific to each ignition furnace to be used for the testing. Provide calibration factors that were determined within the preceding 12-month period. The Department reserves the right to verify Contractor provided calibration factors (C_f and $200 C_f$), when deemed necessary. Do not start mixture production until after the DME/DMM reviews and signs-off on the JMF.

Submit a new JMF with a change in material sources or if a new JMF is necessary to produce a mixture conforming to this specification.

1.b Plant Technicians. Section 413.2(e)1.b. Replace with the following:

1.b Plant Technicians. During mixture production, provide a certified Asphalt Level 1 plant technician at the plant and an on-call certified Asphalt Level 2 plant technician, both meeting the requirements according to Publication 351. Instruct and train the certified technicians to perform all tests and to control plant operations. All technicians must carry a valid certification card during mixture production.

The Department's Representative will be a certified Asphalt Level 1 or Level 2 plant technician. The Representative will be properly trained and meet the requirements outlined in Publication 351.

III. CONSTRUCTION— Section 413.3 with additions and modifications as follows:

(a) Placement Requirements. Section 413.3(a). Add the following subsection:

3. Local Acceptance Quality Control (LA QC) Plan. Submit a separate LA QC Plan to the DME/DMM for review and sign-off. Ensure that the LA QC Plan details the methods and procedures to be used by the Contractor for sampling, packaging, transporting, handling, and securing the mixture and density samples used for acceptance. Include the location of the designated Contractor or Producer laboratory testing facility in the LA QC Plan. Submit the QC plan at least 3 weeks before the planned start of paving. Do not start work until the DME/DMM has reviewed and signed-off on the LA QC Plan.

Should the Representative determine that the LA QC Plan is not being followed; the Representative will direct the Contractor to immediately stop all paving operations and LA sample testing. The Representative may direct an investigation into the cause of the LA QC Plan not being followed, require the performance of corrective actions to the satisfaction of the Representative, and require a revision to the LA QC Plan if necessary. If the Representative is not satisfied, the Department may discontinue testing of LA samples

and begin Department testing and lot acceptance by LTS. When the Representative is satisfied with the corrective actions, resume testing of LA samples.

(c) Asphalt Mixing Plant. Section 413.3(c). Add the following subsection:

3. Laboratory Testing Facility. For testing of LA samples by the Department, identify a laboratory testing facility where the local acceptance testing is to be performed. Identify either the laboratory located at the asphalt mixture production plant, the laboratory where the plant production mixture is being tested for QC, or another laboratory more conveniently located and meeting the requirements of Bulletin 27. Identify a laboratory testing facility which has demonstrated testing proficiency through an AASHTO re:source On-Site Laboratory Assessment performed within the last 2 years before the LA sample testing. The AASHTO re:source On-Site Laboratory Assessment must have been completed on the equipment proposed for utilization by the Department. The Department may consider other testing proficiency qualification processes, but only under extreme circumstances outside of the Contractor's control and only when an AASHTO re:source On-Site Laboratory Assessment cannot be performed.

At the project preconstruction meeting, submit the identified laboratory testing facility location, AASHTO re:source On-Site Laboratory Assessment report, and any necessary corrective action documentation to correct any deficiencies on the Laboratory Assessment report for review by the Representative. The Representative will review the laboratory testing facility location and AASHTO re:source assessment documentation and, if acceptable, designate the laboratory testing facility for the project. Use the designated laboratory for testing all LA samples.

If a change in the designated laboratory testing facility is necessary, submit the new laboratory testing facility location at least 2 weeks in advance of the proposed date of the change. Include the AASHTO re:source On-Site Laboratory Assessment report for the new laboratory testing facility and any necessary corrective action documentation for any deficiencies noted by the AASHTO re:source On-Site Laboratory Assessment report. The Representative will review the new laboratory testing facility and AASHTO re:source assessment documentation and, if acceptable, designate the new laboratory testing facility for the project. If an acceptable laboratory facility cannot be identified and agreed to, acceptance testing will be performed by LTS.

The Representative will specifically review the testing facility equipment to ensure it meets the required test method requirements, manufacturer installation requirements, standardization or calibration requirements and frequency, manufacturer maintenance requirements and frequency, maintenance log record requirements, and the production or facility QC plan includes an action plan for removing equipment from service should it fail to meet any requirements, requires standardization or calibration, becomes inoperable or requires repair/maintenance.

Provide dedicated laboratory testing equipment for Department use at the designated laboratory testing facility as required in the specified test methods and as modified in Bulletin 27 for properly testing mixture and density LA samples. The laboratory testing equipment to be used by the Representative may also be used for QC testing when not in use for acceptance testing. The Representative may reject the proposed laboratory facility if it is determined that sufficient equipment is not available to ensure priority of the local acceptance testing. Additional equipment other than the minimum required equipment listed in Bulletin 27 may be required to properly run some of the referenced procedures.

(h) Spreading and Finishing. Section 413.3(h) with additions and modifications as follows:

2.b Mixture Acceptance Samples. Section 413.3(h)2.b and all subsections. Replace with the following:

2.b Mixture Samples for Local Acceptance (LA).

The Inspector will select different sample locations in each subplot according to PTM No. 1 and PTM No. 746. In the presence of the Inspector, obtain one loose mixture sample for each subplot directly from the uncompacted mixture placed by the paving equipment specified in Section 413.3(e) and immediately package. For 19 mm and smaller NMAS mixtures, package individual samples in cardboard boxes dimensioned approximately 3 3/4 inches x 4 3/4 inches x 9 1/2 inches. For 25 mm and larger NMAS mixtures, package individual samples in cardboard boxes dimensioned approximately 5 inches x 5 1/2 inches x 9 inches. Do not package samples in cardboard boxes with any one dimension greater than 10 1/4 inches or any one dimension smaller than 3 1/2 inches.

Immediately after packaging, the Inspector will take possession of the sample and will identify the sample by ECMS project number, lot and subplot number, location (station and offset), date of placement, mixture type, and as LA samples (Sample Class AS).

Provide a sufficient number of containers of adequate size to contain at least five mixture LA samples from the mixture acceptance lot. Containers may be sized large enough to also contain any pavement core density acceptance samples. If multiple containers are needed, the Inspector will identify containers as being from the same lot and containing LA samples. Do not package LA samples from more than one lot in the same container. The Inspector will inspect the containers. Repair, modify or replace any containers determined to be inadequate or that are not able to be sufficiently secured. Provide newly purchased and unopened padlocks to the Inspector for securing the containers. If the containers cannot be secured with keyed padlocks, the Department will provide individually numbered security ties, security tape or other security devices for securing the containers. The Inspector will properly secure the containers with a security device before the containers are turned over to the Contractor for immediate transport to the designated testing laboratory. If the container or samples show any evidence of their security being compromised, the Department may reject them for testing, suspend paving operations, and require additional samples to be taken for acceptance.

For quality control purposes, a maximum of one loose mixture sample per subplot may be obtained. No loose mixture or core samples may be taken by the Contractor for mixture composition testing after the mixture acceptance samples are obtained. Do not obtain any other pavement samples, except those which are directed by and surrendered to the Department, unless allowed in writing from the District Executive. If loose mixture samples are taken by the Contractor for quality control purposes, keep these samples completely separated from the mixture samples for LA. Do not combine, replace, or otherwise intermingle quality control samples with LA samples.

2.b.1 Mixture Samples for Independent Assurance (IA). For federally funded projects and projects on the National Highway System (NHS), the Department will select the initial lot and a minimum of one out of every ten lots thereafter for IA. IA samples are independent of the construction item and JMF.

For each lot selected by the Inspector and with the Inspector present, obtain at least two loose mixture samples from each subplot at the location determined in accordance with Section III.(h)2.b. For federally funded projects or projects on the NHS, when density acceptance is by pavement cores, a third loose mixture sample from each subplot is required. Package individual samples as specified in Section III.(h)2.b. For each subplot, the Inspector will select one packaged sample as the LA sample and one packaged sample as the mixture IA sample. When a third loose mixture sample is required, the Inspector will also select one packaged sample as the Gmm IA sample.

Immediately after selection of each subplot IA sample(s), the Inspector will take possession of each subplot IA sample(s) and will identify each sample by ECMS project number, lot and subplot number, location (station and offset), date of placement, mixture type, and as an IA sample(s) (Sample Class IA mixture or Sample Class IA Gmm). Leave at least one side of the cardboard sample box free of any writing or marking for LTS use in testing the sample.

The Inspector will submit the IA sample(s) from each subplot within the lot to LTS for testing by delivering them to the shipping point within 3 days of receipt.

2.b.2 Theoretical Maximum Specific Gravity (Gmm) Verification Samples. For federally funded projects or projects on the National Highway System (NHS), when density acceptance is by pavement cores, a second loose mixture sample will be obtained from the same sample locations chosen for LA in each subplot as outlined in III.(h)2.b. The second loose mixture sample at each location will be used to determine the Gmm and corresponding theoretical maximum density (lbs/ft³) values for each subplot.

Immediately after packaging, the Inspector will take possession of the samples and will identify the samples by ECMS project number, lot and subplot number, location (station and offset), date of placement, mixture type, and as Gmm verification samples (Sample Class FV). Leave at least one side of the cardboard sample box free of any writing or marking for Department use in testing the samples. Provide a sufficient number of containers of adequate size to contain at least five mixture Gmm FV samples from the mixture acceptance lot. If multiple containers are needed, the Inspector will identify containers as being from the same lot and containing Gmm FV samples. Do not package Gmm FV samples from more than one lot in the same container. The Inspector will inspect the container. Repair, modify or replace any container determined to be inadequate or that are not able to be sufficiently secured. Provide newly purchased and unopened padlocks to the Inspector for securing the container. If the container cannot be secured with keyed padlocks, the Department will provide individually numbered security ties, security tape or other security devices for securing the container. The Inspector will properly secure the container with a security device before the container is turned over to the Contractor for immediate transport to the designated testing laboratory. If the container or sample shows any evidence of their security being compromised, the Department may reject them for testing, suspend paving operations, and require additional samples to be taken.

For QC purposes, a maximum of one loose sample per subplot may be obtained. No loose mixture or core samples may be taken by the Contractor for mixture composition testing after the Gmm verification samples are obtained. Do not obtain any other pavement samples, except those which are directed by and surrendered to the Department, unless allowed in writing from the District Executive.

2.b.3 Mixture Samples for Theoretical Maximum Specific Gravity (Gmm) Independent Assurance (IA). Section III.(h)2.b.1

2.c Mixture Acceptance and Gmm Verification Sample Testing. Section 413.3(h)2.c and all subsections. Replace with the following:

2.c Mixture Acceptance and Gmm Verification Sample Testing. Local mixture acceptance sample testing and local Gmm verification sample testing by the Representative will be utilized. These procedures apply to standard and RPS construction. When Gmm verification is required, testing of Gmm verification samples will be as specified in Section III.(j)4.d.1.a.

2.c.1 Testing of Local Acceptance (LA) Mixture Samples. Before any testing, the Representative will examine the containers and samples for any evidence of their security being compromised. No testing will be performed on any samples if the Representative determines that the security of the LA samples has been compromised. Testing of LA samples from a lot will not begin prior to paving completion of the lot and will begin immediately after the Representative arrives at the testing location and determines the samples to be secure. LA samples are the top priority for testing over all other testing upon the Representative arriving at the designated testing laboratory to test the LA samples. Do not discard any LA samples used for lot acceptance until directed by the Representative. The Department will retain all paperwork used in the LA sample testing for a period of not less than 3 years from the date of testing.

2.c.1.a Department Testing. At the designated LA laboratory testing facility, the Representative will test each subplot mixture LA sample according to PTM No. 757 or PTM No. 702, Modified Method D, and PTM No. 739, if previously identified problematic aggregates are used in the mixture to determine asphalt content (AC), percent passing the 75 µm (No. 200) sieve, and the percent passing the primary control sieve (PCS).

The Contractor's technician may be present to witness the testing performed by the Representative. The technician must bring to the immediate attention of the Representative any deviation in performing the test according to the specified test method. If deviations are not noted at the time they occur, the test results will be considered accurate.

For individual increment test results outside of the single sample (n=1) tolerances in Table A, the Department will analyze the test results for extreme values according to PTM No. 4 at the 5% significance level. If discarding an extreme value reduces a lot to less

than three remaining test results, the Department will accept the lot as specified in Section 413.3(h)2.a.1. The Department will accept lots with three or more test results as specified in Section IV.(a) or Section 413.4(b).

The asphalt content, the percent passing the 75 μm (No. 200) sieve, and the percent passing the PCS determine the mixture portion of the OLPF. If the mixture portion of the OLPF does not achieve a combined OLPF ≥ 50 for two consecutive lots or a total of three lots, stop all production of the JMF. Determine the cause of the problem and provide a proposed solution to the Department. Do not resume production of the JMF until the Representative reviews the proposed solution and authorizes production to continue.

2.c.2 LTS Testing of Independent Assurance (IA) Mixture Samples. When IA samples are required, the LTS will test the mixture samples for IA according to PTM No. 757 or PTM No. 702, Modified Method D, and PTM No. 739, if previously identified problematic aggregates are used in the mixture to determine AC and the percent passing the 75 μm (No. 200) sieve. The LTS will use the calibration factors (C_f and 200 C_f) provided with the JMF for PTM No. 757.

2.c.2.a Mixture IA Sample Test Result Analysis. When IA samples are required, LTS IA sample test results will be compared to the LA Acceptance Sample test results on the same lot. If the difference in the average LA and IA test results meet the Independent Assurance tolerances in Table E-1, the Department will continue with IA testing at a minimum of one out of every ten lots thereafter.

**Table E-1
Independent Assurance Tolerances on Lot Averages**

Testing Criteria	Max. Difference Between Average Test Results (n \geq 3)
Asphalt Content for 9.5 mm and 12.5 mm NMAS Mixtures	$\pm 0.3\%$
Asphalt Content for 19 mm, 25 mm, and 37.5 mm NMAS mixtures	$\pm 0.4\%$
Percent Passing the No. 8 sieve for 9.5 mm and 12.5 mm NMAS mixtures	$\pm 4\%$
Percent Passing the No. 4 sieve for 19 mm, 25 mm, and 37.5 mm NMAS mixtures	$\pm 5\%$
Percent Passing the No. 200 sieve for all mixtures	$\pm 1.2\%$

If the difference between the lot averages of IA sample test results and LA sample test results exceeds the maximum IA tolerances in Table E-1, specific calibration factors (C_f and 200 C_f) will be determined for each ignition furnace used for testing the IA samples and LA samples according to PTM No. 757 (LTS and Contractor or Producer ignition furnaces) and additional IA samples will be collected in accordance with Section III.(h)2.b.1 from the project directly behind the paving equipment for IA comparison. If the IA tolerances in Table E-1 are still exceeded, the Representative will perform an investigation as to the cause for the non-comparison of the test results. Provide information to the Representative, as requested, on the integrity of samples and on the testing equipment used in the sample testing. The Representative will also review personnel and test methods used in the LA testing. Implement corrective measures for any noted deficiencies to ensure the tests are performed according to the prescribed procedures. The Representative will record the LA sample test results, the IA sample test results, and any applicable corrective measures in the Field Inspector's Diary. The Representative will select the next lot on the project for IA and will submit the IA samples to LTS for testing. If the difference between subsequent IA sample test results and LA sample test results exceeds the IA tolerances in Table E-1, the Department may discontinue testing of LA samples and begin LTS testing of the mixture acceptance samples for the remainder of the project and continue to Section IV for measurement and payment. If the difference between subsequent IA sample test results and LA sample test results meets the IA tolerances in Table E-1, the Department may continue testing of LA samples with IA testing at a minimum of one out of every ten lots.

(j) Mat Density Acceptance. Section 413.3(j) with additions and modifications as follows:

4.c Density Acceptance Samples. Section 413.3(j)4.c. Replace with the following:

4.c Density Samples for Local Acceptance (LA). The Inspector will select different sample locations in each subplot according to PTM No. 1, PTM No. 729, and PTM No. 746. With the Inspector present, drill 6-inch diameter cores as soon as possible but no later than the day following placement. Immediately after drilling, the Inspector will take possession of the core samples. The core at each location will be used to determine the bulk specific gravity (G_{mb}) and density (lbs/ft^3) of the compacted mix. Do not compress, bend, or distort samples during cutting, handling, transporting, and storing. If samples are damaged, immediately obtain replacement samples, as directed by the Inspector, from within 12 inches of the original sample location. Within 24 hours after coring, backfill the hole with mixture of the same JMF or with mixture used for subsequent courses and compact and seal the mixture.

The Inspector will identify the samples by ECMS project number, lot and subplot number, location (station and offset), date of placement, mixture type, and as LA samples (Sample Class AS). Provide the daily theoretical maximum specific gravity value as specified in Section 413.2(e)1.d.4 for the density calculation of each subplot in the lot. If density samples from the lot are taken from more than 1 day's placement, the daily theoretical maximum specific gravity value from each production day will be used to calculate the percent of theoretical density for each individual density acceptance core placed on that production day upon Gmm verification as described in Section III.(j)4.d.1.a. Provide sample containers of sufficient strength to prevent samples from being damaged during transport and that can be secured with security devices to prevent tampering of the density samples during transport and storage until sample testing. The Inspector will submit samples for one lot in one container. The Inspector will properly secure the containers with a security device before being immediately transported to the designated testing laboratory. If the container or samples show any evidence of their security being compromised, the Department may reject them for testing, suspend paving operations and require

additional samples to be taken for acceptance. Provide adequate facilities at all times to maintain the samples in a proper environment to prevent degradation.

For quality control purposes, a maximum of one pavement core per subplot may be obtained unless the Representative allows additional cores. The test results from the density LA samples can be used for quality control purposes. No pavement cores may be taken by the Contractor after the pavement core LA and IA samples are obtained. Do not obtain any other pavement cores, except those which are directed by and surrendered to the Department, unless allowed in writing by the District Executive. If pavement core samples are taken by the Contractor for quality control testing purposes, keep these samples completely separated from the pavement core samples for LA and IA. Do not combine, replace, or otherwise intermingle quality control samples with LA and IA samples.

4.c.1 Density Samples for Independent Assurance (IA). For federally funded projects and projects on the National Highway System (NHS), the Department will select the initial lot and a minimum of one out of every ten lots thereafter for IA. IA samples are independent of the construction item and JMF.

The Inspector will identify each subplot LA sample from Section III.(j)4.c. from a lot which is selected as the IA lot to also serve as the IA samples. Cores coated with paraffin wax according to PTM No. 716 are omitted from IA testing. The Inspector will identify the samples by ECMS project number, lot and subplot number, location (station and offset), date of placement, mixture type, and as AS/IA samples (Sample Class AS/IA). Provide the daily theoretical maximum specific gravity value from Section 413.2(e)1.d.4 for the density calculation of the lot.

Upon testing of each subplot LA sample for the selected IA lot in accordance with Section III.(j)4.d.1, the Inspector will package the density IA samples in the containers and submit the IA samples to LTS for testing.

4.d Acceptance and Gmm Verification Sample Testing. Section 413.3(j).4.d and all subsections. Replace with the following:

4.d Acceptance and Gmm Verification Sample Testing. These procedures apply to standard and RPS construction.

4.d.1 Testing of Local Acceptance (LA) Density Samples. Before any testing, the Representative will examine the containers and samples for any evidence of their security being compromised. No testing will be performed on any samples until the Representative has determined the samples to be secure. Testing of LA samples from a lot will not begin before paving completion of the lot and will begin immediately after the Representative arrives at the testing location. LA samples are the top priority for testing over all other testing upon the Representative arriving at the designated testing laboratory to test the LA density samples.

Do not discard any LA samples used for lot acceptance until directed by the Representative. The Contractor's technician will package the tested samples for dispute resolution and submit to the inspector to properly secure the containers with a security device before transport to an adequate facility to maintain the samples in a proper environment to prevent degradation.

The Department will retain all paperwork used in the LA sample testing for a period of not less than 3 years from the date of testing.

4.d.1.a Department Acceptance and Gmm Verification Testing. At the designated LA laboratory testing facility, the Representative will test each density acceptance sample according to PTM No. 715, and if necessary PTM No. 716, to determine the bulk specific gravity (Gmb) and bulk density (lbs/ft³) of the compacted mixture. The Contractor's technician may be present to witness the testing performed by the Representative. The technician must bring to the immediate attention of the Representative any deviation in performing the test according to the specified test method. If deviations are not noted at the time they occur, the test results will be considered accurate. For individual increment test results outside of the lower and upper specification limits in Table I, the Department will analyze the bulk density test results for extreme values according to PTM No. 4 at the 5% significance level. If discarding an extreme value reduces a lot to less than three remaining test results, the Department will accept the lot as specified in Section 413.3(h)2.a.1.

For lots with no required Gmm verification loose mixture samples, the Contractor's daily theoretical maximum specific gravity values from each production day will be used for acceptance.

For lots with required Gmm verification loose mixture samples (federally funded projects and projects on the NHS), the Representative will randomly select one of the Gmm verification loose mixture samples obtained as specified in Section III.(h)2.b.2 from the lot according to PTM No. 1. The Representative will test the randomly selected Gmm verification loose mixture sample to determine the Gmm of the compacted mixture according to AASHTO T 209 as modified in Bulletin 27, with the following exception:

- the samples will be obtained as specified in Section III.(h)2.b.3

The Representative will compare the randomly selected Gmm verification sample test result with the Contractor's daily Gmm value for that same production or placement date. If the Department and Contractor Gmm values do not differ by more than ± 0.030 , the Contractor's daily Gmm values in the whole lot will be considered verified and the Contractor's daily Gmm values will be used to determine the percent of theoretical maximum density for each density acceptance sample placed on that date. If the initial randomly selected Department Gmm verification sample test result differs from the Contractor's daily Gmm value for that same production or placement date by more than ± 0.030 , the Department Gmm test result value will be used as the acceptance Gmm value to determine the percent of theoretical maximum density for the individual density acceptance cores produced or placed on that same date. The Department reserves the right to select more than one Gmm verification sample from the lot representing the same production or placement date and to select other Gmm verification samples from the lot representing different production or placement dates to verify the Contractor's daily Gmm values. When more than one Gmm verification sample is selected from the lot representing the same production or placement date, the Department Gmm test results will be averaged and the average will be used to verify to the Contractor's daily Gmm value for that same production and placement date.

Individual subplot density values will be calculated and then rounded to the nearest tenth of a percent of theoretical maximum density according to ASTM E 29. Lot average density will subsequently be calculated from the individual subplot values and then rounded to

the nearest tenth of a percent of theoretical maximum density according to ASTM E 29. The Department will accept lots with three or more test results as specified in Section IV.(a) or Section 413.4(b).

If cores are not taken within 1 day after placing the mixture, or if the density for two consecutive lots or for a total of three lots does not result in a density payment factor of ≥ 100 , stop paving operations for the project as directed. Review and evaluate the operation and determine the cause of the problem. Do not resume paving until after the Representative reviews the proposed solution and authorizes paving to continue.

4.d.2 LTS Testing of Independent Assurance (IA) Density Samples and Gmm Samples. When IA samples are required, the LTS will test the density samples for IA according to PTM No. 715, and if necessary PTM No. 716, to determine the percent compaction. The LTS will test the Gmm samples for IA according to AASHTO T 209 as modified in Bulletin 27.

4.d.2.a Density IA Sample Test Result Analysis. When IA samples are required, LTS IA density sample test results will be compared to the LA density sample test results on the same lot. If the difference in the average test results of the LA and IA meet the IA tolerances in Table E-2, the Department will continue with IA testing at a minimum of one out of every ten lots thereafter.

Table E-2
Independent Assurance Tolerances on Lot Averages

Testing Criteria	Max. Difference Between Test Results (n \geq 3)
PTM No. 715 or PTM No. 716, Gmb	0.020
AASHTO T 209 as modified in Bulletin 27	0.030

If the difference between the lot averages of IA sample test results and LA sample test results exceeds the maximum IA tolerances in Table E-2, the Representative will perform an investigation as to the cause for the non-comparison of the test results. Provide information to the Representative, as requested, on the integrity of samples and on the testing equipment used in the sample testing. The Representative will also review personnel and test methods used in the LA testing. Implement corrective measures for any noted deficiencies to ensure the tests are performed according to the prescribed procedures. The Representative will record the LA Sample test results, the IA sample test results, and any applicable corrective measures in the Field Inspector's Diary. The Representative will select the next lot on the project for IA and will submit the IA companion density samples to LTS for testing. If the difference between subsequent IA sample test results and LA sample test results exceeds the IA tolerances in Table E-2, the Department may discontinue testing of LA samples and begin LTS testing of the acceptance samples for the remainder of the project and revert to Section IV for measurement and payment. If the difference between subsequent IA sample test results and LA sample test results meets the IA tolerances in Table E-2, the Department may continue testing of LA samples with IA testing at a minimum of one out of every ten lots.

IV. MEASUREMENT AND PAYMENT— Section 413.4 with additions and modifications as follows:

(a) Standard Asphalt Construction. Section 413.4(a) with additions and modifications as follows:

4.b Dispute Resolution. Section 413.4(a)4.b. Replace with the following:

4.b Dispute Resolution. For mixture acceptance testing or density acceptance testing, the Contractor may request, in writing, that the Department retest a lot if the initial test results indicated a defective lot (remove and replace), a lot with an OLPF < 90.00, the asphalt content pay factor for the lot is < 80.00, or the density pay factor for the lot is < 80.00, except for density when one or more density acceptance cores in the lot were coated with paraffin wax as a result of PTM No. 716 during the original density acceptance testing. Provide written retest requests to the District Executive within 1 week of the date the test results are released. Provide in the written request the preferred test method for asphalt content determination (PTM No. 757 or PTM No. 702, Modified Method D). Retests will not be allowed if a written retest request is not received within 1 week of the date the test results are released. Provide quality control test results and control charts, companion sample test results (if available), test data trend evaluation, and any other pertinent information to justify the retest request. The Department will evaluate the information and may allow retesting if the information submitted provides a reasonable basis to conclude that the failing test results may not represent the in-place material. The LTS will perform the retest with the Contractor present, unless otherwise agreed to in writing with the Contractor.

For retesting of materials failing for asphalt content, percent passing 75 μ m (No. 200) sieve, or percent passing the PCS, the Inspector will identify the locations where the original box samples were collected. The Inspector will select retest sample locations 24 inches from the original sample locations longitudinally in the direction of traffic. If the 24 inch offset causes the retest sample location to fall outside of the subplot, the Inspector will select the retest sample location 24 inches from the original sample locations longitudinally in the opposite direction from traffic.

With the Inspector present, provide appropriate traffic control and drill 6-inch diameter cores for retesting purposes according to the procedure for drilling in PTM No. 729. Ensure drilling procedures include washing off and towel drying the core samples immediately after drilling. Within 24 hours after coring, backfill the hole with mixture of the same JMF or with mixture used for subsequent courses and compact and seal the mixture. Provide traffic control, core, and backfill the core holes at no cost to the Department. The test method used for asphalt determination during the original acceptance testing (PTM No. 757 or PTM No. 702, Modified Method D, and PTM No. 739) will be used for the retest, unless the DME/DMM grants written approval for a change in test

method. The oven correction factors provided with the JMF will be utilized by the LTS. If required to separate the applicable pavement course lift from other pavement courses, the cores will be saw cut at the course lift line(s) as determined by the LTS. The results determined by LTS of the retest cores will be used to calculate payment for asphalt content, percent passing the 75 µm (No. 200) sieve, and percent passing the PCS for the lot.

For retesting of density acceptance, the Inspector will forward the original density acceptance cores to the LTS to be utilized. The LTS will not retest a lot for density acceptance when one or more density acceptance cores in the lot were coated with paraffin wax as a result of PTM No. 716 during the original density acceptance testing. The LTS will retest each original density acceptance core according to PTM No. 715 and PTM No. 716, as necessary, to determine the Gmb and bulk density values. The LTS will not perform Gmm testing for lots where the Contractor's Gmm value was previously considered verified as specified in Section III.(j)4.d.1.a. After Gmb testing is completed, for lots where the Contractor's Gmm was not verified, the LTS will select one original density acceptance pavement core from each production or placement date represented by the density acceptance cores in the lot. Each core selected will be the core with the highest bulk density for that production or placement date from the retest results (e.g., if a lot was placed over 3 production days, and the lot density acceptance cores include at least one core from each production or placement day, the original density cores selected during a density retest to perform Gmm testing will be 3; one from each production or placement date). The LTS will perform Gmm testing on the selected cores according to AASHTO T 209 as modified in Bulletin 27, with the following exceptions:

- The samples will be obtained as specified in Section III.(j)4.c,
- No conditioning, only drying, will be performed on the sample
- The minimum sample size will be waived, as necessary, to use the 6-inch diameter pavement core sample, and
- The supplemental procedure for mixtures containing porous aggregate will only be performed when either the coarse aggregate or fine aggregate in the mixture has a water absorption of $\geq 1.5\%$ as indicated on the JMF and then only when the calculated percent of theoretical maximum density indicates any one individual failing subplot which results in a density pay factor less than 100.00.

The LTS Gmm value(s) determined will be the Gmm values used to determine the percent of theoretical maximum density for the cores represented by the applicable production or placement dates in the lot. Either the previously verified Contractor's Gmm value(s) or the newly tested LTS Gmm value(s) will be used for acceptance to determine the percent theoretical maximum density for each subplot core in the lot. Upon completing the retesting of the original density acceptance cores, the retest values determined by LTS will be used to determine the final payment factor percentage for density.

Upon completing the retesting of the original density acceptance cores, the LTS will evaluate testing repeatability for the bulk density results determined according to PTM No. 715 and PTM No. 716, if necessary, using both the bulk original density test values and the bulk density retest values according to PTM No. 5. After evaluating the testing repeatability, the density test values used to determine the final payment factor percentage for density will be as follows:

- If repeatable, the original test values will be used.
- If lack of repeatability (i.e., non-repeatable), the retest values will be used.

The Department will deduct from the payment the cost per lot associated with conducting a retest as follows in Table J:

TABLE J
Dispute Resolution Retest Cost Table

Test Method	Mixture Acceptance Retest Cost if Retest Results Indicate $\geq 100\%$ Pay Factor(s)*	Mixture Acceptance Retest Cost if Retest Results Indicate $<100\%$ Pay Factor(s)
PTM No. 702/739	\$900	\$3,500
PTM No. 757	\$500	\$2,000
	Density Acceptance Retest Cost if Retest Results Indicate a Lack of Repeatability	Density Acceptance Retest Cost if Retest Results are Repeatable
PTM No. 715, or PTM No. 716 only	\$200	\$750
PTM No. 715, or PTM No. 716, and AASHTO T 209 as specified in Section	\$1,100	\$4,000

* For lots where the original test results indicated a defective lot, only the pay factor(s) where original test results indicated a PWL < 50 for asphalt content, percent passing the 75 µm (No. 200) sieve, or density will be utilized to determine the retest cost. If no original test results indicated PWL < 50 for lots where OLPF < 90, then all pay factors will be utilized to determine the retest cost.

Project Specific Details:

Special Provision: **P5081B - b05081 SECTION 508-B EVALUATION OF RIDE QUALITY ACROSS BRIDGE DECKS AND APPROACH SLABS**

Item(s) Associated:

Header:

SECTION 508-B EVALUATION OF RIDE QUALITY ACROSS BRIDGE DECKS AND APPROACH SLABS

Provision Body:

508.1 DESCRIPTION—This work is for the measurement and evaluation of ride-quality of Bridge Encounters.

(a) General Requirements. Determine the ride quality of finished riding surfaces for Bridge Encounters within the project limits. In the presence of the Inspector, measure the Bridge Encounter profile according to PTM No. 428. The profile should include measurement across the full Bridge Encounter, including across all joints (i.e. relief and expansion joints). Provide the resultant International Roughness Index (IRI) data to the Inspector.

The Inspector will not include measurements from excluded areas to determine acceptance. Measure the riding surface of the following excluded areas separate from the riding surface profile of ride-quality Bridge Encounters:

- Bridge decks not newly constructed, reconstructed, or overlaid.
- Approach slabs not newly constructed, reconstructed, or overlaid.
- Tapered riding surfaces less than 10 feet wide.
- Shoulders, medians, and other riding surfaces indicated.

(b) Bridge Encounter. For the purpose of Evaluation of Ride Quality Across Bridge Decks and Approach Slabs, a Bridge Encounter is defined as a single riding surface lane consisting of 25 feet of approach and exit pavements, approach and exit pavement relief joints, approach slabs, and bridge deck (including expansion joints, when applicable). The Bridge Encounter includes all joints and pavement transitions with the above limits.

508.3 CONSTRUCTION—

(a) Equipment and Operator. Provide pavement surface profile measuring equipment that has been verified by the Department according to PTM No. 428, except single point lasers should not be used on surfaces with longitudinal texturing. In the presence of the Inspector, calibrate the distance sensor and check the profile system calibration before each day's testing.

Provide an operator that is Department certified according to PTM No. 428.

(b) Testing. Notify the Inspector a minimum of 24 hours prior to measuring the Bridge Encounter profile. Measurements for quality control purposes may be performed prior to completion of final riding surface testing.

Provide the traffic control and station marking necessary to accommodate testing. Remove objects and equipment from the surface and sweep the surface as necessary to remove debris. Perform testing in the presence of the Inspector and prior to any required sawed mechanical grooving.

1. Bridge Encounter. In the presence of the Inspector, determine the riding surface profile of the Bridge Encounter according to PTM No. 428. At the completion of testing, immediately submit the Bridge Encounter IRI raw (unfiltered) data, as defined in PTM No. 428, to the Inspector. In addition, provide a summary report from FHWA's Profile Viewing and Analysis Software (ProVAL) detailing the profiles for the Bridge Encounters recorded. Summaries for the Bridge Encounter should include an evaluation and summary for Localized Roughness as defined by Section 508.3(c)1. Submit the report, along with processed IRI data, to the Inspector within 72 hours of the testing.

2. Excluded Areas. Test the entire surface of each excluded area in stages using a rolling 10-foot straightedge. The straightedge should be held and advanced continuously parallel to the road centerline, in contact with the riding surface, and check the entire area from one side to the other, as necessary. Continue straightedge testing until the entire excluded area is tested.

(c) Acceptance. Final acceptance for ride quality will be determined on both the average IRI evaluated on a lane by lane basis for each Bridge Encounter tested and on the evaluation of Localized Roughness as defined in Section 508.3(c)1. Perform measurements for acceptance once final riding surfaces are in place and in final configuration.

Determine an average IRI (inches/mile) for each Bridge Encounter as per PTM No. 428. The average IRI will be determined by averaging the left and right wheel-path measurements within the Bridge Encounter for each lane.

For Bridge Encounters greater than or equal to 265 feet in length, the maximum acceptable average IRI is 130 inches per mile provided the maximum Localized Roughness requirements are not exceeded. Bridge Encounters not meeting the maximum acceptable average IRI and maximum IRI values defined in Section 508.3(c)1 must be corrected.

For Bridge Encounters less than 265 feet, the tested area will be accepted on the evaluation of localized roughness only. Bridge encounters exceeding maximum IRI values defined in Section 508.3(c)1 must be corrected.

1. Localized Roughness. IRI values are to be evaluated for each lane and wheel-path on a continuous 25 foot segment of the Bridge Encounter. Corrective action is required for Bridge Encounters where the maximum individual IRI of 250 inches per mile is exceeded. Segments that include a steel armored expansion joint system, corrective action is required where the maximum IRI of 350 inches per mile is exceeded.

2. Excluded Areas. Perform corrective action for irregularities $> 1/4$ inch when tested with a rolling 10-foot straightedge. Correct joints not conforming to the requirements specified in Section 1001.3.

To improve the ride quality and at the Department's expense, the Inspector may require corrective work of excluded areas that conform to the acceptable straightedge surface tolerances specified in Section 508.3(c).

(d) Corrective Action.

Submit a corrective action plan to the Department for approval. The corrective action plan must detail areas requiring corrective action and contain a summary report from ProVAL. The summary report should include the current IRI of all the areas to be corrected and the estimated IRI after the anticipated corrective action. All corrective work shall not exceed a total depth of $1/2$ inch. All corrective work must be performed prior to any required mechanical texturing is performed. Pavement surfaces not meeting the requirements of Section 508.3(c) after corrective action are considered defective.

1. Do not produce a deviation, such as a ridge or valley with the adjacent riding surface, of more than 1/8 inch when measured on the transverse profile. Correct a sufficient length of pavement to correct the riding surface profile without producing additional high or low points. Retest the Bridge Encounter and excluded areas after completing corrective action. Perform additional measurements of the riding surface profile, as necessary, for the Inspector to determine which areas do not require additional corrective action. Correct surfaces to a uniform texture and cross section.

2. Perform all corrective action before final acceptance of the Bridge Encounter riding surface. If protective coating was applied before corrective action, reapply to the corrected area.

3. Ensure riding surface is free-draining after corrective work.

4. Expansion Dams. Corrective action to expansion dams must be approved by the dam manufacturer and District Executive in writing prior to beginning corrective action and cannot compromise the integrity of the dam.

(e) Defective Work. The ride-quality of the Bridge Encounter is considered defective if after corrective work:

- The Bridge Encounter exceeds the IRI requirements as specified in Section 508.3(c).
- Any individual bump (must grind) exists in the Bridge Encounter where the irregularity is more than 1/4 inch when tested with a rolling 10-foot straightedge.
- The surface adjacent to ride-quality surface contains a ridge or valley of more than 1/8 inch.
- The respective specification sections for construction of the asphalt and/or concrete pavements, approach slabs, and/or bridge deck require removal and replacement within the ride-quality Bridge Encounter.

508.4 MEASUREMENT AND PAYMENT—Incidental

The collection and evaluation of ride-quality data is considered to be incidental to the asphalt pavement, concrete pavement, approach slab, and/or bridge deck work completed and will not be paid for separately.

After corrective action, Bridge Encounters considered defective will be accepted if the Contractor accepts an \$8,000 downward adjustment (rebate) of the amount paid for the Bridge Encounter.

Project Specific Details:

Special Provision: **P6011A - b06011 SECTION 601.2(d) – CRUSHED GLASS**

Item(s) Associated:

Header:

SECTION 601.2(d) – CRUSHED GLASS

Provision Body:

Revise Section 601.2 by adding the following:

(d) Crushed Glass. Use crushed glass as defined by Act 101 “Post Consumer Material” or having an approval by DEP. Crushed glass for this application is required to be listed in Bulletin 15. Do not include automobile glass, lead crystal, TV monitors, lighting fixtures, and electronic applications. Provide glass of any color, free of toxic materials and hypodermic needles meeting the following specifications:

- Gradation – 100 percent of crushed glass particles must pass the 9.5 mm (3/8-inch) sieve.

- Quality requirements – Section 703.2(a), Table B, Type C, except crushed glass particles can be used up to 100 percent by mass (by weight) for pipe bedding and up to a maximum of 20 percent by mass (by weight) blended with conventional aggregates for pipe backfill.
- Non-glassy Material – 5 percent by mass (by weight), excluding ceramics and pottery.

Project Specific Details:

Special Provision: **S6291A - b06291 SECTION 629 HIGH-TENSION CABLE BARRIER SYSTEM**

Item(s) Associated:

Header:

Provision Body:

SECTION 629—HIGH-TENSION CABLE BARRIER SYSTEM

629.1 DESCRIPTION—This work is furnishing and installing a high-tension cable barrier system, with concrete post foundations, steel sockets, and end anchor terminals, at the locations indicated on the plans or as directed by the Representative, including all appurtenances and hardware.

629.2 MATERIAL—Furnish all material needed to complete a continuous segment of high-tension cable barrier system including, but not limited to, end anchor terminals, pre-stretched cables, turnbuckles, cable ends, intermediate anchor assemblies, bolts, nuts, and other hardware required by the manufacturer. Galvanize all hardware, including steel sockets, as specified in Section 1105.02(s) and conforming to AASHTO M 111. Furnish posts in steel sockets which are encased in concrete foundations, according to manufacturer's recommendations.

(a) Cables.

- Pre-stretched
- 3/4-inch diameter (minimum), 3 × 7, galvanized steel wire rope, AASHTO M 30, Type 1, Class A coating
- Minimum breaking strength = 39,000 pounds

(b) Fittings (including turnbuckles and connections).

- Minimum breaking strength = 36,800 pounds
- Galvanized after fabrication conforming to ASTM A153

(c) High-Tension Cable Barrier. High-tension cable median barrier system with four cables as listed in Bulletin 15. System is to be crashworthy according to the 2016 AASHTO Manual for Assessing Safety Hardware (MASH). Proprietary cable systems must have a determination by an ISO 17025 accredited testing laboratory stating that the cable barrier system has either passed a full suite of tests or all critical tests and is compliant with the 2016 AASHTO MASH. MASH 2009 is also allowed on level terrain and slopes up to 1V:4H if crash tested prior to 2016. System is to meet the following requirements:

- Test Level 4 (TL-4) for cross slopes of 1V:10H or flatter.
- Test Level 3 (TL-3) for cross slopes steeper than 1V:10H but no steeper than 1V:4H.
- Systems to be installed on cross slopes steeper than 1V:10H but no steeper than 1V:4H must be compliant with both MASH TL-4 on level terrain and MASH TL-3 for 1V:4H slopes.
- The maximum dynamic deflection/working width is 10 ft based on the MASH Test 4-11 with the 2270P test vehicle (pickup truck) on level terrain.
- The installed post spacing is determined from either method below; but regardless, the post spacing shall not be greater than the post spacing used during the MASH 3-17 and MASH 4-17 (sedan penetration) crash test or 18 feet, whichever is less.
 - If the MASH 4-11 crash test with the 2270P test vehicle on level terrain was performed on a range of post spacings, then the installed post spacing is interpolated to meet the deflection requirement.

- If the MASH 4-11 crash test with the 2270P test vehicle on level terrain was performed at only one post spacing, then the installed post spacing must match the post spacing during crash testing. Also, the deflection determined during the crash testing must be less than the maximum required deflection.

(d) High-Tension Cable Barrier End Anchor Terminal. End anchor terminal as listed in Bulletin 15. System is to be crashworthy according to the 2016 AASHTO MASH. Proprietary end anchor terminals must have a determination by an ISO 17025 accredited testing laboratory stating that the end anchor terminal has either passed a full suite of tests or all critical tests and is compliant with the 2016 AASHTO MASH. End anchor terminal is to meet the following requirements:

- Test Level 3 (TL-3)
- Cross Slope = 1V:10H or flatter

(e) Class A and Class AA Cement Concrete. Section 704

(f) Reinforcement Bars. Section 709.1

(g) Curing and Protecting Covers for High-Tension Cable Barrier End Anchor Terminal. Section 711.1

(h) Reflective Sheeting. Section 1103.05

(i) Certification. Section 106.03(b)3

629.3 CONSTRUCTION—

(a) Preconstruction Submittals.

1. High-Tension Cable Barrier. Prepare shop drawings as specified in Section 105.02(d).

At a minimum, include the following in the shop drawings to cover all runs of high-tension cable barrier:

- General notes and construction specifications
- Height of each cable in the system from ground line and top of foundation
- Installation tolerances
- Post length and height of each post with respect to the ground level
- Post spacing along entire length of system
- Diameter and depth of line post foundations
- Detailed drawings of all posts, hardware, concrete, and reinforcement bars
- Maximum length between turnbuckles, not to exceed 1,100 feet
- Minimum depth of the line post foundations, as specified in Section 629.3(b)6
- Minimum diameter of 12 inches for the line post foundations

Provide Form CS-4171, Certificate of Compliance, for the associated components of the entire high-tension cable barrier system. Include the breaking strength, modulus of elasticity, and amount of force used to elongate the wire rope.

2. High-Tension Cable Barrier End Anchor Terminals. Submit a proposed design to account for the soil type.

Prepare shop drawings as specified in Section 105.02(d).

Borings and soil testing for line post foundations may be performed according to Publication 222 at no additional cost to the Department.

At a minimum, include the following to cover all locations for end anchor terminals:

- **Borings and Soil Testing.**
 - Perform drilling by a prequalified geotechnical drilling contractor listed in Publication 222.
 - Prepare and deliver the boring inspection information according to Publication 222, Section 4.11.
 - Obtain each boring within 25 feet horizontally of each proposed end anchor terminal location. If two end anchor terminals are close enough that one boring is within 25 feet of both end anchor terminals, then the same boring may be used for both end anchor terminals.
 - If end block anchorage is proposed for the high-tension cable barrier system, drill each boring to a minimum depth of 15 feet into soil, or a minimum of 5 feet into rock, whichever is encountered first. If a drilled shaft is proposed for the high-tension cable barrier system's end block anchorage, drill each boring to a minimum depth of 25 feet into soil or a minimum of 10 feet if rock is encountered, whichever occurs first. Any additional borings or additional depth of boring required due to change in proposed end anchorage are at the contractor's expense.
 - At each boring location, laboratory testing shall include soil classification, soil strength and rock strength testing to determine the required in situ soil/rock parameters for design of the foundation.
 - Testing shall be performed by a certified AASHTO Materials Reference Laboratory (AMRL). Show water table on boring log.

- **End Anchor Terminal Foundation Design.** Provide design for end anchor terminal foundations based on site specific soils for each end anchor terminal location.
 - Design the block anchor or drilled caisson (shaft) anchor according to Publication 15M, Design Manual Part 4, and the AASHTO LRFD Bridge Design Specifications, including overturning, sliding (block anchor only), and reinforcement steel. Design each end anchor terminal foundation for the Service Limit State including the cable tension force, and the Extreme Event (Collision) limit state using a minimum impact/collision force of 31 kips. Use the most conservative limit state, either Service or Extreme Event (Collision), for the end anchor terminal foundation design. Design cable median barrier anchorage connections into the end block foundations for the controlling Strength or Extreme Event (collision) limit state.
 - Support or resistance provided by the top 1 foot of soil is discounted and shall not be included in the design of the end anchor terminal foundation.
 - Design the end anchor terminal foundation for longitudinal deflection of 1 inch. The contractor is to inspect the end anchor terminal foundation upon completion of the entire project. If the end anchor terminal longitudinal deflection exceeds 1 inch (is out of plumb by 1 inch in the direction of the cable), the contractor is responsible for tensioning or repairing the cable median barrier system to ensure proper cable tension and system functionality.
 - Base the minimum design load for the cable end terminal to cable connections on the theoretical cumulative tension expected at -25F.
 - Design the bottom elevation of the end anchor terminal foundations to a minimum frost depth of *(Insert Value)* inches.

(Determine the value in inches for the minimum depth of end anchor terminal foundations that is at least 6 inches below the depth of frost penetration. Obtain the depth of frost penetration according to Publication 242, Pavement Design Manual, Section 9.3, Item 2 (Maximum Potential Serviceability Loss Due to Frost Heave), add 6 inches to that depth, and round up the resulting value to the nearest 6-inch increment. For example, if a depth of frost penetration of 34 inches is obtained, the value in inches for the minimum depth of end anchor terminal foundations is 34 inches + 6 inches = 40 inches, then round up the resulting value to 42 inches (i.e., up to the nearest 6-inch increment)).

- One foundation design may be submitted for one or more end anchor terminal locations based on the most conservative roadway boring information.

3. Submittals to the Department. Submit the items as specified in Sections 629.3(a)1 and 629.3(a)2 to the Representative at least 30 calendar days before planned construction and have them signed and sealed by a Professional Engineer, registered in the State. Include manufacturer's product brochure, specifications, and requirements.

Within 16 calendar days after receipt, the Representative will notify the Contractor in writing of all additional information required and/or necessary changes. Submit the additional information and/or necessary changes within 7 calendar days of receiving comments from the Representative. The Representative will notify the Contractor within 7 calendar days, after receipt of the additional information, of the Department's acceptance or rejection.

(b) Installation.

1. Schedule and conduct a construction project high-tension cable barrier preinstallation review no later than 60 calendar days after the Notice to Proceed Date. Field verify the exact locations of the end anchor terminals and the high-tension cable barrier with at least one individual in attendance from the following organizations:

- Contractor
- District Representative
- District Senior Inspector-in-Charge
- District Guide Rail Mentor (*District's option to keep or remove.*)
- Bureau of Project Delivery, Highway Design and Technology Section (*District's option to keep or remove.*)

Before the preinstallation review, place temporary markings (paint, stakes, or flags) indicating planned locations of all permanent high-tension cable barrier and end anchor terminals to be installed as part of the project.

2. Begin work only after the preinstallation review has been held and all preconstruction submittals as specified in Section 629.3(a) have been accepted in writing by the Representative.

3. Furnish services of a manufacturer's technical representative during layout/foundation activities and during installation of posts, cable, and hardware.

4. Provide at least one trained installer as specified in Section 620.3(g)2.

5. Place Class A Cement Concrete and reinforcement for line post foundations.

Place Class AA Cement Concrete and reinforcement for high-tension cable barrier end anchor terminals.

6. Construct line post foundations and high-tension cable barrier end anchor terminals to be flush with finished ground or up to 1 inch above finished ground if allowed according to manufacturer's recommendations.

Construct the bottom elevation of the line post foundations to either the manufacturer's minimum depth or to a minimum frost depth of **(Insert Value)** inches, whichever is greater.

(Determine the value in inches for the minimum frost depth of line post foundations that is at least 6 inches below the depth of frost penetration. Obtain the depth of frost penetration according to Publication 242, Pavement Design Manual, Section 9.3, Item 2 (Maximum Potential Serviceability Loss Due to Frost Heave), add 6 inches to that depth, and round up the resulting value to the nearest 6-inch increment. For example, if a depth of frost penetration of 34 inches is obtained, the value for the minimum frost depth of line post foundations is 34 inches + 6 inches = 40 inches, then round up the resulting value to 42 inches (i.e., up to the nearest 6-inch increment)).

In areas where random boulders, hardpan, or bedrock are encountered, and the specified steel socket cannot be constructed to full depth, drill a minimum diameter and minimum depth hole as specified by the manufacturer. Fill excavation completely with the same class of cement concrete used in the foundation.

7. Install high-tension cable barrier with an offset away from the median ditch as indicated on the plans. Do not install high-tension cable barrier between 4 feet and 20 feet from the hinge point.

8. Install high-tension cable barrier with an offset between it and existing guide rail or concrete barrier as indicated on the plans.

Install high-tension cable barrier end anchor terminal with an offset between it and the paved surface of the median crossover as indicated on the plans. High-tension cable barrier may be installed at a minimum flare rate of 50:1 to avoid existing barriers and for deceleration lanes of median crossovers.

9. Install posts and cables at a height measured from finished ground in front of traffic side next to the concrete footing for the line post foundation, conforming to the accepted preconstruction submittals, and meeting manufacturer's guidance for tolerance. It is critical that cables are set to the proper height.

10. Install reduced post spacing or extra posts as indicated on the plans by start and stop locations. Any further reduced post spacing or extra posts installed for performance in horizontal or vertical curves, to reduce deflection or for any other reason, is included in the price.

11. Replace any post and cables damaged during installation, as determined by the Representative, at no additional cost to the Department.

12. Furnish and install delineation devices with reflective sheeting on posts, and on high-tension cable barrier end anchor terminals, according to the manufacturer's requirements.

Install delineation devices to not exceed the spacing requirements for guide rail delineation as shown on Standard Drawing TC-8604.

In locations where a high-tension cable barrier end anchor terminal is near a permanent median crossover, install delineation devices on every line post within 100 feet of the end anchor terminal.

Provide a minimum of 120 square inches of reflective sheeting on the end anchor terminal.

Provide a minimum of 8 square inches of reflective sheeting attached directly on or attached to the posts. Place reflective sheeting as high as possible on the line posts.

Delineation is required on the side closest to traffic. Delineation is also required on the other side if the cable barrier is within the clear zone of traffic on the other side. Verify that the reflective sheeting of all delineation devices is visible to approaching traffic.

In locations where high-tension cable barrier overlaps another roadside barrier, provide delineation only on the barrier system closest to traffic.

Provide delineation on every other post when any individual run of the system is within 4 feet of edge of traveled way.

13. Repair all turf grass areas damaged during installation of high-tension cable barrier and high-tension cable barrier end anchor terminals, as specified in Section 804.

14. Mold one set of concrete QC cylinders to be tested for compressive strength for concrete that is placed for line post foundations.

Mold one set of concrete QC cylinders to be tested for compressive strength for concrete that is placed for end anchor terminals.

Acceptance of cylinders is as specified in Section 704.1(d)5, except lots established daily.

15. Perform initial cable tensioning after the concrete for the line post foundations and the end anchor terminals has cured for a minimum of 3 days, and the concrete for the end anchor terminals has achieved a minimum compressive strength of 3,500 pounds per square inch. Cable tension must meet manufacturer's guidance and be within tolerance for different tensions for various temperature ranges. Follow the manufacturer's instructions for tensioning near turnbuckles. After a minimum of 3 days but no more than 14 days after initial tensioning, recheck cable tension and adjust, if necessary, according to the manufacturer's instructions.

Prepare and submit tension logs to the Representative with, at a minimum, the following:

- Date tensioning was performed
- Temperature of wire cable at the time of tensioning
- The segment and offset of each end terminal and near each turnbuckle being tensioned
- A diagram showing the number assigned to each of the cables
- The wire cable number being tensioned
- The initial tension load in each cable (optional)

- The final tension load applied to each cable
- Any applicable installation notes
- The name and signature of person conducting the tension testing

16. Repair all mow strips damaged during installation of line post foundations, high-tension cable barrier, and high-tension cable barrier end anchor terminals at no additional cost to the Department. *(District's option to keep or remove.)*

(c) Post-Construction Activities. *(District's option to keep or remove.)*

1. Tensioning Equipment. Furnish the Department with *(District to provide specific list of equipment)* and manuals that are required to maintain the installed high-tension cable barrier and high-tension cable barrier end anchor terminals. *(District's option to keep or remove.)*

2. Training for Maintenance Forces and Emergency Responders. After the installation of the system and before final acceptance by the Department, the manufacturer is to provide training for the Department's maintenance contractor, Department County maintenance crews, and area emergency responders. Coordinate with the County Emergency Management Coordinator and County Maintenance Manager to schedule a time and place for the training.

Furnish course content and materials certified by the manufacturer. The manufacturer is to provide a minimum of two hours of classroom instruction and a minimum of one hour of onsite instruction on maintenance and repair of the system. Provide the Representative with a log of individuals who received the training. *(District's option to keep or remove.)*

629.4 MEASUREMENT AND PAYMENT—

(a) High-Tension Cable Barrier. Linear Foot.

For the cross slopes indicated.

Training for maintenance forces and emergency responders is incidental. *(District's option to keep or remove.)*

Costs associated with placement of the temporary markings, and attendance at the preinstallation review are considered incidental to other items of work, and no separate payment will be made.

Revisions to contract quantities of high-tension cable barrier will be paid as specified in Section 110.

(b) High-Tension Cable Barrier End Anchor Terminal. Each.

(c) Roadway Borings and Laboratory Testing for High-Tension Cable Barrier End Anchor Terminal. Each. Roadway borings and laboratory testing for line post foundations are incidental.

(d) Tensioning Equipment (High-Tension Cable Barrier). Lump Sum. *(District's option to keep or remove.)*

Project Specific Details:

Special Provision: **S11061A - b11061 SECTION 1106 - PRECAST CONCRETE
BRIDGE BEAMS**

Item(s) Associated:

Header:

SECTION 1106 - PRECAST CONCRETE BRIDGE BEAMS

Provision Body:

1106.01 GENERAL REQUIREMENTS -

(a) Description. This work is the fabrication, storage and transportation of precast concrete bridge beams for incorporation into precast concrete channel beam bridge as indicated, unless otherwise directed.

(b) Shop Drawings. Section 105.02(d) and as follows:

Show items such as chairs, inserts, lifting devices and all reinforcement incorporated into the beam, listed by source, type and supplier; incidental items such as plain neoprene bearing pads, and anchor bolts.

1106.02 MATERIAL -

(a) Class AAA Cement Concrete. Section 704.

(b) Protective Coating. Section 680.3(c) or Section 1001.2(f).

(c) Reinforcement Bars. Section 709.1.

(d) Steel Dowels. Section 1107.02(g)

(e) Neoprene Material. Section 1107.02(n)

1106.03 BEAM CONSTRUCTION -

(a) Inspection. Make all materials, equipment, tests, processes of fabrication and the finished beam, including handling, storage and transportation subject to inspection and acceptance.

(b) Quality Control. Establish a level of quality control based on uniform production practices. Submit the plant's quality control procedure annually.

(c) Fabrication.

1. Concrete Mixture. Make trial mixes, in accordance with Bulletin 5, except mold, cure and test cylinders, using the procedures specified for the beam concrete. Do not use calcium chloride or any admixture containing calcium chloride.

2. Placing Concrete. Place concrete without segregation. Deposit the concrete in its final position in each part of the form. Methods of placement are subject to acceptance. Do not work or flow the concrete along the forms from the point of deposit. Work the concrete under and around the reinforcement.

In case the concreting is stopped for an extended period of time, which may result in a cold joint, stop work and remove and discard the concrete from unfinished beams.

Consolidate the plastic concrete by the use of acceptable internal or external mechanical vibrators, or a combination of both. Do not operate manual vibrators in one place more than 5 seconds.

3. Test Cylinders. Mold a minimum of two (2) concrete test cylinders for each beam cast. Use the cylinders to verify either the shipping or twenty-eight (28)-day concrete strength.

Mold the cylinders, in accordance with PTM No. 631, from the concrete being placed into each beam. Handle and cure the cylinders in the same manner as the beam. Place cylinders close to the bottom pallet and test at the site of the work, in accordance with PTM No. 604, under the supervision of a Department representative.

4. Finishing. Finish the top of beam with the type of finish shown on the shop drawings.

5. Patching. Section 1107.03(d)5.f.

6. Curing of Concrete. Cure concrete using either steam, heat or saturated cover curing. Do not use membrane curing. Cure beams a sufficient length of time so that the concrete develops the specified shipping and compressive strength at twenty-eight (28) days or less.

Cover beams for curing. Insure that cover is sufficient to protect the curing beam from outside drafts and to maintain a moist atmosphere. Separate the curing cover from the beam to allow full circulation around the entire beam.

Do not allow curing temperature to exceed 71 C (160F).

7. Removal of Forms. Strip beams after the concrete has reached a compressive strength of 19 Mpa (2750 psi).

8. Tolerances. Fabricate to plan dimensions within the following tolerances. Tolerances are not to be considered cumulative. Members not meeting tolerances may be rejected. If the deviations from the tolerances can be acceptably corrected, the members may be used, if accepted in writing.

- Depth (overall).....+13 mm (1/2-inch), - 6 mm (1/4-inch)
- Width (overall).....± 6 mm (1/4-inch)
- Length of beam (longitudinal tolerances based on design length, as indicated at centerline).....+ 13 mm (1/2-inch), - 25 mm (1 inch)
- Wall thickness (web).....+ 10 mm (3/8-inch), - 3 mm (1/8-inch)
- Depth (top slab).....+ 13 mm (1/2-inch), - 3 mm (1/8-inch)
- Horizontal alignment (deviation from a straight line parallel to the beam centerline)..+ 6 mm (1/4-inch)
- Longitudinal reinforcing bars (measured from top or bottom, whichever is closer).....+ 6 mm (1/4-inch)
- Stirrup bars (longitudinal spacing).....± 25 mm (1 inch)
- Longitudinal position of handling devices.....± 150 mm (6-inch)

9. Handling and Storage. Insure that damage to the concrete or reinforcement of the beam does not occur in handling or storage.

Store beams on a level and stable surface. Support at bearing areas.

10. Transportation. Do not ship beams until 80% of the minimum twenty-eight (28)-day compressive strength, as shown on the shop drawings, has been attained, but in no case before 72 hours of total storage time has elapsed following stripping from the forms. Provide adequate padding between tie chains or cable and the beam to preclude chipping of concrete.

Inspect beams again at the bridge site for damage and cracking during shipment. Check tolerances and dimensions required for satisfactory erection.

Replace beams damaged by improper storing, handling, transporting or erecting at no expense to the Department.

Project Specific Details:

Special Provision: **D1B - c00001 ITEM 9000-6012 – CONSTRUCT CONCRETE CURB RAMPS AND SIDEWALKS (BY QUADRANT)**

Item(s) Associated:

Header:

ITEM 9000-6012 – CONSTRUCT CONCRETE CURB RAMPS AND SIDEWALKS (BY QUADRANT)

Provision Body:

I. DESCRIPTION

This work is the construction of concrete curb ramps, cement concrete sidewalks, cement concrete curb, *granite curb [Delete if not applicable]*, concrete cheekwalls and associated work to construct the designed pedestrian facilities, and restoration of the adjacent area as indicated on the approved curb ramp design drawings and applicable standards.

II. MATERIAL

As specified in Sections 630, *634 [Delete if not applicable. If applicable utilize Section 634 Specification]* 676, specified in and as indicated on the approved design curb ramp drawings.

III. CONSTRUCTION

In accordance with the special provisions and additional requirements specified herein. Construct curb ramps and sidewalks as specified in Section 630 and Section 676, and as indicated, except as follows:

Section 630.3 (g) Backfilling and Embankment. Revise to read as follows:

Excavate the existing pavement up to a maximum of 2 feet in front of the existing curb to neat (saw cut) lines. Maintain positive drainage. Alternatively, pull curb away from the roadway leaving a neat vertical surface. Provide a partial height front form on the roadway side of the curb with the existing roadway section providing the remainder of the depth. Provide a full depth form on the back side of the curb. If the curb is not removed to provide a neat vertical surface, saw cut roadway and excavated 2 feet from the curb line and provide full depth forms on both sides of the curb.

Backfill the area on the roadway side of the curb up to the depth of the existing pavement structure with No.2A Stone. Backfill in lifts not to exceed 6 inches and compact by means of mechanical tampers or rollers, not to exceed 8 tons. Place asphalt material for the remainder of the excavated area, matching the existing pavement structure or as indicated by the Department. Following placement of asphalt material, seal the paved area with PG 64S-22. If concrete is encountered as part of the pavement structure, use Asphalt Base or as directed to replace removed concrete.

Section 676.3 Construction – Add the following:

Construct plain cement concrete curb ramps as indicated on the approved design curb ramp drawings; as shown on Standard Drawings RC-67M and RC-64M; and meeting the requirements of Publication 13M, Design Manual Part 2, Chapter 6. On Standard Drawing RC-67M, the details depicted are most appropriate for new construction. Alterations to existing facilities must meet the requirements, unless a Technical Infeasibility Form has been approved by the Department for each deficient location.

Do not start work on curb ramps until the drawings for the quadrant or ramp, as applicable, are submitted and approved. [A quadrant is defined as all of curb ramps and ADA features associated with a particular corner, median crossing, island, commercial driveway, or mid-block crossing. Each corner, median crossing, island, commercial driveway (both sides) and mid-block crossing (both sides) will be a separate quadrant. A “T” intersection will constitute a maximum of three quadrants.]

Perform all work within the Legal Right-of-Way unless written permission is obtained from the Department. If an authorization to enter (waiver of claim) is needed to complete the work, notify the Department.

Minor utility adjustments such as, but not limited to, minor vertical adjustments (up to 4 inches) of manholes, junction boxes, and valve boxes, etc. may be required. Coordinate with utility facility owners for adjustments to facilities for construction of the curb ramp. *[Insert reference to correct utility special provision.]*

Minimum and maximum dimensions contained on Standard Drawings RC-67M and RC-64M are absolute. Construction tolerances do not apply when a dimension is shown as minimum or maximum. Check slopes with a Digital Display Level as specified in Section 609.2(e)3 for compliance. An acceptance certificate will not be issued if any newly constructed curb ramps do not fully comply with the approved curb ramp design drawings and applicable standards.

Curb ramps crossing streets, alleys, or railroad tracks will include Sidewalk Detectable Warning Surfaces (DWS) as specified in Section 695, unless excluded by Publication 13M, Design Manual Part 2, Section 6.5.A.8. Curb ramps crossing residential driveways will not have DWS. Where curb ramps cross stop or yield controlled commercial driveways, DWS must be installed.

Remove existing concrete and curb to neat lines.

Grade areas behind the sidewalk that are within the work area to match the grade of the new sidewalk and existing topography so the area will drain away from the pedestrian facility when possible. Place topsoil and seed the area with Seeding and Soil Supplements as specified in Section 804.

If a new curb ramp is being placed at a quadrant of an intersection where there is an existing curb ramp, but not at the same location of the existing ramp, remove the existing depressed curb and replace with new curb to tie into the new curb cut ramp. Remove the existing curb ramp and replace with sidewalk or topsoil at a grade to meet the new curb ramp facility. This work is included in the quantity limits for each quadrant.

Temporary construction activities required for alterations that affect existing Pedestrian Access Routes (PAR) will require the provision of a safe, alternate, and accessible pedestrian route around the construction activities. Provide alternate access in accordance with Publication 13M, Design Manual Part 2, Section 6.14 Temporary Alternate Circulation Paths at Construction Sites to the maximum extent feasible so the usability of the alternate PAR is maintained. Maintain the alternate PAR through the duration of the construction activity. Erect and maintain traffic control signs in accordance with Publication 213.

After construction of each curb ramp, the Representative will utilize Department form CS-4401 to evaluate constructed curb ramps for compliance with the referenced Department standards. Reconstruct curb ramps that are non-compliant at the no cost to the Department, unless the curb ramp had been authorized to be constructed through the use of an approved Technically Infeasible Form.

An acceptance certificate will not be issued if any newly constructed curb ramp does not fully comply with the Standard Drawings RC-67M, PROWAG, and the approved design drawing.

IV. MEASUREMENT AND PAYMENT- Each (Each consists of one quadrant). Each quadrant will not exceed 40 Square Yard of concrete sidewalk and 40 Linear Foot of curb. Quantities in excess of 40 Square Yard or 40 Linear Foot, per quadrant, will be paid by a unit cost for “Excess Square Yard of concrete sidewalk” and “Excess Linear Foot of curb”

a. Maintenance and Protection of Pedestrian Traffic. Section 901.4

b. Other Items. The following items are incidental:

- Topsoil – Section 802
- Seeding and Soil Supplements - Section 804
- Mulch- Straw – Section 805
- Detectable Warning Surfaces – Section 695
- Minor Utility Adjustments such as, but not limited to, minor vertical adjustments (up to 4 inches) of manholes, junction boxes, valve boxes, may be required. Coordinate with utility companies before construction for adjustments to their facility for construction of the curb ramp.
- Repair of Adjacent Roadway (within 2 feet of curb)
- Adjustments to existing pushbuttons (reach and height)
- Pedestrian sign installation, removal and relocation (does not include traffic sign relocation)
- Connections to existing buildings. Caulking at building/sidewalk interface; cheek walls to protect foundations, window wells and access vaults; changing existing inlet grates; adjusting existing steps and landings; etc.

Project Specific Details:

Special Provision: **P10851B - c00007 ITEM 8550-XXXX – BEBO PRECAST
CONCRETE-ARCH BRIDGE SYSTEM**

Item(s) Associated:

Header:

ITEM 8550-XXXX – BEBO PRECAST CONCRETE-ARCH BRIDGE SYSTEM

Provision Body:

I DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of precast reinforced concrete arch bridge systems along with and construction of footing as indicated and specified on the approved PADOT Drawing No. 98-211 PE.

II MATERIAL - Bebo Precast Concrete Arch Bridge System. PADOT Drawing No. 98-211 PE (English Units - Dated January 31, 2000), including design and fabrication requirements is available upon request from District Bridge Engineer office. Obtain Bebo Precast Concrete Arch Bridge System units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III CONSTRUCTION –

(a) Design. Provide design in accordance with PADOT Drawing No. 98-211 PE (English Units)

(b) Shop Drawings. Provide approved shop drawings before fabricating Bebo Precast Concrete Arch units. Provide shop drawings meeting the general requirements of Section 105.02(d).

(c) Installation. Install in accordance with PADOT Drawing No. 98-211 PE. (English Units)

IV MEASUREMENT AND PAYMENT – Lump Sum

Project Specific Details:

Special Provision: **I7141D - c00014 ITEM 8642-XXXX - PREFABRICATED T-WALL
RETAINING WALL SYSTEM**

Item(s) Associated:

Header:

ITEM 8642-XXXX - PREFABRICATED T-WALL RETAINING WALL SYSTEM

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of precast reinforced concrete Prefabricated T-Wall Retaining Wall System along with the construction of footing as indicated and specified on the approved PennDOT Drawing No. 87-402 PE (Revision IV) (Dated 4/13/2017).

(a) Design. Provide design in accordance with PennDOT Drawing No. 87-402 PE (Revision IV) (Dated 4/13/2017) using Load Resistance Factor Design.

II. MATERIAL

Prefabricated T-Wall Retaining Wall System. PennDOT Drawing No. 87-402 PE (Revision IV) (Dated 4/13/2017), including design and fabrication requirements is available upon request from District Bridge Engineer office. Obtain Prefabricated T-Wall Retaining Wall System units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION

(a) Shop Drawings. Provide approved shop drawings before fabricating Prefabricated T-Wall Retaining Wall System units. Provide shop drawings meeting the general requirements of Section 105.02(d).

(b) Installation. Install in accordance with PennDOT Drawing No. 87-402 PE (Revision IV) (Dated 4/13/2017).

IV MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I7412B - c00015 ITEM 8622-XXXX – PREFABRICATED U-WALL RETAINING WALL SYSTEM**

Item(s) Associated:

Header:

ITEM 8622-XXXX – PREFABRICATED U-WALL RETAINING WALL SYSTEM

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of precast reinforced concrete Prefabricated U-Wall Retaining Wall System along with the construction of footing as indicated and specified on the approved PADOT Drawing No. 2010-221 PE (Dated 9/05/2013).

(a) Design. Provide design in accordance with PADOT Drawing No. 2010-221 PE (Dated 9/05/2013) using Load Resistance Factor Design.

II. MATERIAL -

Prefabricated U-Wall Retaining Wall System. PADOT Drawing No. 2010-221 PE (Dated 9/05/2013), including design and fabrication requirements is available upon request from District Bridge Engineer office. Obtain Prefabricated U-Wall Retaining Wall System units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Shop Drawings. Provide approved shop drawings before fabricating Prefabricated U-Wall Retaining Wall System units. Provide shop drawings meeting the general requirements of Section 105.02(d).

(b) Installation. Install in accordance with PADOT Drawing No. 2010-221 PE (Dated 9/05/2013).

IV. MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I7413B - c00016 ITEM 8622-XXXX – MSE ARES RETAINING WALL SYSTEM**

Item(s) Associated:

Header:

ITEM 8622-XXXX – MSE ARES RETAINING WALL SYSTEM

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of ARES Retaining Wall System as indicated and specified on the approved PennDOT Drawing No. 2011-273 PE (Dated 01/17/2014).

II. MATERIAL - ARES Retaining Wall System. PennDOT Drawing No. 2011-273 PE (Dated 01/17/2014), including design and fabrication requirements is available upon request from District Bridge Engineer office. Obtain ARES Retaining Wall System units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Design. Provide design in accordance with PennDOT Drawing No. 2011-273 PE (Dated 01/17/14).

(b) Shop Drawings. Provide approved shop drawings before fabricating ARES Retaining Wall System panels.

Provide shop drawings meeting the general requirements of Section 105.02(d).

Reimburse the Department a fee of \$1000 per design for the review and approval of the revision.

(c) Installation. Install in accordance with PennDOT Drawing No. 2011-273 PE (Dated 01/17/2014).

IV MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I7421C - c00017 ITEM 8642-XXXX – EVERWALL ABUTMENT AND RETAINING WALL SYSTEM**

Item(s) Associated:

Header:

ITEM 8642-xxxx – EVERWALL ABUTMENT AND RETAINING WALL SYSTEM

Provision Body:

I. DESCRIPTION -

This work is the design, manufacture, storage, delivery, installation, and assembly of Everwall Abutment and Retaining Wall System along with the construction of footing as indicated and specified on the approved PADOT Drawing No. PE 2002-021 (Dated 9/30/05).

II. MATERIAL -

Everwall Abutment and Retaining Wall System. PADOT Drawing No. PE 2002-021 (Dated 9/30/05), including design and fabrication requirements is available upon request from District Bridge Engineer office. Obtain Everwall Abutment and Retaining Wall System units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Design. Provide design in accordance with PADOT Drawing No. PE 2002-021 (Dated 9/30/05).

(b) Shop Drawings. Provide approved shop drawings before fabricating Everwall Abutment and Retaining Wall System units.

Provide shop drawings meeting the general requirements of Section 105.02(d).

(c) Installation. Install in accordance with PADOT Drawing No. PE 2002-021 (Dated 9/30/05).

IV. MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I7422B - c00018 ITEM 8620-XXXX – DURA-HOLD WALL SYSTEM**

Item(s) Associated:

Header:

ITEM 8620-XXXX – DURA-HOLD WALL SYSTEM

Provision Body:

I. DESCRIPTION -

This work is the design, manufacture, storage, delivery, installation, and assembly of DURA-HOLD Wall System as indicated and specified on the approved PENNDOT Drawing No. 95-144R PE (Dated 12/20/2011).

II. MATERIAL -

DURA-HOLD Wall System. Provide rail and tieback units as specified in Materials notes on PENNDOT Drawing No. 95-144R PE (Dated 12/20/2011). Obtain DURA-HOLD Wall System from a fabricator listed in Bulletin 15. Certification to be submitted in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) **Design.** Provide design in accordance with PENNDOT Drawing No.95-144R PE (Dated 12/20/2011).

(b) **Shop Drawings.** Provide approved shop drawings before fabricating DURA-HOLD units.

Provide shop drawings meeting the general requirements of Section 105.02(d).

Contractor is required to reimburse the Department a fee of \$1000 per design for the review and approval of the revision.

(c) **Installation.** Install in accordance with PENNDOT Drawing No. 95-144R PE (Dated 12/20/2011).

IV. MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I7423B - c00019 ITEM 8622-XXXX – STONE STRONG
RETAINING WALL SYSTEM**

Item(s) Associated:

Header:

ITEM 8622-XXXX – STONE STRONG RETAINING WALL SYSTEM

Provision Body:

I. DESCRIPTION -

This work is the design, manufacture, storage, delivery, installation, and assembly of STONE STRONG RETAINING WALL SYSTEM as indicated and specified on the approved PENNDOT Drawing No. 2009-187 PE (Dated 4/11/2013).

II. MATERIAL -

Stone Strong Retaining Wall System. PennDOT Drawing No. 2009-187 PE (Dated 4/11/2013), including design and fabrication requirements is available upon request from District Bridge Engineer office. Obtain Stone Strong Retaining Wall System from a fabricator listed in Bulletin 15. Certification to be submitted in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Design. Provide design in accordance with PENNDOT Drawing No. 2009-187 PE (Dated 4/11/2013).

(b) Shop Drawings. Provide approved shop drawings before fabricating Stone strong wall units.

Provide shop drawings meeting the general requirements of Section 105.02(d).

Contractor is required to reimburse the Department a fee of \$1000 per design for the review and approval of the revision.

(c) Installation. Install in accordance with PENNDOT Drawing No. 2009-187 PE (Dated 4/11/2013).

IV. MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I7424B - c00020 ITEM 8620-XXXX – PREFABRICATED RETT-
WALL RETAINING WALL SYSTEM**

Item(s) Associated:

Header:

ITEM 8620-XXXX – PREFABRICATED RETT-WALL RETAINING WALL SYSTEM

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of

precast reinforced concrete Prefabricated Rett-Wall Retaining Wall System along with the construction of footing as indicated and specified on the approved PADOT Drawing No. 2011-203 PE (Dated 8/1/2013).

(a) Design. Provide design in accordance with PADOT Drawing No. 2011-203 PE (Dated 8/1/2013) using Load Resistance Factor Design.

II. MATERIAL -

Prefabricated Rett-Wall Retaining Wall System. PADOT Drawing No. 2011-203 PE (Dated 8/1/2013), including design and fabrication requirements is available upon request from District Bridge Engineer office. Obtain Prefabricated Rett-Wall Retaining Wall System units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Shop Drawings. Provide approved shop drawings before fabricating Prefabricated Rett-Wall Retaining Wall System units. Provide shop drawings meeting the general requirements of Section 105.02(d).

(b) Installation. Install in accordance with PADOT Drawing No. 2011-203 PE (Dated 8/1/2013).

IV. MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I9019B - c00021 ITEM 9000-7007 – TEMPORARY BARRIER, STEEL, ZONEGUARD™ (STRUCTURE MOUNTED)**

Item(s) Associated:

Header:

ITEM 9000-7007 – TEMPORARY BARRIER, STEEL, ZONEGUARD™ (STRUCTURE MOUNTED)

Provision Body:

I. DESCRIPTION -

This work is the design, manufacture, storage, delivery, installation, and assembly of Zoneguard™ Portable Steel Barrier System as indicated and specified on the approved PennDOT Drawing No. 12-602-BDTD (Dated 2/22/2013).

II. MATERIAL -

Zoneguard™ Portable Steel Barrier System. Provide barrier segments and anchors as specified in Materials notes on PennDOT Drawing No. 12-602-BDTD (Dated 2/22/2013). Obtain Zoneguard™ Steel Barrier System from a fabricator listed in Bulletin 15. Certification to be submitted in accordance with Section 106.03(b)3.

Adhesive anchors. Provide adhesive anchors required to attach barrier to bridge deck which are in accordance with Section 643.2(c).

III. CONSTRUCTION -

(a) Installation. Install in accordance with PennDOT Drawing No. 12-602-BDTD (Dated 2/22/2013). Install adhesive anchors per Section 643.3(b).

IV. MEASUREMENT AND PAYMENT - Linear Foot

Project Specific Details:

Special Provision: **I9020B - c00022 ITEM 9000-7008 – TEMPORARY BARRIER, STEEL, BARRIERGUARD 800 (STRUCTURE MOUNTED)**

Item(s) Associated:

Header:

ITEM 9000-7008 – TEMPORARY BARRIER, STEEL, BARRIERGUARD 800 (STRUCTURE MOUNTED)

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of BarrierGuard 800 Portable Steel Barrier System as indicated and specified on the approved PennDOT Drawing No. 14-602-BDTD (Dated 7/24/2014).

II. MATERIAL - BarrierGuard 800 Portable Steel Barrier System. Provide barrier segments and anchors as specified in Materials notes on PennDOT Drawing No. 14-602-BDTD (Dated 7/24/2014). Obtain BarrierGuard 800 Portable Steel Barrier System from a fabricator listed in Bulletin 15. Certification to be submitted in accordance with Section 106.03(b)3.

Adhesive anchors. Provide adhesive anchors required to attach barrier to bridge deck in as specified in Section 643.2(c).

III. CONSTRUCTION -

(a) Installation. Install in accordance with PennDOT Drawing No. 14-602-BDTD (Dated 7/24/2014). Install adhesive anchors as specified in Section 643.3(b)

IV MEASUREMENT AND PAYMENT - Linear Foot

Project Specific Details:

Special Provision: **I9101C - c00023 ITEM 9000-7009 - METAL FINNED PIPE FOUNDATIONS FOR CONVENTIONAL LIGHTING POLES**

Item(s) Associated:

Header:

ITEM 9000-7009 - METAL FINNED PIPE FOUNDATIONS FOR CONVENTIONAL LIGHTING POLES

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of steel

finned foundations for conventional lighting poles as indicated and specified on the approved Drawing No. 99-034 PE, Rev. 1.

II. MATERIAL - Metal Finned Pipe Foundations for Conventional Lighting Poles. Drawing No. 99-034 PE, Rev. 1 (dated 06/22/09), including design and fabrication requirements is available upon request from the District Bridge Engineer's office. Obtain steel finned foundations from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b) 3.

III. CONSTRUCTION -

(a) Design - Provide design in accordance with Drawing No. 99-034PE, Rev. 1.

(b) Shop Drawings - Provide approved shop drawings before fabricating steel finned foundations. Provide shop drawings meeting the general requirements of Section 105.02(d).

(c) Installation - Install as per Drawing No. 99-034 PE, Rev. 1.

IV. MEASUREMENT AND PAYMENT - Each

Each alternate foundation design incorporated into the project will be subject to a reduction of \$1000 per design for the amount of the Contractor's share of the Department's engineering costs.

The Contractor's share of the Department's engineering costs will be recovered by processing a work order.

Project Specific Details:

Special Provision: **I9102C - c00024 ITEM 9000-7010 - METAL FINNED PIPE FOUNDATIONS FOR HIGH MAST LIGHTING POLES**

Item(s) Associated:

Header:

ITEM 9000-7010 - METAL FINNED PIPE FOUNDATIONS FOR HIGH MAST LIGHTING POLES

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of steel finned foundations for high mast lighting poles as indicated and specified on the approved Drawing No. 95-291 PE, Rev. 1.

II. MATERIAL - Metal Finned Pipe Foundations for High Mast Lighting Poles. Drawing No. 95-291 PE, Rev. 1 (dated 06/22/09), including design and fabrication requirements is available upon request from the District Bridge Engineer's office. Obtain steel finned foundations from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Design - Provide design in accordance with Drawing No. 95-291 PE, Rev. 1.

(b) Shop Drawings - Provide approved shop drawings before fabricating steel finned foundations. Provide shop drawings meeting the general requirements of Section 105.02(d).

(c) Installation - Install as per Drawing No. 95-291 PE, Rev. 1.

IV. MEASUREMENT AND PAYMENT - Each

Each alternate foundation design incorporated into the project will be subject to a reduction of \$1000 per design for the amount of the Contractor's share of the Department's engineering costs.

The Contractor's share of the Department's engineering costs will be recovered by processing a work order.

Project Specific Details:

Special Provision: **I9103D - c00025 ITEM 9000-7011 - METAL FOUNDATIONS FOR OVERHEAD SIGN STRUCTURES CANTILEVER AND CENTER-MOUNT..**

Item(s) Associated:

Header:

ITEM 9000-7011 - METAL FOUNDATIONS FOR OVERHEAD SIGN STRUCTURES CANTILEVER AND CENTER-MOUNT STRUCTURES

Provision Body:

I. DESCRIPTION -This work is the design, manufacture, storage, delivery, installation, and assembly of Metal Foundations for Overhead Sign Structures, Cantilever and Center-Mount Structures as indicated and specified on the approved drawings, PADOT DWG No. 95-290 PE, Rev. 1 and 13-602-BDTD.

II. MATERIAL - Metal Foundations for Overhead Sign Structures, Cantilever and Center-Mount Structures. Drawing PADOT DWG No. 95-290 PE, Rev. 1 (dated 06/22/09) and 13-602-BDTD (dated 10/31/2013), including design and fabrication requirements is available upon request from the District Bridge Engineer's office. Obtain steel finned foundations from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Design - Provide design in accordance with Drawing No. 95-290 PE, Rev. 1 or 13-602-BDTD, based on structure size.

(b) Shop Drawings - Provide approved shop drawings before fabricating metal foundations. Provide shop drawings meeting the general requirements of Section 105.02(d).

(c) Installation - Install as per Drawing No. 95-290 PE, Rev. 1 or 13-602-BDTD, based on structure size.

IV. MEASUREMENT AND PAYMENT - Each

Each alternate foundation design incorporated into the project will be subject to a reduction of \$250 per design for the amount of the Contractor's share of the Department's engineering costs.

The Contractor's share of the Department's engineering costs will be recovered by processing a work order.

Project Specific Details:

**I10841C - c00033 ITEM 8550-XXXX – PRECAST REINFORCED
CONCRETE STRUCTURE**

Special Provision:

Item(s) Associated:

Header:

ITEM 8550-XXXX – PRECAST REINFORCED CONCRETE STRUCTURE

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of precast reinforced concrete structure units, (precast segments) along with construction of footings, wingwalls, headwall, and concrete bridge barriers as indicated and specified.

II. MATERIAL -

(a) Precast Reinforced Concrete Structure. CON/SPAN PRECAST BRIDGE. Drawing No. 86-353 PE (Change #1) (Dated 06/29/2001), including design and fabrication requirements is available upon request from the District Bridge Engineer's Office. This drawing may also be viewed as an Approved Bridge and Structure Product through the Department's website (<http://www.dot.state.pa.us>) from the Bureau of Project Delivery, Bridge Design and Technology Division. Obtain precast segments from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

(b) Other Material.

- Class A Cement Concrete. Section 704. Do not use admixture containing chlorides.
- Class AA Cement Concrete (in curbs and concrete bridge barriers). Section 704. Do not use admixtures containing chlorides.
- Reinforcement Bars. Section 1002
- Galvanized Anchoring Assembly. Section 1105.02
- Epoxy Bonding Compound. Section 1001.2(k)
- Premolded Expansion Joint Filler. Section 705.1
- Joint Seal: Type I or Type II with primer. ASTM C-877 except exclude steel straps.
- Selected Borrow Excavation - Structure Backfill: Type No. OGS. Section 703.2, except delete Sections 703.2(a)2., 3., 4., 5., 6., and 7.
- Geotextile Fabric: Class 1. Section 1001.3(c), except use Type No. OGS.
- Geotextile Fabric: Class 2, Type A. Section 735.
- Nonshrink Grout. Section 1080.2(c).
- Membrane Sealers. Section 680 or as specified in Special Provisions.
- Pipe Underdrain. Section 610.2 and 615.2.

III. CONSTRUCTION -

(a) Design. Provide design in accordance with Drawing No. 86-353 PE (Change #1).

(b) Shop Drawings. Provide approved shop drawings before fabricating precast segments.

Show precast segment length on drawing. Provide precast segments of maximum length compatible with hauling equipment in order to minimize the number of joints.

Provide shop drawings meeting the general requirements of Section 105.02(d).

Provide shop drawings clearly showing all items incorporated into the precast segments including all reinforcing. List items such as chairs and inserts by source, type and supplier.

(c) Inspection. Precast segments will be inspected by Department representatives during the complete fabrication process.

(d) Quality Control.

1. General. Each fabricating plant establishes a level of quality control based on uniform practices in all stages of production.

2. Quality Control Personnel. The fabricator provides personnel assigned to, and responsible for, quality control.

(e) Handling and Storage. Handle and store precast segments to ensure no damage occurs to the concrete or reinforcing steel.

(f) Delivery. Replace precast segment damaged by improper storing, handling, transporting, or erection at no expense to the Department.

Precast segments will be inspected again by the Representative at the site for possible damage and cracking during shipment and for tolerances and other dimensions required for the satisfactory assembly.

Do not ship precast segments until the 28 day minimum compressive strength is attained.

Provide 24 hour advance notice of loading and shipping schedule. Have the Department representative verify Form CS-4171 and properly tag precast segments before shipping. Do not ship unapproved items. Observe hauling restrictions.

(g) Installation Requirements.

1. Foundation. Excavate and construct footing in accordance with Section 1001.3 as indicated.

2. Grouting. Grout hand holes, pockets, bolt sleeves, tie rod holes, and lifting lugs after joints are sealed and hardware is installed.

3. Placement. Place precast segments carefully on the footing. Do not damage the precast segments or footing.

4. Backfill. Backfill in accordance with Shop Drawing.

5. Joints. Seal the outside wall at every joint, with joint wrap.

(h) Wingwalls. Construct wingwalls as indicated.

(i) Epoxy Bonding Compound. When wing walls are specified, coat the contact surfaces with an epoxy bonding compound in accordance with ASTM-C881.

(j) Protective Coating. When specified, provide protective coating in accordance with the shop drawing.

(k) Curing. Section 714.8

IV. MEASUREMENT AND PAYMENT - Lump Sum

Project Specific Details:

Special Provision: **I10842B - c00034 ITEM 9000-7022 – COMPOSITE ARCH BRIDGE SYSTEM**

Item(s) Associated:

Header:

ITEM 9000-7022 – COMPOSITE ARCH BRIDGE SYSTEM

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of the Composite Arch Bridge System as indicated and specified on the approved PADOT Drawing No. 2013-236 PE (Dated 07/07/2014).

(a) Design. Provide design in accordance with PADOT Drawing No. 2013-236 PE (Dated 07/07/2014) using AASHTO 1st Edition, "LRFD Guide Specifications for Design of Concrete-filled FRP Tubes for Flexural and Axial Members".

II. MATERIAL - PADOT Drawing No. 2013-236 PE (Dated 07/07/2014), including design and fabrication requirements is available upon request from District Bridge Engineer office. Obtain Composite Arch Bridge System units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Shop Drawings. Provide approved shop drawings before fabricating Composite Arch Bridge Wall System units. Provide shop drawings meeting the general requirements of Section 105.02(d).

(b) Installation. Install in accordance with PADOT Drawing No. 2013-236 PE (Dated 07/07/2014).

IV. MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I10843B - c00035 ITEM 9000-7023 – FOLDED STEEL PLATE GIRDER SYSTEM**

Item(s) Associated:

Header:

ITEM 9000-7023 – FOLDED STEEL PLATE GIRDER SYSTEM

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of the Folded Steel Plate Girder System as indicated and specified on the approved PennDOT Drawing No. 14-604-BDTD (Dated 9/2/2014).

(a) Design. Provide design in accordance with PennDOT Drawing No. 14-604-BDTD (Dated 9/2/2014) using AASHTO and Design Manual, Part 4 design criteria.

II. MATERIAL – PennDOT Drawing No. 14-604-BDTD (Dated 9/2/2014), including design and fabrication requirements is available upon request from District Bridge Engineer office. Obtain Folded Steel Plate Girder System units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Shop Drawings. Provide approved shop drawings before fabricating Folded Steel Plate Girder System units. Provide shop drawings meeting the general requirements of Section 105.02(d).

(b) Installation. Install in accordance with PennDOT Drawing No. 14-604-BDTD (Dated 9/2/2014).

IV MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I10864B - c00036 ITEM 9000-7024 - ACOUSTAX ABSORPTIVE SOUND BARRIER SYSTEM, ALUMINUM PANELS**

Item(s) Associated:

Header:

ITEM 9000-7024 - ACOUSTAX ABSORPTIVE SOUND BARRIER SYSTEM, ALUMINUM PANELS, STRUCTURE MOUNTED.

Provision Body:

I. DESCRIPTION -

This work is the design, manufacture, storage, delivery, installation, and assembly of ACOUSTAX perforated aluminum sound barrier wall panels with NEPCOAT paint system and the construction of steel posts as indicated and specified on the approved PENNDOT Drawing No. 2002-130PE (Dated 9/25/08).

II. MATERIAL -

ACOUSTAX with NEPCOAT paint system aluminum panels, structure mounted sound barrier system. PENNDOT Drawing No. 2002-130PE (Dated 9/25/08), including design and fabrication requirements is available upon request from District Bridge Engineer Office. Obtain ACOUSTAX aluminum sound wall panel units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Design. Provide design in accordance with PENNDOT Drawing No. 2002-130PE (Dated 9/25/08).

(b) Shop Drawings. Provide approved shop drawings before fabricating ACOUSTAX perforated aluminum panels and steel wall posts.

Provide shop drawings meeting the general requirements of Section 105.02(d).

Contractor is required to reimburse the Department a fee of \$1,000.00 per design for the review and approval of the revision.

(c) Installation. Install in accordance with PENNDOT Drawing No. 2002-130PE (Dated 9/25/08).

IV. MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I10865B - c00037 ITEM 9000-7025 - ACOUSTACRETE PRECAST
ABSORPTIVE SOUND BARRIER PANEL WALL**

Item(s) Associated:

Header:

ITEM 9000-7025 - ACOUSTACRETE PRECAST ABSORPTIVE SOUND BARRIER PANEL WALL

Provision Body:

I. DESCRIPTION -

This work is the design, manufacture, storage, delivery, installation, and assembly of AcoustaCrete precast absorptive sound barrier panel wall system as indicated and specified on the approved PENNDOT Drawing No. 2000-335PE (Dated 10/15/08).

II. MATERIAL -

AcoustaCrete precast absorptive sound barrier panel wall system. PENNDOT Drawing No. 2000-335PE (Dated 10/15/08), including design and fabrication requirements is available upon request from District Bridge Engineer Office. Obtain AcoustaCrete precast absorptive sound barrier panel wall system from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Design. Provide design in accordance with PENNDOT Drawing No. 2000-335PE (Dated 10/15/08).

(b) Shop Drawings. Provide approved shop drawings before fabricating AcoustaCrete precast absorptive sound barrier panels and posts.

Provide shop drawings meeting the general requirements of Section 105.02(d).

Contractor is required to reimburse the Department a fee of \$1000 per design for the review and approval of the revision.

(c) Installation. Install in accordance with PENNDOT Drawing No. 2000-335PE (Dated 10/15/08).

IV. MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I10866B - c00038 ITEM 9000-7026 - VERSAPANEL COATED STEEL REFLECTIVE SOUND BARRIER PANEL WAL**

Item(s) Associated:

Header:

ITEM 9000-7026 – VERSAPANEL COATED STEEL REFLECTIVE SOUND BARRIER PANEL WALL SYSTEM

Provision Body:

I. DESCRIPTION -

This work is the design, manufacture, storage, delivery, installation, and assembly of Versapanel coated steel reflective sound barrier panel wall system as indicated and specified on the approved PENNDOT Drawing No. PE # 2006-206 (Dated 02/17/09).

II. MATERIAL -

Versapanel coated steel reflective sound barrier panel wall system. PENNDOT Drawing No. PE # 2006-206 (Dated 02/17/09), including design and fabrication requirements is available upon request from District Bridge Engineer Office. Obtain Versapanel coated steel reflective sound barrier panel wall system from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Design. Provide design in accordance with PENNDOT Drawing No. PE # 2006-206 (Dated 02/17/09).

(b) Shop Drawings. Provide approved shop drawings before fabricating Versapanel coated steel reflective sound barrier panels and posts.

Provide shop drawings meeting the general requirements of Section 105.02(d).

Contractor is required to reimburse the Department a fee of \$1000 per design for the review and approval of the revision.

(c) Installation. Install in accordance with PENNDOT Drawing No. PE # 2006-206 (Dated 02/17/09).

IV. MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I10867B - c00039 ITEM 9000-7027 - PLYWALL SOUND BARRIER WALL SYSTEM**

Item(s) Associated:

Header:

ITEM 9000-7027 - PLYWALL SOUND BARRIER WALL SYSTEM

Provision Body:

I. DESCRIPTION -

This work is the design, manufacture, storage, delivery, installation, and assembly of PLYWALL sound barrier wall system as indicated and specified on the approved PENNDOT Drawing No. 2009-050 PE (Dated 10/17/2011).

II. MATERIAL -

PLYWALL sound barrier wall system. Provide posts and panels as specified in Materials notes on PENNDOT Drawing No. 2009-050 PE (Dated 10/17/2011). Obtain PLYWALL sound barrier wall system from a fabricator listed in Bulletin 15. Certification to be submitted in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Design. Provide design in accordance with PENNDOT Drawing No. 2009-050 PE (Dated 10/17/2011).

(b) Shop Drawings. Provide approved shop drawings before fabricating PLYWALL panels and posts.

Provide shop drawings meeting the general requirements of Section 105.02(d).

Contractor is required to reimburse the Department a fee of \$1000 per design for the review and approval of the revision.

(c) Installation. Install in accordance with PENNDOT Drawing No. 2009-050 PE (Dated 10/17/2011).

IV. MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I10868B - c00042 ITEM 9000-7031 – ACRYLITE SOUNDSTOP
STRUCTURE MOUNTED SOUND BARRIER SYSTEM**

Item(s) Associated:

Header:

ITEM 9000-7031 – ACRYLITE SOUNDSTOP STRUCTURE MOUNTED SOUND BARRIER SYSTEM

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of Acrylite Soundstop Structure Mounted Sound Barrier System as indicated and specified on the approved PADOT Drawing No. 2012-050A PE (Dated 5/1/14).

II. MATERIAL - Acrylite Soundstop Structure Mounted Sound Barrier System. PADOT Drawing No. 2012-050A PE (Dated 5/1/14), including design and fabrication requirements is available upon request from District

Bridge Engineer office. Obtain Acrylite Soundstop Structure Mounted Sound Barrier System from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Design. Provide design in accordance with PADOT Drawing No. 2012-050A PE (Dated 5/1/14).

(b) Shop Drawings. Provide approved shop drawings before fabricating Acrylite Soundstop Structure Mounted Sound Barrier panels and posts.

Provide shop drawings meeting the general requirements of Section 105.02(d).

Reimburse the Department a fee of \$1000 per design for the review and approval of the revision.

(c) Installation. Install in accordance with PADOT Drawing No. 2012-050A PE (Dated 5/1/14).

IV MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I10865A - c00042 ITEM 9000-7033 - SUPERIOR TRANSPARENT
SOUND BARRIER SYSTEM**

Item(s) Associated:

Header:

ITEM 9000-7033 - SUPERIOR TRANSPARENT SOUND BARRIER SYSTEM

Provision Body:

I. DESCRIPTION –

This work is the design, manufacture, storage, delivery, installation, and assembly of Superior Transparent Sound Barrier System as indicated and specified on the approved PennDOT Drawing No. 2017-332, dated 4/26/18.

II. MATERIAL –

Superior Transparent Sound Barrier System, PennDOT Drawing No. 2017-332, dated 4/26/18, including design and fabrication requirements is available upon request from District Bridge Engineer Office. Obtain Superior Transparent Sound Barrier System from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION –

(a) Design. Provide design in accordance with PennDOT Drawing No. 2017-332, dated 4/26/18.

(b) Shop Drawings. Provide approved shop drawings before fabricating Superior Transparent Sound Barrier System barrier panels and posts.

Provide shop drawings meeting the general requirements of Section 105.02(d).

Contractor is required to reimburse the Department a fee of \$1,000 per design for the review and approval of the revision.

(c) Installation. Install in accordance with PennDOT Drawing No. 2017-332, dated 4/26/18.

IV. MEASUREMENT AND PAYMENT – Square Foot

Project Specific Details:

Special Provision: **I9104B - c00043 ITEM 9000-7032 - METAL FOUNDATIONS FOR DMS SIGN STRUCTURES, CENTER-MOUNT STRUCTURES**

Item(s) Associated:

Header:

ITEM 9000-7032 - METAL FOUNDATIONS FOR DMS SIGN STRUCTURES, CENTER-MOUNT STRUCTURES

Provision Body:

I. DESCRIPTION -This work is the design, manufacture, storage, delivery, installation, and assembly of Metal Foundations for DMS Sign Structures, Center-Mount Structures as indicated and specified on the approved drawings, PennDOT DWG No. 14-603-BDTD.

II. MATERIAL - Metal Foundations for DMS Sign Structures, Center-Mount Structures. Drawing PennDOT DWG No.14-603-BDTD (dated 4/28/2015), including design and fabrication requirements is available upon request from the District Bridge Engineer's office. Obtain metal foundations from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) **Design** - Provide design in accordance with Drawing No. 14-603-BDTD, based on structure size.

(b) Shop Drawings - Provide approved shop drawings before fabricating metal foundations. Provide shop drawings meeting the general requirements of Section 105.02(d).

(c) Installation - Install as per Drawing No. 14-603-BDTD, based on structure size.

IV. MEASUREMENT AND PAYMENT - Each

Each alternate foundation design incorporated into the project will be subject to a reduction of \$250 per design for the amount of the Contractor's share of the Department's engineering costs.

The Contractor's share of the Department's engineering costs will be recovered by processing a work order.

Project Specific Details:

Special Provision: **I53A - c00053 ITEM 9000-7101 – SINE WALL MSE PANEL SYSTEM**

Item(s) Associated:

Header:

ITEM 9000-7101 – SINE WALL MSE PANEL SYSTEM

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of SINE WALL MSE Panel System as indicated and specified on the approved PennDOT Drawing No. 2015-110 (Dated 12/2/16).

II. MATERIAL - SINE WALL MSE Panel System, PennDOT Drawing No. 2015-110 (Dated 12/2/16), including design and fabrication requirements is available upon request from District Bridge Engineer Office. Obtain SINE WALL MSE Panel System units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION -

(a) Design. Provide design in accordance with PennDOT Drawing No. 2015-110 (Dated 12/2/16).

(b) Shop Drawings. Provide approved shop drawings before fabricating SINE WALL MSE Panel System panels.

Provide shop drawings meeting the general requirements of Section 105.02(d).

Reimburse the Department a fee of \$1,000 per design for the review and approval of the revision.

(c) Installation. Install in accordance with PennDOT Drawing No. 2015-110 (Dated 12/2/16)..

IV. MEASUREMENT AND PAYMENT - Square Foot

Project Specific Details:

Special Provision: **I55B - c00055 - ROCK SLOPE SCALING and TRIMMING**

Item(s) Associated:

Header:

ITEM 9000-6172 - ROCK SCALER

ITEM 9000-6173 - SCALED ROCK DISPOSAL

ITEM 9000-6174 - VEGETATION DISPOSAL

ITEM 9000-6175 – SEEDING, SOIL SUPPLEMENTS, AND MULCHING

ITEM 9000-6176 – AERIAL LIFT

ITEM 9000-6177 – CONTROLLED BLASTING

Provision Body:

I. DESCRIPTION—This work is removal of vegetation, loose rocks, and potentially unstable rocks on slopes by manual, mechanical, chemical, and explosive methods. Includes removal and disposal of all material resulting from the scaling and blasting operation and all pre-scaling rockfall material located in the area between the rock slope and the pavement.

II. MATERIAL—

(a) Scaling Equipment. Provide scaling bars, winching, drag scaling, air bags, hydraulic jacks, chemical expansive agents, excavators, hydraulic and pneumatic hammers, drills, aerial lifts, and cranes that are appropriate for the type of rock being removed. Provide communication equipment to allow for two-way audio and photo communication.

(b) Explosives. If blasting is used, provide blasting agents as specified in Section 207.2.

(c) Seeding and Soil Supplements. Section 804.2(b), Seed Formula C.

(d) Mulching. Section 805.2(a).1.e, Bonded Fiber Matrix (BFM)

(e) Submittals. Prepare and submit a detailed Work Plan that describes the methods of vegetation clearing and rock scaling. The Work Plan must include a design for any required temporary shielding. Submit the Work Plan to the Representative for approval at least 21 calendar days before starting the scaling work.

Do not start work until the Work Plan is approved in writing. Acceptable submittals will be approved within 21 calendar days. Resubmit any deviations from the approved submittals for approval. No adjustment for contract time will be allowed due to incomplete submittals.

Include the following information in the Work Plan:

1. Schedule. Provide a schedule of operations that outlines the planned construction sequence and duration of the scaling work.

2. Equipment. List the types of equipment and tools to be used for the work and for accessing the work area.

3. Qualifications of Personnel. Provide documentation that the personnel conducting work or activities related to scaling operations have performed satisfactory work on three similar projects within the last 3 years. All scaling personnel must have a minimum of 2 years of full-time experience in rock slope stabilization that includes rock scaling. Scaling supervisor must have at least 1,000 hours of documented experience as a rock slope scaler. Scalers must have at least 500 hours as a rock slope scaler.

4. Crews. Indicate the anticipated number of planned scaling crews to be employed on the project. A crew is defined as one scaling supervisor and a minimum of two scalers.

5. Material Control, Removal, and Disposal. In the scaling sequence for the project, describe the intended direction and fall area for rock debris generated from the slope, frequency and method of rock debris removal, and disposal plan for rock debris generated from the slope scaling work and any rock debris currently along and adjacent to the toe of the slope.

6. Use of Cracking Agents. If cracking agents are used, provide a detailed plan, including type of cracking agent, Safety Data Sheets, manufacturer's technical data, hole spacing, loading sequence, and additional information for protecting traffic during the time period when the cracking agent is deployed, chemically active, and in use as a scaling method.

7. Traffic Control. Follow the approved Traffic Control Plan (TCP) requirements provided in the contract. Any proposed changes or additions to the TCP must meet the requirements of Publication 213 and be approved.

8. Shielding Plan. If temporary shielding is needed, a Shielding Plan is required. Submit the Shielding Plan as specified in the special provision for "Temporary Shielding for Rock Slope Scaling". The Work Plan must include methods described in the required Shielding Plan. Describe methods and procedures to be used to protect personnel and the traveling public from harm and adjacent facilities and structures from damage. Include provisions to protect adjacent roadway facilities and components and any local private facilities. Restore, repair, or recompense for damage or injury caused by this work.

9. Environment. Describe the procedure of application of herbicide and the manufacture's specification sheet for the specific herbicide to be used. Plan to protect the environment by minimizing erosion, preventing sedimentation and pollutants, and falling rock and debris from entering streams or waterways, and any other environmental impacts.

10. Emergency Management. Describe the plan of action for possible worker injury. Describe the plan of action for potentially large rocks or rock masses scaled onto the roadway that are not removable within the time limit restriction for traffic as indicated.

III. CONSTRUCTION—Proceed as indicated and according to the approved Work Plan.

Prevent damage to adjacent roadway facilities and components, existing rockfall protection structures and appurtenances, and adjacent or local private facilities. Repair or replace any pavement, guide rail, signage, structures, property or other components, public or private utilities, and any local private properties or facilities damaged due to the scaling work, at no additional cost to the Department. Provide adequate means to protect motorists and surrounding property from injury and/or damage during rock scaling and all other activities according to the approved Shielding Plan.

Conform to required regulations, permits and licenses as specified in Section 107.08.

A crew supervisor must be on-site during any on-slope scaling work.

Perform scaling only in the presence of the Representative. Use communication equipment between the Representative and each rock scaling crew to effectively communicate the slope conditions or issue alerts regarding unstable conditions.

(a) Conduct slope scaling within the slope stabilization area indicated on the plans and prepare finished rock slope surface using manual, mechanical, chemical, and explosive methods appropriate for the rock type being scaled. Begin rock scaling at the top of the slope and proceed downward toward the roadway, removing all loose rocks and unstable blocks as the work progresses. Remove any overhanging rock as directed by the Representative.

(b) Do not remove pieces of rock that will result in undercutting of overlying material. Do not excavate material that will disturb intact rock, compromise the stability of the rock face or slope, or disturb or damage the toe of slope unless such work is deemed necessary by the Department to meet project objectives or correct a more serious condition, as directed. For cases where scaling has disturbed intact rock, compromised stability of the rock face, or damaged the toe of slope, cease scaling within and near the affected area and submit a Corrective Action Plan and supporting analysis to the Representative for review and approval. Scaling work can continue in unaffected areas of the slope that do not further disturb the affected area, or that are outside of

locations where operations may be affected by compromised stability of the rock face. The submission for design and corrective action must satisfactorily demonstrate adequacy to resolve and correct the problem as determined by the Representative. The Representative will respond to the proposed Corrective Action Plan within 10 calendar days of receipt.

Prepare the Corrective Action at no additional cost to the Department. No adjustments in contract time will be allowed as the result of preparation, Department review, and implementation of the plan. Conduct all work for corrective action resulting from damages from activities not directed or approved by the Representative at no additional cost to the Department.

(c) Remove all vegetation from the rock slope within the limits, or as directed by the Representative, by spraying with approved herbicide and/or by cutting and mechanical removal. Do not grub. Vegetation includes live and dead trees, woody shrubs, brush, vines, and similar organic matter. Perform herbicide treatment as specified in Section 804.2(d). Perform tree removal and stump treatment as specified in Sections 810.2 and 810.3(b). Do not grub. Cut all trees to a height of not more than 4 inches above the ground line. Only treat stumps that will remain on the slope and will not be removed by subsequent scaling. Record all completed herbicide treatment type and quantities used, however, the Form M-609, Roadside Activity Report is not required.

(d) If chemical expansion agents are used, store securely until use. Handle and use all chemicals according to the manufacturer's recommendations and as indicated in the approved Work Plan.

(e) Blasting is allowed only with an approved Blasting Plan. Conform to Section 207 when scaling operations require blasting to remove rock to the profile as indicated in the plans and as required by field conditions.

(f) Provide 48 hours advance notice to the Representative before completion of any work to allow the Representative to evaluate the condition of the exposed face. All rocks and debris displaced during scaling must be removed completely from the slope to allow inspections by the Representative. To aid visual slope inspections, provide and operate an aerial lift having a telescopic or articulating boom equipped with an occupied platform. The lift extension must allow inspection of the entire slope face, capable of achieving a minimum platform height of 115 feet at a 70-foot horizontal reach, but not to exceed a maximum platform height of 150 feet or horizontal reach of 80 feet. For inspections of lower height slopes that do not require the maximum platform height and reach, an adequate lift of lesser vertical and horizontal capacity can be used. Lifts must have a minimum platform load capacity of 750 pounds in partially-extended configuration, and 500 pounds in their fully-extended configuration. The platform must be capable of accommodating both the lift operator and a passenger conducting the inspection. Lift operators must be certified in OSHA Aerial Boom Lift Safety, 2-hour training (minimum). The lift must be operated at all times according to the manufacturer's requirements and recommendations. Make any site preparations or modifications as necessary to allow proper positioning and safe operation of the lift, while allowing inspection of the entire slope face. Cease all rock scaling activities during any inspections necessary for the Representative to evaluate scaling activities, check the progress of work, or assess stability of the slope or an individual rock block or mass. Scale additional rock identified during inspections as directed.

(g) Remove all rock and debris produced from the blasting (if performed) and scaling operations as well as existing debris at the base of the slope and dispose as specified in Section 105.14. Do not exceed one 15-minute traffic stoppage per 2 hours for frequency of removal, unless the Representative deems it necessary to provide more frequent intervals to maintain a safe and efficient worksite or to allow the Representative to safely inspect the work. Remove or stabilize any rock on the cut face that is loose, hanging, deemed to be unsafe or unstable, or that creates a potentially dangerous condition to the satisfaction of the Representative during or upon completion of each portion of rock scaling.

Scaling and/or removal of rock carried out below or beyond the grades as indicated, below or beyond that established by the Representative, or for contractor convenience is at no additional cost to the Department.

(h) Hydraulically apply seeding, supplements, and mulch to disturbed areas of soil within and adjacent to the finished slope that are at risk of future erosion, as approved. Apply seeding Formula C and soil supplements as specified in Section 804.2 and 804.3, except tillage, blending, and rolling of soil are not required. Apply mulch as specified in 805.2(a)1.e.

IV. MEASUREMENT AND PAYMENT—

(a) Rock Scaler. Hour.

Rock scaling will be measured by the total number of hours spent on this bid item that are not incidental to any other bid item. Payable time includes when a scaler is physically on the slope setting required safety anchors,

time setting up equipment related to the use of expansion bags and chemicals for scaling, ascending the slope, descending the slope, time actively rock scaling and removing vegetation from the slope, and on-slope standby time during clean-up or when necessary for the safe conduct of traffic. Intermittent on-slope standby time up to 15 minutes is allowed for clean-up of scaled rocks at the base of the slope. Standby time exceeding 15 consecutive minutes is not payable, unless approved.

Payment will not be made for rock scaling conducted in areas outside those shown on the plans or scaling performed solely for the purpose of worker safety, unless approved by the Representative.

Scaler Supervisor hours will not be measured or paid for separately and are incidental to the rock scaler pay item.

(b) Controlled Blasting. Linear Foot.

Measured on linear foot of acceptable presplit or trim blasthole depth for required blastholes drilled within the tolerance as specified in Section 207.3(f). All holes drilled and not successfully blasted as determined will not be paid.

(c) Scaled and Blasted Rock Disposal. Cubic Yard.

Pay quantity is determined by measuring the volume of rock material in a fully-loaded (by weight) haul truck, and the cumulative haul count, as approved by the Representative. Truck load volumes that are less than a full load will be measured individually and paid separately from the cumulative haul count.

(d) Vegetation Disposal. Cubic Yard.

Pay quantity is determined by measuring the chipped volume of all woody vegetation with a diameter of 6 inches or less removed from the slope, as approved. Dispose of scaled tree segments and branches having a diameter greater than 6 inches, at no additional cost to the Department.

(e) Soil Seeding, Supplements and Mulching. Square Yard

(f) Aerial Lift. Day.

A calendar day during which a lift is used by the Representative to inspect the slope is payable as one day. Days when lift is on-site but not used for Department inspection are not payable.

Project Specific Details:

Special Provision: **I56A - c00056 ITEM 9000-6171 - TEMPORARY SHIELDING FOR ROCK SLOPE SCALING**

Item(s) Associated:

Header:

ITEM 9000-6171 - TEMPORARY SHIELDING FOR ROCK SLOPE SCALING

Provision Body:

I. DESCRIPTION—This work is furnishing, installing, maintaining, and removing a temporary shielding system to prevent scaled rock, airborne rock fragments, trees, vegetation, construction debris, tools, building materials, and other objects that might be removed, dropped, pushed, kicked, washed, or blown from the rock face from leaving the rockfall construction area as shown on the drawings. The term “Shielding” means all materials, components, and mechanisms necessary to completely support the system and protect vehicular, pedestrian, or railroad traffic or environmental sensitive areas from falling debris and construction materials.

II. Material—

(a) Temporary Shielding System. Provide a temporary shielding system designed with sufficient height, length, and structural integrity to withstand the designed rock fall energy impacts that will prevent material and debris from leaving the rockfall construction area. Provide temporary shielding systems, as needed, to protect intermittent vehicular and pedestrian traffic.

Design the temporary shielding system to safely handle all loading anticipated during scaling and to prevent material from passing from the rockfall construction area into the temporary traffic lanes and beyond. System must limit free fall, minimize fall velocities, and eliminate bounce on impact at the base of the rock face.

(b) Submittals. Prepare and submit a detailed project Shielding Plan to the Representative at least 10 working days before starting the scaling work. The Shielding Plan must include detailed working drawings of the type and location (in plan and elevation view) of the system(s). Provide description of installation sequence, inspection frequency, maintenance plan, and removal sequence of the temporary shielding system. Show all components, supports, analysis, calculations, and any necessary manufacturers' data indicating that the temporary shielding system can safely handle all loads imposed on the components.

Provide design calculations deriving the expected loads from falling rock and debris with supporting rockfall analysis, including design assumptions and justification of selected parameters.

Provide plans in conformance with PennDOT Design Manual Part 3.

Include any necessary 'catalog cuts' and other manufacturers' data showing the type(s) of temporary shielding being used. Provide all relevant design load limits, energy ratings, performance levels, and safety factors associated with the temporary shielding system components.

Have the calculations and plans for temporary shielding signed and sealed by a Professional Engineer registered in the State.

Do not begin any work on the rock face that would require use of the temporary shielding until the Shielding Plan is approved by the Representative. Acceptable submittals will be approved in writing within 10 working days.

III. CONSTRUCTION—Install the temporary shielding system in accordance with the designer/manufacture's specifications and instructions as approved by the Representative.

If netting type system is used, install it with sufficient sag and proximity to the rock face so as to capture or control any falling object.

Maintain the temporary shielding system in place throughout the execution of any work on the slopes that would cause material to leave the work zone and cause damage to persons, equipment, or property.

Remove material/debris from the temporary shielding system at the end of each work day or more frequently if necessary to maintain the system's capacity to function as designed. Do not allow material and debris to accumulate on the temporary shielding system.

Monitor and inspect the condition of the temporary shielding system at least once every week in accordance with the approved monitoring, inspection, and maintenance plan, or as directed by the Representative. Ensure that the system continues to function as intended. Immediately replace sections or parts of the system that show damage, wear, or deterioration that affect the system's integrity.

For the duration of the construction project, perform repairs, reinstallation, disposal, and replacement of any part of the system as necessary at no additional cost to the Representative. Stop rock slope scaling operations, as required or directed, when system repair or maintenance is performed.

Upon completion of construction, remove any anchors that are attaching the temporary shielding system to the existing concrete barrier and fill the holes with an approved non-shrink grout, at no extra cost to the Department. Welding of the temporary shielding system to any existing barrier is not allowed.

Restore, repair, or recompense for any damage or injury caused by ineffective performance of temporary shielding at no additional cost to the Department.

IV. MEASUREMENT AND PAYMENT—

(a) Temporary Shielding for Rock Slope Scaling. Lump Sum.

Project Specific Details:

Special Provision: **I57B - c00057 ITEM 9000 - _____ - FIBER MODIFIED _____
COURSE, PG ____-____, _____ MILLION ESALS**

Item(s) Associated:

Header:

ITEM 9000 - _____ - FIBER MODIFIED _____ COURSE, PG ____-____, _____ MILLION ESALS, _____
MM MIX, _____ DEPTH, SRL - _ (FMC)

Provision Body:

I. DESCRIPTION—This work is the standard and RPS construction of plant-mixed Fiber Modified Courses (FMC) on a prepared surface using a volumetric mixture design developed with the Superpave Gyratory Compactor.

II. MATERIAL—Section 413.2 with the following additions.

(k) Aramid Fibers. Use only Para-aramid fibers (aramid fibers) approved and listed in Bulletin 15 for use in Asphalt. Provide a supplier certification with each shipment as specified in Section 106.03(b)3. Certify that the aramid fibers conform to the physical requirements of TABLE 1.

Add aramid fibers at a rate of 2.0 ounces (minimum) of aramid fiber per ton of asphalt mix.

Aramid fibers may be packaged in loose form with other inert material, or packaged in a bundled form coated with wax (or other inert material) to aid in dispersion of the aramid fibers into the mixture.

Deliver fibers in sealed, undamaged, pre-weighed bags or as loose fibers in bulk containers. Identify the pre-weighed bags or bulk containers with legible labels, indicating fiber manufacturer name, product name or designation, manufacturer lot number, and weight.

Store materials in accordance with manufacturer's recommendations. Protect fibers from UV radiation. Do not allow fibers to become wet or contaminated. Discard and replace wet or contaminated fibers at no additional cost to the Department.

TABLE 1

Aramid Fiber Properties	
Property	Requirement
Length	3/4 inch ± 1/16 inch
Form	Filament Yarn
Color	Yellow
Tensile Strength	400,000 psi minimum
Decomposition Temperature	800 F minimum
Modulus	10.2 x 10 ⁶ psi minimum
Specific Gravity	1.44 - 1.45 (g/cm ³)

III. Construction—Section 313.3 or 413.3 with the following additions.

- **Revise Section 413.3(c) Asphalt Mixing Plant to add the following:**

Make any plant modifications needed to add fibers in accordance with manufacturer's recommendation. Follow manufacturer's requirements for minimum mix production temperature when adding fibers.

- **Revise Section 413.3(c)1 Batch Plant to add the following:**

Add fibers to the aggregate in the weigh hopper and follow the manufacturer's recommendations for both the dry and wet mixing times. Ensure that the fibers are uniformly distributed before the injection of asphalt cement into the mixture. If there is evidence of clumping of fibers, stop production of the asphalt material.

The addition of fibers must be controlled to $\pm 10\%$ by weight of the aramid fibers required. The Plant's fiber supply system must be approved by the fiber manufacturer, and include one of the following methods:

- For use of pre-weighed bags, add the bags of fibers through an automated supply system during production. Have the fiber supply system meter and print out, with date and time stamp, the number of bags added during mix production.
- For use of loose (bulk) fibers, utilize one of the following methods:
 - **Automated Fiber Feeder System:** Add fibers through an integrated fiber feeder system that prints out, with date and time stamp, the weight of the aramid fibers added during each batch mix production. Calibrate the equipment to the satisfaction of the Representative to show the aramid fibers are being accurately metered and uniformly distributed into the mix.

OR, in lieu of an automated system

- **Qualified QA/QC Mixing Technician:** Have a dedicated, qualified QA/QC mixing technician trained by the manufacturer, to feed the aramid fibers into the asphalt during plant mixing operations to produce all the fiber modified quantities required for the project.

A certification report must be submitted upon project completion. The report must certify that the metering and feeding was performed per the dosage rate requirements of this specification, and that a visual inspection was performed during the mixing process to verify no clumping of aramid fibers.

- **Revise Section 413.3(c)2 Drum Mixer to add the following:**

Add fibers to the RAP collar or as per Manufacturers recommendation to ensure that fibers are uniformly distributed before the injection of asphalt cement into the mixture.

Do not allow fibers to be removed by the exhaust or dust collection system. If there is evidence of clumping of fibers, stop production of the asphalt material.

The addition of fibers must be controlled to $\pm 10\%$ by weight of the aramid fibers required. The Plant's fiber supply system must be approved by the fiber manufacturer, and include one of the following methods:

- For use of pre-weighed bags, add the bags of fibers through an automated supply system during production. Have the fiber supply system meter and print out, with date and time stamp, the number of bags added during mix production.
- For use of loose (bulk) fibers, utilize one of the following methods:
 - **Automated Fiber Feeder System:** Add fibers through an integrated fiber feeder system that prints out, with date and time stamp, the weight of the aramid fibers added during mix production. Calibrate the equipment to the satisfaction of the Representative to show the aramid fibers are being accurately metered and uniformly distributed into the mix.

OR, in lieu of an automated system

- **Qualified QA/QC Mixing Technician:** Have a dedicated, qualified QA/QC mixing technician trained by the manufacturer, to continuously feed the aramid fibers into the asphalt during plant mixing operations to produce all the fiber modified quantities required for the project.

A certification report must be submitted upon project completion. The report must certify that the metering and continuous feeding was performed per the dosage rate requirements of this specification, and that a visual inspection was performed during the mixing process to verify no clumping of aramid fibers.

IV. MEASUREMENT AND PAYMENT—Section 313.4 or Section 413.4 with the following modifications.

- **Revise Section 313.4(a)1 Courses to read as follows for base course:**

1. Fiber Modified Base Course (FMC). Add the following:

1.f Fiber Modified Superpave Asphalt Mixture Design, Base Course. Square Yard or Ton

- **Revise Section 413.4(a)1 Courses to read as follows:**

1. Fiber Modified Courses (FMC).

1.a Fiber Modified Superpave Asphalt Mixture Design, Wearing Course. Square Yard or Ton

1.b Fiber Modified Superpave Asphalt Mixture Design, Wearing Course (Scratch). Ton

1.c Fiber Modified Superpave Asphalt Mixture Design, Wearing Course (Leveling). Ton

1.d Fiber Modified Superpave Asphalt Mixture Design, Binder Course. Square Yard or Ton

1.e Fiber Modified Superpave Asphalt Mixture Design, Binder Course (Leveling). Ton

- **Revise Section 413.4(b) RPS Construction to read as follows:**

(b) RPS Fiber Modified Construction. Square Yard or Ton

Project Specific Details:

Special Provision: **I61A - c00061 LIMITED MOBILITY GROUTING**

Item(s) Associated:

Header:

LIMITED MOBILITY GROUTING

Provision Body:

LIMITED MOBILITY GROUTING

I. DESCRIPTION – This work is the densification of loose non-cohesive material and the filling of voids to improve subsurface conditions. Limited Mobility Grouting is considered specialty work that must be performed by an approved specialty contractor experienced in this type of work. The following definitions apply:

- **Back Pressure:** Residual pressure in the grout hole in the absence of grout flow.
- **Grout Take:** Quantity of grout, measured in cubic feet.
- **Injection Riser:** A flush-joint steel pipe grout is injected through, having a 2 to 4-inch inside diameter, installed tightly in a drilled hole.
- **Limited Mobility Grout (LMG):** A stable mixture of Portland cement, approved bulk filler, admixtures, and water, mixed to a uniform stiff consistency similar to a mortar, with a slump of less than or equal to 2 inches, as measured at the pump hopper.
- **Limited Mobility Grouting:** The controlled injection of stiff, low-slump, mortar-like cement grout that compacts loose non-cohesive soils and fills voids, or compacts soil seams in rock by displacing loose or soft soil and filling the open void spaces the grout is injected into without traveling into small fractures, joints, or other discontinuities.
- **Production Drill Hole:** A hole advanced for the purpose of injecting grout in that hole.
- **Stage:** A partial or complete length of hole that is grouted as a unit. The actual length of a stage depends upon grouting conditions encountered. Do not exceed a stage length of 2 feet.
- **Upstage Grouting:** A method of drilling and grouting in which each hole is drilled to full depth, followed by grouting of successive stages through a riser pipe set at successively shallower depths.

II. MATERIAL -

(a) GROUT: Composed of Portland cement, filler material, and water; may contain water reducing agent or other approved additives, as required for the work, and if approved. Provide grout with a slump of 1.0 to no more than 2.0 inches, as measured at the pump hopper. The grout mix must be pumpable between rates of 0.4 to 2.0 cubic feet per minute through 1 3/4-inch minimum to 3-inch maximum inside diameter grout lines and risers. The grout must also be pumpable through the automated recorder, and with all other equipment provided and used for mixing, pumping, and injection. Grout mix must be homogeneous. Grout mix introduced to the pump must not contain unmixed materials.

1. Water – Section 720.1

2. Cement – Section 701

3. Filler: A combination of soil, fine aggregate, fly ash or slag cement, and fine gravel, conforming to the following gradation, PI, LL, and particle shapes:

Sieve Designation/U.S. Std. Square <u>Mesh</u>	Cumulative Percentage by Weight <u>Passing</u>
1/2-in.	100
No. 4	70-100
No. 10	40-90
No. 200	10-30*

* The inclusion of clay size particles in the filler shall be limited to 5%.

- PI < 5; LL < 30

- Particle shapes are allowed in the range from sub-angular to rounded. Rounded particle shapes are preferred for material passing the #200 sieve. Angular, flat, elongated, or platy particles are not allowed.

- Do not use bentonite, other high-plasticity clays or slag. However, fly ash and slag cement may be used.

- Soil: Includes natural materials with little to no clay size particles classified as SM, SP-SM, SW-SM, SP, or SW according to the Unified Soil Classification System (ASTM D2487, free of topsoil, organic material, and particles larger than 1/2 inches. Provide material having particles with sub-angular to rounded shapes and with the ratio of the smallest to largest dimension of the grains greater than 0.5. The soil may be manufactured as a combination of separately processed sizes or classifications; the different components may be batched separately or blended before delivery to the mixing plant.

- Fine Aggregate – Section 703.1(c), except no Asphalt Concrete Sand Type B Filler material.

- Fly Ash – Section 724.2(b)

- Slag Cement – Section 724.3

- Fine Gravel: Mineral aggregates of crushed or natural rock being retained between the No. 4 and 1/2-in sieves.

- Pulverized limestone/agricultural lime is prohibited.

4. Water-Reducing Admixture, Type A – Section 711.3. A compound possessing characteristics that will increase the flowability of the mixture, assist in dispersal of the cement grains, and neutralize shrinkage of the grout. Bentonite or other high-plasticity clays are prohibited. The amount of water-reducing agent incorporated in the mix design should be minimized to limit the potential for the grout to act as a fluid when injected under pressure.

5. Anti-Washout Agent: Grout used in saturated or water-filled zones below the water table requires anti-washout grout additive, such as silica fume, to prevent impacting groundwater quality.

6. 28-Day Compressive Strength (PTM No. 604) – as indicated.

(b) RISER PIPE: Provide grout injection risers consisting of flush-joint steel pipes having an inside diameter of 2 to 4 inches. Use riser sections in lengths of 5 feet or less that are able to resist the forces of drilling, installation, grouting, and extraction.

(c) MATERIAL DELIVERY, STORAGE, AND HANDLING

1. Fine Gravel: In the event the fine gravel is found to contain foreign matter or oversized particles, screen the material to attain the required particle sizes. No additional payment will be made for screening.

2. Grout, On-Site Batching: Upon discharge into the pump hopper or holding tank, the grout must be continuously agitated. Mixed grout may not be held in the agitator for more than two hours after batching, or within four hours if an approved set retarder is used. Dispose of remaining grout not pumped within the time limit, at no additional cost to the Department.

3. Grout, Ready Mix: The use of ready mix grout will be allowed, provided the quality of the materials utilized by the supplier and the delivered product meets the requirements specified. Grout batch tickets specifically listing quantities of cement, water, fine aggregate, fine gravel, filler, and admixtures, are required for each load. Grout batch tickets are not considered an adequate measure of material volume injected into the ground for payment purposes. Additions to the ready mix grout at the site are not allowed. Ready mix grout must be used within two hours from the initial batch time, or within four hours if using an approved set retarder. Dispose of remaining grout not pumped within the time limit at no additional cost to the Department.

III. CONSTRUCTION -

(a) CONTRACTOR QUALIFICATIONS

A specialty contractor with a minimum of five years of documented limited mobility grouting experience is required, and shall have the following qualifications:

1. Must be a specialty contractor regularly engaged in limited mobility grouting work.

2. Successfully completed at least five similar limited mobility grouting projects within the last five years. Similar projects shall be those performed to achieve a similar purpose (i.e. soil densification, void filling, sinkhole mitigation, or indirect support of pavements or structures).

3. Provide a full-time grouting superintendent with at least five years of experience in limited mobility grouting. The superintendent must also have successfully completed at least three limited mobility grouting projects using the methods and procedures required by these specifications.

(b) SUBMITTALS

1. Contractor Qualifications: Submit the information necessary to show compliance with the required Contractor qualifications at least 21 days before the start of work. Submit job descriptions, references that may be contacted, superintendent and key personnel resumes, and lists of equipment to be used on this project. Include among the references owners and engineers familiar with the Contractor's performance of limited mobility grouting on specific projects.

Provide Contractor's detailed information concerning at least five similar limited mobility grouting projects within the past five years, including the following information for each project at least 21 days before the start of grouting work:

- Name and Location of Project
- Total Dollar Value of the Limited Mobility Grouting Portion of the Work
- Quantity of Limited Mobility Grout Placed
- Equipment Used
- Grout Mix Design
- Drilling Methods and Depths
- Name of Site Superintendent or Foreman in Charge of the Grouting
- Name, Phone Number, and Address of Owner
- Name, Phone Number, and Address of Design Engineer

2. Equipment and Materials List: Submit an equipment list for approval indicating the manufacturer, model, type, and capacity of all equipment to be used for grouting and monitoring. Submit list of materials to be used for approval. Submit appropriate documentation regarding the control of materials as specified in Section 106.

3. Grouting and Operations Plan: Submit a detailed grouting and operations plan describing operations for drilling, grouting, and monitoring for the approval. Include sequence of grouting the holes; methods of drilling, sealing and extracting risers; mixing, pumping and delivery of the grout; monitoring; and all other aspects of the grouting operations. Include examples of all daily records and operations logs to be used during drilling and grouting operations. Include provisions to prevent damage to surface or subsurface structures, utilities, and other facilities to remain. Also include a detailed description of the verification testing program including materials, equipment, and drilling and testing procedures. Submit the grouting and operations plan for review and approval 21 days before initiating the work. Be sure to include a contingency plan for grouting operations detailing how pressure spikes or low or high volume takes are to be addressed. Provide 72-hour advanced notice of changes to the proposed grouting schedule, including work hours, night/weekend work, number of crews, etc.

Submit a procedure for cleaning out the grout hoses when checking for pressure spikes or grout plugs for approval.

Submit as directed locations of primary and secondary grout holes on the Grouting Location Plan. Drill and grout additional holes as directed. Additional holes will be added based on the review of the drilling and grouting results. Adjust the hole locations indicated on the Grouting Location Plan as necessary, with the approval of the Department, for equipment access, subsurface structures and utilities, and other factors affecting the drilling and grouting.

4. Grout Mix Design: Submit a grout mix design to achieve the specified strength, pumpability, consistency, and slump for approval.

5. Daily Records and Operation Logs: Submit daily records and operations logs generated during the grouting operations as described herein. Records include drill logs, grout mix logs (or batch logs), grouting logs, QC testing results, grout testing results, movement monitoring logs, verification testing results, and other instrumentation monitoring reports related to the LMG Program. Submit records of the previous day's work within 24 hours of the work shift. Submit records that are neat, legible, and orderly. Follow the guidelines for record keeping according to Publication 293, Appendix C – Use and Guidelines for Limited Mobility Grouting.

6. Recommendations for additional holes and verifications testing based on a review of the grouting results. The Department will review the recommendations and make the final decision if additional holes or verification testing is required.

(c) UTILITIES: Locate all utilities and modify drill hole locations, with approval of the Representative, so there is no damage to existing in-service or abandoned pipes, drains, utilities, or other underground structures.

(d) EQUIPMENT

1. General: Provide drilling and grouting equipment of a type, capacity, and mechanical condition necessary for doing the work, as indicated. Typically, this includes a mixer, a pump, hoses, pipes, gauges, drilling equipment, and riser pipe extraction apparatus. Provide equipment capable of: re-circulating grout to purge the lines and adjust the grout consistency between injections; providing accurate control of grout injection rate; and measuring volume injected into each stage. All equipment used to convey the grout under pressure must be rated for a safe working pressure in excess of the pressure used of 1,500 pounds per square inch or greater.

2. Preconstruction Test Program: Before commencement of work, demonstrate in the presence of the Representative at the job site that the proposed equipment, methods, and grout mix meet the specifications, and that the mechanical condition of the equipment is satisfactory by pumping a test mix and performing test injections at locations specified. Demonstrate all monitoring and measurement devices and orient the Representative to the equipment operation and arrangement as part of this program. Familiarize the Representative with computer output or reports provided relative to monitoring of grouting operations. Replace equipment found to be inadequate of achieving the project requirements at no additional cost to the Department. Do not substitute equipment after commencement of the work, unless approval is given in writing. If, during the course of grouting, the Representative determines equipment is not operating satisfactorily, remove it immediately and replace with approved equipment at no additional cost to the Department.

3. Drilling and Riser Equipment: Provide drilling equipment to penetrate concrete, soil, rock, and other materials that may be encountered during the installation of risers, and to the depth as indicated. Deeper holes may be required. Use drilling equipment capable of installing the risers with less than a 1/4-inch annular space between the riser pipe and the inside of the drilled hole. The drilling equipment may be pneumatic, hydraulic, percussion, or rotary. It is required that the drilling equipment be of a type that advances the casing during the drilling. Use environmentally safe grease/lube for threaded connections and environmentally safe oils for drill hammers.

4. Pump: Provide a piston-type positive-displacement grout pump with a maximum theoretical pump stroke of 0.3 cubic feet or less, or a material cylinder diameter of 4.0 inches or less. Use a pump capable of continuously injecting stiff cement grout with a slump between 0.5 and 2 inches, at controllable rates from 0.2 to 2 cubic feet per minute, at continuous pressures of at least 600 pounds per square inch, as measured at the top of the riser pipe. Calibrate the stroke volume and volume displacement rate of the pump by pumping into a container of known volume of 1 cubic foot or

larger. Utilize a stroke counter or other approved volume measurement device to provide a record of volume injected in each stage. Provide equipment for the calibration of the volume measurement device and perform calibration at the start of the work and when required.

5. Grout Delivery Line: Provide high-pressure flexible hose, or a combination of hose and rigid pipe, that is watertight under the full range of grout pressures to be used, and with an internal diameter between 2 and 3 inches. All couplings and fittings should be the full inside diameter of the delivery line. Where elbows are required in the line, use wide-sweep (large bend radius) fittings; sharp bends and diameter changes in lines and fittings are not allowed. Use delivery line components, including couplings, in good condition and rated to a pressure no less than 1,500 pounds per square inch. Immediately replace components that are damaged, worn, or no longer watertight. Perform a pressure test of the delivery line to confirm it operates as specified.

6. Pressure gauges: Provide calibrated new pressure gauges with capacities of zero to at least 600 pounds per square inch, but no greater than 1,000 pounds per square inch, and a minimum dial gauge face diameter of 3 inches for readability. Provide pressure gauges marked in 10 pounds per square inch divisions for the full scale, with a minimum accuracy of one-half division. Provide gauges to cover replacement and recalibration without a delay in work. Submit calibration certificates showing that calibrations were performed within six months of the start of work for each gauge before utilizing the gauge. Place gauges at the top of the injection riser and also at the pump. Provide gauge savers of type full-contact diaphragm or equal. Maintain and replace pressure gauges as necessary to provide accurate readings throughout the work. Alternate digital pressure monitoring devices may be acceptable if calibrated to equal or greater accuracy and approved. Keep pressure gauges clean and in mechanically-sound condition at all times.

7. Grout Mixing Equipment: Provide on-site grout mixing equipment capable of mixing, stirring, pumping, and delivering the grout as indicated. Maintain the grout mixing equipment in optimum operating condition at all times. Ensure grout mix is homogeneous and does not contain pockets of dry mix. Furnish at least one mechanically driven, screw or pug mill-type grout mixer capable of effectively mixing and stirring stiff cement grout having a slump as low as 0.5 inch.

A batch mixer may also be used, where quantities of materials are measured and blended into each batch. Provide mixing equipment capable of continuously metering accurate quantities of materials in the grout mix. Provide a mixer with means of dispensing the stiff cement grout directly to the grout pump.

Replace grout holes lost or damaged due to mechanical failure of equipment, inadequacy of grout supply, or scheduling conflicts, by drilling and grouting another hole at no additional cost to the Department.

8. Measurement Equipment:

a. Grout Measurement Equipment: Provide equipment for performing accurate and rapid measurements of grout quantities injected, and quantities of water, filler, cement, and additives used for mixing. Demonstrate and calibrate all measurement systems and equipment before the start of grouting. Provide measurement equipment capable of measuring grout quantities to the nearest 0.1 cubic feet.

b. Movement Monitoring Equipment: Provide a rotating laser level, or other approved means, to measure ground surface movement during the grouting. Monitor for heave of the ground surface and nearby structures at a minimum of three points for each grout injection location. Provide monitoring equipment capable of accurately measuring movements of 0.01 feet or less. Monitoring equipment should only alarm (or provide positive indication) when movement has occurred and not when the point is resting at the neutral position. If heave occurs, soils are being displaced upward and are not being compacted. Ensure movement of the actual ground surface is monitored, not the relative movement between the measuring device and injection site.

c. Grout Monitoring Equipment: Provide automated equipment capable of monitoring and recording grout pressure, injection rate, and cumulative grout volume take versus time for each grout stage. Equipment must be capable of providing a summary report of recorded data displayed in an easy to read graphical format showing continuous plots of pressure, injection rate, and cumulative grout volume take versus time for each grout stage. Provide the reports for each day's grouting no later than 24 hours after grouting has taken place. Provide an on-site means of checking the calibration of the equipment for pressure, flow rate, and cumulative grout volume take.

(e) MIXES

1. Grout Mixes: Proportion mixes as specified in the approved mix design. Provide a grout consisting of cement, filler, and water. Use other approved additives, as needed, per the approved mix design.

2. Mix Proportions: Vary the constituents of the grout to achieve a pumpable low slump mix, while still meeting the criteria as specified in Part II. (a) Grout. Thicken or otherwise modify the mix so that grout does not form lenses or exude from the ground surface around the injection pipe. Reduced slump, addition of fine gravel to the grout, or both may be required where open voids are encountered. Submit proposed changes to the grout mix for approval.

(f) NUMBER AND LOCATION OF HOLES: The numbers and locations of limited mobility grouting holes are as indicated. Estimated top and bottom of grouting zone are also as indicated. Additional limited mobility grouting holes may be added by the Representative based on the results of the grouting operations.

(g) DRILLING AND INSTALLATION OF RISER PIPE

1. Drill and install riser pipe into the bedrock or designated competent bearing stratum. Install the riser pipe from the ground surface to the bottom of the production drill hole. Use the following drilling termination criteria, or as directed:

a. Drill at least the minimum depths as indicated;

b. Terminate production drill holes in rock a minimum of 2 feet beyond voids or soil seams; and

c. Terminate production drill hole only when at least 4 feet of the final 10 feet of the production drill hole is drilled through rock.

Do not advance production drill holes beyond the depths as indicated unless a void or soil filled zone is encountered within 2 feet of the termination depth as indicated, or as approved. Subsequent series holes should be drilled to a minimum depth equal to the lowest stage take of 25 cubic feet or more of the adjacent hole from a previous series, or as directed.

2. Where air or water circulating equipment is used, maintain continuous circulation and control the air or water pressure to prevent fracturing of the soil overburden and bedrock. Carefully monitor and control pressures and flow rates during drilling of the top 10 feet below ground surface, to reduce the potential for ground heave. Should heaving or other displacement be noted during drilling, cease drilling until the procedure can be modified to prevent such damage. Include movement monitoring during drilling operations as directed.

3. Provide dust control measures during drilling operations. Dust control measure include (but not limited to) the use of water, diffuser drums, filters, and tarps.

4. For each hole, maintain a drill log, including:

- Hole ID
- Top of hole elevation
- Total depth of riser installed
- Drilling method(s) used
- Depth of soil overburden
- Top of rock elevation
- Rock penetration rate and drilling times
- Possible voids, fractured zones, and other conditions noted during the drilling
- Drilling fluid communication between the drill hole and adjacent holes that have not yet been grouted
- Area of possible voids or soft soil zones
- Fractured zones, depth of rock and soil zones
- Groundwater level measurement
- Header information of log should include: SR, section, ECMS number, S-Number, substructure unit, hole number, date and time drilling was started, date and time drilling was completed, drilling company, driller's name, drill inspector's name, equipment used to drill the hole, top of hole elevation, and date and time hole grouting was started and completed.

Submit drilling records within 24 hours of the work shift the holes were drilled.

5. Fit the riser tightly within the drill hole. If necessary, backfill the annulus using uniformly-graded fine dry sand (such as play sand) to achieve a tight fit. An annular space of more than 1/4-inch around the riser will not be allowed.

6. Install risers in the order indicated on the approved Grouting and Operations Plan. Drill and set risers vertically at all hole locations unless otherwise directed. The Representative may direct that holes be drilled at an angle up to 30 degrees maximum from the vertical.

7. Riser pipes withdrawn during limited mobility grouting may be reused after thoroughly cleaning to remove grout and soil.

8. A hole where a riser pipe cannot be withdrawn is considered lost. Lost holes must be backfilled with grout and replaced with a new hole, at no additional cost to the Department.

9. Do not drill holes within a minimum of 10 feet of a hole where grout injection has been performed within the past 24 hours.

(h) GROUTING

1. In the Grouting and Operations Plan, include provisions to prevent damage to surface or subsurface structures, utilities, and other facilities to remain. Avoid drilling within 3 feet of utilities. Do not inject grout within 10 feet horizontally or vertically of utilities, unless otherwise indicated.

2. Sequencing of Grouting: In general, each row of primary grout holes should be sequenced so that grouting proceeds from each end of the row towards the center of the row. Do not drill secondary holes until after adjacent primary holes have been grouted. Drill tertiary holes (if required) only after adjacent primary and secondary holes have been grouted. Drill additional hole series only if directed based on review of grouting results.

3. Procedures: Perform all grouting operations in the presence of the Representative, who will independently observe pumping rates, pressures used, and grout volumes injected. Monitor the grouting and maintain records as specified in "Record Keeping" outlined below. Specific grouting procedures will be determined by the subsurface conditions; however, adhere to the general procedures in the following guidelines:

a. Use grout lines and fittings of the same uniform inside diameter. Avoid sharp bends and diameter reductions in the lines and fittings. Control the injection rate to prevent pressure from building up too rapidly during injection.

b. Perform grouting using Upstage Grouting, as defined previously. The bottom of the first stage is the bottom of the drilled grout hole. Inject grout in 2-foot stages or as indicated on Contract Drawings, starting from the bottom of the hole and proceeding upward to the cutoff injection depth. Just before grouting each stage, extract the riser to the top of the stage. Above the cutoff injection depth, as the riser pipe is being withdrawn, backfill the remainder of the hole with grout to fill the hole. Do not place additional grout under pressure during backfilling. Where holes are situated in paved areas, backfill the hole with LMG to the bottom of the pavement section to allow for subsequent patching of the pavement.

c. Pumping (Injection) Rate – Before production grouting, and during the Limited Mobility Grouting Preconstruction Test Program, determine the optimal pumping rate by slowly increasing the rate until the pressure shows a sudden drop, indicating that hydrofracturing has initiated. Use the pumping rate slightly lower than the rate resulting in the sudden pressure drop, as the production pumping rate; however, do not exceed a maximum pumping rate of 2 cubic feet per minute when densifying soil zones or displacing groundwater. If directed, a pumping rate of up to 4 cubic feet per minute may be used to grout zones of air-filled voids. At the discretion of the Representative, injection rates may be reduced to as low as 0.5 cubic feet per minute for placement adjacent to critical structures and in sensitive subsurface conditions observed during drilling and grouting operations.

Monitor the grout pressure. While grouting at a determined production rate, if there is a sudden drop in pressure, reduce the injection rate below the rate that the pressure drop occurred. The pumping rate may need to be adjusted as different subsurface conditions are encountered.

d. Grouting Pressure - Continually observe grout pressure, and control grout pressure by varying the pumping rate to maximize the volume of grout injected. Lowering of pumping rate may be necessary to prevent hydrofracturing, sudden loss of grout pressure, or ground heave. Before performing production grouting, determine line loss by measuring the pressure necessary to pump the grout at 1.5 cubic feet per minute from the top to the end of casing with the various anticipated lengths of grout hose and riser pipe. Provide the line loss calculation to the Representative. Determine measured grout pressure minus the measured line loss to determine net grouting pressure.

Document events such as sudden pressure changes, pressure spikes, excessive pressure to start grout movement through grout lines and risers, and variation of pumping rate at a constant pressure. Address these events by proposing changes to the grouting procedure. All changes must be approved.

e. Grouting Refusal Criteria -

1. A grout stage will be judged complete when one of the following refusal criteria is met. Note that all pressures should be measured at the top of the riser.

- Pressure Refusal - Grout flow ceases at a maximum injection gauge pressure reading of at least 600 pounds per square inch for depths greater than 30 feet below the ground surface, and 400 pounds per square inch for depths shallower than 30 feet below the ground surface.
 - Heave - Ground or structure movement is detected in excess of 0.01 feet, or tilt of a surface structure is detected. Terminate pressure grouting at a hole if cumulative ground heave in excess of 0.04 feet (1/2 inch), or cumulative surface structure or pavement movement of 0.02 feet (1/4 inch), is observed. The remainder of the hole will be backfilled with grout to fill the hole, but no additional grout will be placed under pressure.
 - Pressure and Volume Refusal - A volume of more than 12 cubic feet of grout is injected in a given stage at a gauge pressure of 150 pounds per square inch or greater.
 - Volume Refusal - A volume of more than 100 cubic feet of grout is injected in a stage. If the grout take in two consecutive stages exceeds 100 cubic feet per stage, suspend grouting in that hole for a minimum of 12 hours before grouting the next stage.
- Note: Refusal pressures and volumes indicated may be adjusted in the field due to the proximity of sensitive soils, adjacent structures, or due to observations made during the grouting operations.

2. At each grout hole, terminate injection of grout under pressure at a depth as indicated, unless otherwise directed. As the riser pipe is being withdrawn, the remainder of the hole will be backfilled with grout to fill the hole, but no additional grout will be placed under pressure.

f. Upon meeting grout refusal, extract the riser the required stage length. Repeat the grouting process until reaching the designated pressurized grout injection cutoff depth. Inject grout continuously as the riser pipe is raised between stages to minimize the chance for hole collapse.

g. Secure risers against lifting under reaction to the grout pressures in the hole. Where a riser lifts under pressure from the grout before completing a stage, reinstall the riser to the required top of stage depth, secure the riser pipe, and re-grout until the stage refusal criteria is met.

h. If grout connects to the annular space between the riser pipe and the hole, the hole is to be abandoned, properly backfilled, and replaced at a location determined by the Representative. If grout connects to the annular space because the annular space was more than 1/4-inch around the riser, the hole is to be replaced at no additional cost to the Department.

4. Record Keeping: Maintain grouting logs for each hole that documents stage depths, changes in grout mix, and grout injection volumes for each stage, including pressures, injection rates and refusal criteria for each location grouted; remarks concerning movement monitoring; and other information about the grouting including line loss. An example field grout log provided in Publication 293, Figure C.6.7.2-1. Minimum additional requirements for documenting each hole grouting operation include:

- Hole ID
- Top of hole elevation
- Total depth of riser installed
- Depth of soil overburden
- Top of rock elevation
- Groundwater level measurement
- Connections to adjacent holes (pushing groundwater) or other observations during grouting
- Header information of log should include: SR, section, ECMS number, S-Number, substructure unit, hole ID, date and time grouting was started, date and time grouting was completed, grouting contractor, grouting foreman's name, grouting inspector's name, equipment used to grout the hole, top of hole elevation, and date and time hole grouting was started and completed.

Submit drilling records within 24 hours of the work shift the holes were drilled.

5. Closure Criteria and Additional Grout Holes: As grouting of the primary and secondary hole locations progresses, present the results of the grouting in a format that indicates grout take per hole and grout take per stage so that an evaluation can be made by the Representative concerning grout takes and procedures. Submit grouting records for completed grout holes within 24 hours of completion of the work shift the holes were grouted. Drill and grout additional holes adjacent to production hole according to the following closure criteria:

Closure Criteria - Maximum Grout Take per Stage: 25 cubic feet

As grouting progresses submit recommendations for additional holes based on the grouting results. The need for additional primary, secondary, and tertiary grout holes beyond the stated closure criteria will be determined by the Representative based on their review of the Contractor's recommendations and the Representative's independent review of the grouting results and verification testing results.

At the completion of secondary grout holes, tertiary grout hole locations may be selected by the Representative at their discretion. Install tertiary grout riser pipes at the location(s) and depth(s). Grout the additional hole(s) as outlined above, or as otherwise directed.

(i) MOVEMENT MONITORING

1. Ground, Structure and Utility Monitoring: Continuously monitor ground and structure movement while pumping grout. Monitor potential movements near the riser and within a minimum radius of 15 feet from the injection point, or to whatever distance is required to monitor and prevent uncontrolled heave or damage to existing structures. At each grout hole where injection is occurring, monitor a minimum of three points on the ground surface within 2, 8, and 15 feet from the injection point, and additional points as required to prevent damage to pavements, foundations, utilities, conduits or other structures. Monitor all points continuously during grout injection. Monitoring equipment should only alarm, or provide positive indication, when movement has occurred and not when the point is resting at the neutral position. Note heave on the grouting log, indicating the nature and magnitude of the movement, and stage of grouting when it occurred.

(j) HOLE LAYOUT & TOLERANCES

1. Grout Hole Layout: Lay out the grout holes as indicated and additional primary, secondary and tertiary grout holes as required. Determine the elevation of all holes, to the nearest 0.1 feet, with reference to a benchmark established using the project vertical datum.

2. Grout Hole Tolerances: Locate grout holes within 0.25 feet of the approved plan location and align grout holes within one degree of vertical, unless otherwise indicated or directed.

(k) PROTECTION OF WORK AREA AND CLEANUP - During the work operations, take such precautions as may be necessary to prevent drill cuttings and dust, equipment exhaust, oil, wash water and grout from defacing or damaging the surrounding area, structures, and passing traffic. Furnish such pumps as may be necessary to manage wastewater and waste grout from operations and clean up all waste in a timely manner.

(l) RESTORATION - Remove and properly dispose of all excess grout or other debris generated as part of the work. Fill all holes with grout to the surface through the riser as it is extracted. Patch all cored holes in the pavement section with a non-shrink cement grout, as directed. Restore work, staging, and laydown areas to pre-existing conditions, unless otherwise indicated.

Repair damage to structures and utilities caused by the grouting. Submit a repair plan for review and approval before performing repair work.

Restoration and repair must be completed to the satisfaction of the Representative before final payment.

(m) QUALITY CONTROL

1. General: All drilling and grouting is to be performed in the presence of the Representative. Establish and maintain quality control for all operations to assure compliance with specifications and maintain records of quality control for all operations. Assure that drilling and grouting equipment is provided and kept in good mechanical condition, that the work complies with all requirements of the specifications, and that work areas are protected and properly cleaned up.

2. Grout Testing:

a. Perform slump tests according to PTM No. 601 and AASHTO T 119 (or alternative ASTM C143), with the exception that the material is not rodded between lifts as the cone is filled. Test slump for each batch of grout, at the pump hopper, with a minimum of one test per ten cubic yards of batched material. Perform a minimum of one slump test per grout hole, and whenever a change in grout consistency or appearance is noted.

b. Provide at least one gradation analysis of soil used in the grout for every 10,000 cubic feet of grout, and whenever a change in the appearance of the grout or the soil is noted.

c. Take samples of grout daily, and when the grout mix changes, for strength testing. Take four cylinders for each sample and mark with the date and time of day taken. Use minimum cylinder size of 4 x 8 in. Break one cylinder at seven days, two at 28 days, and the remaining cylinder held. Test the cylinders at an approved testing laboratory. Prepare, cure and test the grout samples according to PTM Nos. 604 and 611.

3. Limited Mobility Grouting Preconstruction Test Program:

a. Before the start of production limited mobility grouting, perform a test grouting program using the proposed production limited mobility grouting equipment and procedures. The purpose of the test program is to evaluate whether or not the proposed equipment, methods, and grout mix meet the specifications.

Unacceptable grout behavior includes: grout that is not pumpable; grout that dry-packs in the hoses or riser pipes; grout that exceeds the required slump; grout that extrudes around the riser pipe annulus at the ground surface; grout that does not exhibit a stiff, mortar-like consistency; or grout that hydrofractures the overburden soil mass, as indicated by a steady rise in grout pressure with injection followed by a sudden drop-off in injection pressure.

Determine the optimal pumping rate as specified in Part III. (h) GROUTING.

If the results of the test program are not satisfactory, adjust the grout mix, equipment, or procedures in an appropriate manner and perform a new test program at no additional cost to the Department.

b. The scope of the program is as follows:

Determine line loss by measuring the pressure necessary to pump the grout at 1.5 cubic feet per minute from the top to the end of riser pipe with the various anticipated lengths of grout hose and riser pipe needed for production grouting. Provide the line loss calculation to the Representative.

Install a minimum of four limited mobility grout test columns at approved locations near the proposed work, outside of the limits of the proposed grouting treatment area. Test column locations must be a minimum of 10 feet from production holes, and a minimum of 10 feet must be maintained between adjacent test grout columns.

The test columns must be installed using the design grout mix and drilling and grouting equipment to be used for the production grouting work.

Install the test columns to the depth as indicated for the Production Holes. Install the columns using 2-foot grout stages and the grouting refusal criteria. Verification testing consisting of one boring drilled in the center of the test column pattern is required for soil densification and compaction LMG applications.

Prepare installation logs and records for each column and submit for review before commencing production grouting.

4. Verification Testing (Standard Penetration Testing/Rock Coring):

Perform verification testing after some or all of the Primary Holes have been drilled and grouted, and as directed. Adjustments to the grouting program or additional drilling and grouting may be required depending on the result of the soil and rock sampling.

a. Prequalification of Drilling Contractors – The driller must be on the PennDOT list of Prequalified Drilling Contractors in Publication 222. Before start of drilling, submit the name of the driller, the equipment to be used and personnel qualifications for approval.

b. Test Boring Specifications – Perform test borings according to the Standard Specifications of Section 200 in Publication 222. Termination of the borings will be determined in the field by the Representative. Do not terminate a test boring in voids. When directed, grout all test borings full depth using cement grout.

1. Mobilization: According to Section 201 in Publication 222.

2. Soil Borings with Continuous SPT Sampling: According to Section 202 in Publication 222.

3. Unsampled: According to Section 202 in Publication 222.

4. NX or NQ Rock Coring: According to Section 204 in Publication 222.

5. Grout Backfill in Soil or Rock: According to Section 210 in Publication 222.

c. Submit legible, hand-written logs within 24 hours of drilling and sampling.

5. Daily Records and Logs: Review daily record and logs for completeness and accuracy. Verify records and logs conform to the requirements provided by Publication 293, Appendix C – Use and Guidelines for Limited Mobility Grouting.

6. QC Reports: Furnish a copy of quality control documents or records as they become available, and a record of corrective action(s) taken.

IV. MEASUREMENT AND PAYMENT -

Materials, equipment or operations not specifically noted for payment, but necessary for completing the final work, are considered incidental to the various items of work.

(a) Item No. 9000-XXXX Grout Hole Setup. Each.

Includes moving and setting up equipment for drilling and grouting operations at each required grout hole location associated with the Limited Mobility Grouting activities. Includes labor, materials and equipment necessary to mobilize drilling, grouting and support equipment from a hole location, or a location within the work zone, to another hole location; and to ready the equipment for the intended operation once at the hole. Only one Grout Hole Setup will be paid for each hole, regardless of the number of drilling and grouting operations required to successfully complete the hole. Item applies for the test grouting program and production grouting.

(b) Item No. 9000-XXXX Injection Hole Drilling. Linear Foot.

Cased hole advanced through soil or rock, for the test grouting program and for production grouting.

(c) Item No. 9000-XXXX Limited Mobility Grout. Cubic Foot.

For furnishing and placement of limited mobility grout, injected into the ground only, during the test grouting program and for production grouting at an injection rate of between 0.5 – 2.0 cubic feet per minute, as determined during the Preconstruction Test Program. No payment will be made for grout wasted incidental to the work, or due to mechanical failure, scheduling conflicts, or excessive slump. This includes, but is not limited to, grout wasted while cleaning out hoses, riser pipes, pumps, etc.; grout remaining in the delivery truck that cannot be placed; grout wasted due to exceeding the allowable time from batching; and grout that is rejected for improper slump, uniformity or consistency.

(d) Item No. 9000-XXXX Verification Testing, Mobilization. Lump Sum.

(e) Item No. 9000-XXXX Verification Testing, Soil Borings with Continuous SPT Sampling. Linear Foot.

Includes backfilling with sand-cement grout.

(f) Item No. 9000-XXXX Verification Testing, Unsampled. Linear Foot.

Includes backfilling with sand-cement grout.

(g) Item No. 9000-XXXX Verification Testing, NX or NQ Rock Coring. Linear Foot.

Includes backfilling with sand-cement grout.

Project Specific Details:

Special Provision: **I62B - c00062 Electronic Ticketing (e-Ticketing) for Construction**

Item(s) Associated:

Header:

ITEM 9000-5100 ELECTRONIC TICKETING SYSTEM

Provision Body:

I. DESCRIPTION - This work is providing an electronic ticketing system for (*aggregate, concrete, or asphalt*) deliveries to the project, to report individual and cumulative loads of material delivered during the construction process.

II. MATERIAL - The electronic ticketing system must be fully integrated with the load read-out system at the plant. The system software and hardware must prevent alteration of the data inputs from the scales. For acceptance on a project, the electronic ticket must contain the following information:

-Aggregate (*Delete aggregate e-Ticketing requirements if not needed*)

- ECMS Number or Purchase Order Number
- Plant Supplier Code
- Material Type/Class/Number
- Date and Time Ticketed
- Unique Truck ID
- Mass (Weight), Gross, Tare, Net
- Name and license number of Licensed Public Weighmaster
- Running Daily Total in Tons of material being transported

-Concrete (*Delete concrete e-Ticketing requirements if not needed*)

- ECMS Number or Purchase Order Number
- Plant Supplier Code
- Class of concrete
- JMF number
- Date and Time Ticketed
- Unique Truck ID
- Net Cubic Yards of concrete being transported
- Indicate total yards shipped to total yards ordered

-Asphalt (*Delete asphalt e-Ticketing requirements if not needed*)

- ECMS Number or Purchase Order Number
- Plant Supplier Code
- Material Type/Class/Number
- JMF Number
- Date and Time Ticketed
- Unique Truck ID
- Mass (Weight), Gross, Tare, Net
- Running Daily Total in Tons of material being transported

- Name and license number of Licensed Public Weighmaster

III. CONSTRUCTION -

(a) Construction Requirements.

1. Submit details of the proposed electronic ticketing system to the Department for approval at least 30 days before material is delivered to the project. Submission must occur at the preconstruction meeting or through PPCC. Include details for how supplemental paperwork and certifications will be delivered to the Department.
2. Incorporate the electronic ticketing system process into the Contractor's applicable QC Plan.
3. If the project site or material supplier cannot support electronic ticketing, develop an alternative means to deliver tickets in real time. This may include, but is not limited to, the submission of paper delivery tickets. If an alternative delivery method is used, e-Tickets shall be sent between the producer and the Department at the end of the shift. Confirm all e-Ticketing requirements with the Department at the preconstruction meeting or at the project's pre-placement meeting.
4. Provide access to the electronic ticketing system to personnel identified by the Representative or in the QC Plan.

(b) Data Deliverables.

1. Provide to the Representative via iOS apps or web browser in real-time so report summaries can be gathered. Provide a field for the Representative to add comments pertaining to the material on each ticket. Record the user's name for all entered and updated information.
2. Provide access to all ticket information in a CSV or Excel file to the Department.
3. Maintain an internet connection with a minimal bandwidth of 10Mbps or the minimum bandwidth recommended by their e-Ticketing software vendor, whichever is smaller.

IV. MEASUREMENT AND PAYMENT – Lump Sum.

For all costs related to providing an electronic ticketing system and all equipment required for the reporting process.

Project Specific Details:

Special Provision: **I63A - c00063 Repair of Detour Route on Posted Roadways**

Item(s) Associated:

Header:

ITEM 9000-XXXX - REPAIR OF DETOUR ROUTE ON POSTED ROADWAYS

Provision Body:

I. DESCRIPTION –

This work is the repair of damage to the detour route identified herein. Perform repair work according to Publication 408 and as directed.
(list details here)

II. MATERIAL – Furnish material for repair work that is compatible with the existing roadway, as determined by the Department.

III. CONSTRUCTION – Repair or reconstruct damaged roadway to restore the profile and/or cross slope to original or like condition.

IV. MEASUREMENT AND PAYMENT – Dollar.

The proposal will include an item and a predetermined amount of money for this item. The contract item will have a unit of measure of Dollar, a unit price of \$1.00, and a quantity equal to the predetermined amount.

Section 110.02(d) is not applicable to this item.

Work performed as repair of detour route will be paid under this item, measured by determining the actual amount of equipment, tools, labor, material, and engineering required to perform the work and paid as follows:

(a) Contract Items. For performance of work, identified as having similar items listed in the contract, the contract price will be paid.

(b) Non-Contract Items. Items of work not identified in the contract will be paid as follows:

1. Negotiated Price. At an agreed upon price. This price will be agreed upon with the Department before performing the work. When applicable, agreement is also required with the FHWA.

2. Force Account Basis. Section 110.03(d)

Project Specific Details:

Special Provision: **I64A - c00064 Roadway Condition Inspection and Video Log of Detour Route**

Item(s) Associated:

Header:

ITEM 9000-XXXX - ROADWAY CONDITION INSPECTION AND VIDEO LOG OF DETOUR ROUTE

Provision Body:

I. DESCRIPTION –

This work is performing a narrated video documentation of the before and after conditions of all posted roadways that are to be used as part of the proposed detour route.

II. MATERIAL –

Video Record – created digitally in DVD Storage Format and in color.

III. CONSTRUCTION –

(a) General

Schedule the initial video documentation at a mutually agreeable date and time before the detour route is implemented, such that the District Posted and Bonded Roads Coordinator (***Enter Coordinator name and phone number***) must be in attendance.

Complete the initial video documentation of (***Enter the Road Name and From/To description***). Include in the video recording the pavement condition, pavement markings, driveways and other roadside feature within the Right-of-Way. Include in the video recording a verbal narration at 100 foot maximum intervals along the roadway identifying the location along the detour route.

Submit a copy of the initial video documentation to the Representative. If detouring traffic onto a weight restricted roadway, the Representative must distribute the inspection materials to the District Posted and Bonded Roads Coordinator.

Schedule the final video documentation at a mutually agreeable date and time after the detour route is removed and needed repairs are completed, that the District Posted and Bonded Roads Coordinator must be in attendance.

Complete the final video documentation, after the detour is removed, of the route that was video recorded before the detour. Include in the video recording the pavement condition, pavement markings, driveways and any other roadside feature within the Right-of-Way. Include in the video recording a verbal narration at 100 foot maximum intervals along the roadway identifying the location along the detour route.

Submit a copy of the final video documentation to the Representative and District Posted and Bonded Roads Coordinator for approval.

(b) Video Requirements

High Definition (HD) Digital Video – 1080i/p preferred, 720p minimum.

(c) Submission Requirements

Submit a digital video recording in MPEG-4 file format or acceptable variant determined by the Representative on a DVD or USB drive.

IV. MEASUREMENT AND PAYMENT – LUMP SUM

Paid for in two (2) payments, according to the following schedule:

50% of the Lump Sum amount will be paid upon approval of the initial video documentation.

50% of the Lump Sum amount will be paid upon approval of the final video documentation.

Project Specific Details:

Special Provision: **D1070B - c01070 ITEM 8910-YYYY - PERMITS FOR DESIGN-BUILD PROJECTS**

Item(s) Associated:

Header:

ITEM 8910-YYYY - PERMITS FOR DESIGN-BUILD PROJECTS

Provision Body:

I. DESCRIPTION -This work is the preparation of and obtaining approval for all permits necessary to construct the project as indicated in the contract documents and signed Final Design Drawings.

II. DESIGN –

(a) Department-obtained permits. The following permits have been obtained by the Department for construction of this project: *(Select from the list permits that have been obtained for the project, delete those not obtained. If no permits have been obtained, state “None”)*

US Army Corps of Engineers Section 404 Permit

PA DEP Water Obstruction and Encroachment Permit 105/404

PA DEP GP-1 Fish Habitat Enhancement Structures

PA DEP GP-2 Small Docks and Boat Launching Ramps

PA DEP GP-3 Bank Rehabilitation, Bank Protection and Gravel Bar Removal

PA DEP GP-4 Intake and Outfall Structures

PA DEP GP-5 Utility Line Stream Crossing

PA DEP GP-6 Agricultural Crossings and Ramps

PA DEP GP-7 Minor Road Crossings

PA DEP GP-8 Temporary Road Crossings

PA DEP GP-11 Maintenance, Testing, Repair, Rehabilitation, or Replacement of Water Obstructions and Encroachments

Generic Permit EXX-9999

PA DEP PAG-02 General NPDES Permit for Stormwater Discharges Associated with Construction Activities

PA DEP Individual NPDES Permit for Stormwater Discharges Associated with Construction Activities

PA DEP Erosion and Sediment Pollution Control Permit

Erosion and Sediment Pollution Control (E&SPC) Plan (Section 102)

PA DEP Section 401 Water Quality Certification

PA DEP Flood Plain Management Permit (Section 106)

PA DEP Coastal Zone Consistency Determination Permit

US Coast Guard Navigational Permit

(b) General. Obtain the following permits for construction of this project: *(Select correct permits from the list for the contractor to obtain for the project, delete those not required or obtained by the Department and listed in (a) above)*

US Army Corps of Engineers Section 404 Permit

PA DEP Water Obstruction and Encroachment Permit 105/404

PA DEP GP-1 Fish Habitat Enhancement Structures

PA DEP GP-2 Small Docks and Boat Launching Ramps

PA DEP GP-3 Bank Rehabilitation, Bank Protection and Gravel Bar Removal

PA DEP GP-4 Intake and Outfall Structures

PA DEP GP-5 Utility Line Stream Crossing

PA DEP GP-6 Agricultural Crossings and Ramps

PA DEP GP-7 Minor Road Crossings

PA DEP GP-8 Temporary Road Crossings

PA DEP GP-11 Maintenance, Testing, Repair, Rehabilitation, or Replacement of Water Obstructions and Encroachments

Generic Permit EXX-9999

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PA DEP Erosion and Sediment Pollution Control Permit

Erosion and Sediment Pollution Control (E&SPC) Plan (Section 102)

PA DEP Section 401 Water Quality Certification

PA DEP Flood Plain Management Permit (Section 106)

PA DEP Coastal Zone Consistency Determination Permit

US Coast Guard Navigational Permit

All permits must comply with Environmental Commitments and Mitigation Measures.

The following documents are attached (FOR INFORMATION ONLY) to facilitate the preparation of the permit submissions: ***(Select correct documents from the list for the project)***

- Preliminary Drainage and Storm Water Management Hydraulic Computations
- Hydrologic and Hydraulic Report
- Conceptual Erosion and Sediment Pollution Control Plan
- Conceptual Storm Water Management Plan

The approved ***(Insert environmental document - Categorical Exclusion Evaluation or Environmental Assessment)*** is available on the Department's CE/EA Expert System. ***(If the Environmental Assessment is not available on the CE/EA Expert System, delete the previous sentence and insert the following;)***

The approved Environmental Assessment is included the Project Development Checklist on ECMS. ***(Delete if not needed)***

Be responsible to ensure that all plans and documents are relevant and current for the appropriate permit submissions. Application fees will be waived for permits submitted on behalf of the Department.

1. Erosion and Sediment Pollution Control (E&SPC) Plan. Prepare and submit the E&SPC Plan to the *(Insert County Conservation District or Pennsylvania Department of Environmental Protection, as required)* for review/approval, as applicable.

2. NPDES - If an NPDES Permit is required, develop and submit the NPDES Permit Application to the *(Insert County)* County Conservation District for review/approval. The Contractor responsible for earthmoving activities on the project will become co-permittee with the Department on the NPDES Permit.

The review of the E&SPC Plan, Erosion and Sediment Pollution Control Permit and NPDES Permit Application by the *(Insert County)* County

Conservation District will be according to the policies of the conservation district. The Contractor will be responsible for accounting for the review time of the E&SPC Plan and NPDES Permit by the conservation district in the project schedule.

3. Waterway Permits - Prepare and submit the *(Insert appropriate permit(s) from list)* Permit(s) Application in accordance with the conditions of the permit(s). Use of the KEES Keystone Environmental System *(is/is not)* required. Do not commence construction activities until the applicable waterway permit(s) are obtained.

III. MEASUREMENT AND PAYMENT – Lump Sum.

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- NPDES Permit Application Initial Submission
- NPDES Permit Issuance
- Waterway Permit Application Initial Submission
- Waterway Permit Issuance
- Erosion and Sediment Pollution Control Permit Application Initial Submission
- Erosion and Sediment Pollution Control Permit Issuance

(Add other permit components as necessary)

Project Specific Details:

Special Provision: **D1072A - c01072 ITEM 8911-YYYY - UTILITY RELOCATION INFORMATION FOR DESIGN/BUILD PROJECTS**

Item(s) Associated:

Header:

ITEM 8911-YYYY - UTILITY RELOCATION INFORMATION FOR DESIGN/BUILD PROJECTS

Provision Body:

I. DESCRIPTION - The utility relocation coordination for contract document *(Insert Contract Document Number)* has not been finalized as this is a *(full or partial)* Design/Build Project and final design is not completed. This work is the coordination of any and all utility facility relocation required to complete the project within the project limits as shown on the *(Contract or Conceptual)* Drawings.

II. COORDINATION

Coordinate all utility work required to complete the project. Perform the following, at minimum:

- Contact all utilities identified or having facilities within the project limits within 7 calendar days from the issuance of the Notice to Proceed and thereafter in intervals not to exceed 30 calendar days, and provide updates to the District Utility Administrator (DUA) as to plan development and updated estimates in calendar days for completion of utility relocations for both the utility and contractor;
- Incorporate all utility relocation design and resulting relocation arrangements into the Schedule;
- Coordinate required utility relocation highway occupancy permits and utility reimbursement agreements through the DUA; and
- Coordinate the relocation of any utilities affected by the project. If the utilities claim a real property interest within the project limits, then forward the reimbursement documents including real property interest documentation to the DUA immediately upon receipt. The DUA will forward the information to the Central Office Utility Relocation Unit (COURU) so determination can be made on the real property interest.

Assign a Utility Coordination Manager to this project. *(Delete if utility relocations are not complex)*

Be responsible for the cost and delay of any additional utility relocation that results from changes in the Contractor's plans or construction sequences made subsequent to (1) acceptance of the utility's relocation plans and (2) where the utility has physically moved its facilities based upon those relocation plans.

For all utility relocation coordination activities, follow the procedures as provided in Publication 16, Design Manual Part 5, Utility Relocation.

Throughout the project, upon taking appropriate action, forward all utility documents and correspondence to the DUA for recordation.

Review and approve all documents associated with the utility relocation process requiring signatures within 5 working days of receipt and forward to the DUA for an expedited 30 working day review. The DUA in turn will forward to the Central Office Utility Relocation Unit all documents requiring Central Office approval. Working days are as specified in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VII.

Verify the following list of utilities and contact all utilities within the project limits, including any utilities within the project limits not listed.

Utilities:

(List the Utilities on the project, along with contact names and phone numbers)

III. MEASUREMENT AND PAYMENT – Lump Sum

Full payment for Utility Coordination will be made upon completion of all utility facility relocations on the project. *(Modify as necessary to account for complex relocations to be completed by project stages, and where temporary relocations must be restored to original locations)*

Project Specific Details:

Special Provision: **P2031A - c02031 ITEM 9203-0100 - SELECT BORROW EXCAVATION, STRUCTURE BACKFILL, TIRE DERIVED AGGREGATE**

Item(s) Associated:

Header:

ITEM 9203-0100 – SELECT BORROW EXCAVATION, STRUCTURE BACKFILL, TIRE DERIVED AGGREGATE

Provision Body:

I. DESCRIPTION – This work is the construction of embankments and structure backfills incorporating tire derived aggregate (TDA).

II. MATERIAL – Section 206.2(a)1, and as follows;

(a) TDA. Shred tires only by a shearing process to the following physical characteristics and with at least one sidewall severed from the tread of each tire.

1. Gradation.

- Not more than 1% (by mass) having a maximum dimension, measured in any direction, greater than 18-inches.
- Not more than 10% (by mass) having a maximum dimension, measure in any direction, greater than 12-inches.
- That meets the following gradation:

SIEVE SIZE	PERCENT PASSING
8-inches	75-100%
3-inches	50% maximum
1.5-inches	25% maximum
No. 4	1% maximum

2. Metal Belts.

- Less than 1% (by mass) of loose metal fragments.
- At least 75% (by mass) of TDA with metal fragments encased in rubber that do not protrude more than 1-inch from the cut edge of TDA.
- At least 90% (by mass) of TDA with metal fragments encased in rubber that do not protrude more than 2-inches from the cut edge of the TDA.

3. Deleterious Materials – Provide TDA that is not burnt, is free of petroleum-based products, and ice and snow.

4. Fines and Organic Matter. Provide TDA with not more than 1% (by mass) of soil, fine rubber fragments, and organic matter such as grass, leaves, wood fragments, etc.

(b) Geotextile. Section 735, Class 4, Type A.

(c) High-strength Geotextile. Section 735 and that meets the following property requirements:

Property	Test Method	Property Requirement (minimum)
Apparent Opening Size (AOS)	ASTM D4751	No.20 sieve
Water Permittivity	ASTM D4491	0.02/sec.
Tensile Strength,	ASTM D4595	600 lb./in.
Minimum in machine direction		
Tensile Strength,	ASTM D4595	300 lb./in.
Minimum in x-machine direction		
Secant Modulus at 10% strain	ASTM D4595	1,600 lb./in.
Grab Strength	ASTM D4632	250 lb.
Puncture Resistance	ASTM D4833	90 lb
Tear Strength,	ASTM D4533	90 lb.
Minimum in machine and x-machine direction		
Burst Strength	ASTM D3786	400 psi
Ultraviolet (UV) Radiation Stability	ASTM D4355	70% Strength Retained (min.) after 500 hours in weatherometer

(d) Drainage Trench. Section 703.2, AASHTO No. 8, Type A or B.

(e) Embankment Material, Soil. Section 206.2(a)1.a.

III. CONSTRUCTION – Section 206.3, and as follows;

(a) Site Preparation. Prepare the embankment foundation area in accordance with Section 201 and compact as specified in Section 206.3(a). If granular working mats are required, construct as specified on the construction drawings, and then place high-strength geotextile. Overlay with material satisfying Section 206.2(a)1.a, the full

width of the embankment with a minimum thickness of 2 feet. Grade final foundation surface to 3% outward slope.

(b) Placement and Compaction. Construct drainage trenches as indicated on construction drawings. Place separation geotextile on the final foundation surface before placing the bottommost TDA lift. Overlap adjacent layers 18-inches. Construct bottommost TDA lift by placing and spreading TDA in the direction of the geotextile overlap to prevent lifting. Place a minimum of 12-inches of TDA on the geotextile before allowing equipment to traverse the area. Compact TDA in maximum 12-inches lifts for the entire width of the embankment with six passes of a vibratory smooth drum roller with a minimum static weight of 20,000 pounds. Overbuild the top of each TDA layer as indicated on the construction drawings. Enclose (fully wrap) each TDA layer with geotextile.

Construct all soil layers between TDA layers, top slopes and side slopes using embankment material satisfying Section 206.2(a)1.a. Place and compact embankment material satisfying Section 206.3(b)1 and as indicated on the construction drawings. Construct 1 foot wide drainage outlets adjacent to the base of each sideslope of the TDA layer. Place drainage outlets with a 50-foot spacing with an outward slope of 3% using AASHTO No. 8 aggregate.

Maintain a minimum separation distance of 4.3 feet between the top of TDA layer and the top of the pavement.

(c) Abutment and Wing Wall Areas. Within 3-feet of abutment or wing walls do not use equipment weighing more than 3,000 pounds. Place TDA lifts with a maximum thickness not to exceed 12-inches. Compact each lift using six passes of a walk behind vibratory smooth drum, vibratory tamping foot, or vibratory sheepsfoot roller with a minimum static weight of 1,500 pounds and a maximum static weight of 3,000 pounds. Do not use vibratory plate compactors.

Align and install weep holes at the base of the bottommost TDA lift. Construct drainage zone using 3.5 cubic feet of AASHTO No. 8 aggregate wrapped in geotextile at the inlet of each weep hole.

(d) Surcharge. Construct an additional surcharge of common borrow to an elevation 12-inches above the final grade and leave in place for a period of 30 days. Leave the surcharge in place for 60 days in areas where TDA layers are placed directly against bridge abutments. Remove common borrow used as surcharge and regrade and recompact to elevation indicated.

IV. MEASUREMENTS AND PAYMENT – Section 206.4, and as follows:

(a) TDA. Cubic Yard, In-place volume. Drainage trenches are incidental to the work. Placement and removal of the additional surcharge of common borrow will be considered incidental to construction of the TDA fill.

(b) Geotextile, Class 4, Type A. Section 212.4(d).

(c) Embankment Material, Soil. Section 206.4(a).

(d) High Strength Geotextile.

Placement is incidental.

(e) Common Borrow. Section 205.4(a)

Excavation to remove the surcharge is incidental.

Project Specific Details:

Special Provision: **I2032D - c02032 ITEM 9203-2101(ITEM 9203-0101) - TEMPORARY**

EXCAVATION SUPPORT AND PROTECTION SYSTEM

Item(s) Associated:

Header:

ITEM 9203-2101 (ITEM 9203-0101) - TEMPORARY EXCAVATION SUPPORT AND PROTECTION SYSTEM

Provision Body:

I. DESCRIPTION - This work is the design and construction of a temporary excavation support and protection system or appropriately designed open cut excavation, as indicated, with a service life of less than or equal to 36 months.

II. MATERIAL - Provide certification or laboratory test results verifying material properties. For used steel, the salvage design values from AASHTO Guide Design Specification for Bridge Temporary Works (AASHTO Guide Spec) may be used as an alternate to testing to determine grade of steel. Materials need not be new but must be in serviceable condition as determined by the Representative. Temporary material used does not have to be from a Bulletin 15 source, but must meet the following:

- Structural Steel.....AASHTO M 270 (ASTM A709M/A709) Grade 36, Grade 50 or Grade 50W, ASTM A992, ASTM A588, Section 1105
- Steel Sheet Piling.....ASTM A328, ASTM A572, Section 1105
- Steel H-Piles.....AASHTO M 270 (ASTM A709M/A709), Grade 36 or ASTM A572 Grade 50, Section 1105
- Wood Lagging.....Rough Cut Species in AASHTO Guide Spec Appendix A and AASHTO Construction Handbook for Bridge Temporary Works Appendix C
- Cement.....AASHTO M85 and AASHTO M240, Section 701
- Pre-Stressing Steel.....ASTM A416 Grade 270, Section 1107
- Welded Wire Fabric.....ASTM A1064, Section 709
- Reinforcement Bars.....AASHTO M 31 (ASTM A615) ASTM A616 Grade 60, ASTM A706 Grade 60, Section 615 and/or Section 709
- Other Material.....As specified in applicable Sections of Publication 408

III. DESIGN - Design the temporary excavation support and protection system in accordance with current AASHTO LRFD Bridge Design Specifications, Design Manual Part 4, FHWA guidelines, and AASHTO Guide Spec. Design temporary excavation support and protection system for final condition and all construction conditions, including surcharge loads due to vehicle traffic and construction equipment. Submit design calculations and completed detailed drawings signed and sealed by a Professional Engineer registered in the Commonwealth of Pennsylvania to the District Executive or Representative via the PennDOT Project Collaboration Center for review. Include in the design calculations all material properties, design loads, and design assumptions. Include on the completed detailed drawings all design dimensions, limits of work, elevations, material, member sizes and construction sequence. Provide cutoff elevation of steel and wooden components for work in streambed. Include specific installation procedures and testing requirements as part of the submittal. Allow 14 days for the review by the Department.

Ensure that temporary excavation support and protection system design and construction conforms to the following:

(a) Open cut excavations are allowed, provided they meet OSHA requirements, the safety of the traveling public, the approved traffic control plan, the support and safety of the existing structure is assured, and they stay within the legal right-of-way lines. Cuts can extend beyond legal right-of-way lines only with the written approval of the Department and written permission of the property owners. Ensure environmental compliance if cut extends beyond area cleared by the Department.

(b) Temporary embankment or soil cut slopes that do not require a stability analysis, must have the following required subsurface information available from existing subsurface exploration or as supplemented by additional subsurface investigation as a minimum:

- Soil and rock (if applicable) strata and orientation/slope of strata

- In-situ soil testing (Standard Penetration Testing (SPT) and/or Cone Penetration Testing (CPT)) for applicable soil layers
- Groundwater level(s)
- Laboratory classification test results including natural moisture content, sieve and hydrometer analyses, and Atterberg limits
- Laboratory Testing for shear strength parameters is to be performed wherever practical. For critical situations and conditions, laboratory testing of representative project specific materials to determine shear strength parameters is mandatory.
- Meet OSHA requirements for Type C soil, or better

b.1. A slope stability analysis is not required for temporary embankment slopes that meet all the following requirements:

- The proposed embankment is 20 feet or less in height measured vertically from the toe to the top of proposed embankment
- Proposed slope is 1.5H:1V or flatter
- Embankment will be constructed as specified in Publication 408, Section 206
- Estimated friction angle of foundation material to a depth of at least the height of the embankment is at least 30 degrees
- Ground slope beneath the embankment and 20 feet beyond the toe of the embankment is 4H:1V or flatter
- A structure is not proposed or currently within or above the slope
- For slope widening, in addition to above, the existing slope is 1.5H:1V or flatter, the existing embankment will be benched before fill placement, the estimated friction angle of the existing embankment is at least 30 degrees, and the existing embankment shows no indication of instability.
- Meet OSHA requirements for Type C soil, or better
- Conform to OSHA requirements, including, but not limited to, placement of spoil, ingress or egress, and inspection.

b.2. A slope stability analysis is not required for temporary soil cuts and soil cut widenings that meet all the following requirements:

- Proposed cut is 20 feet or less in height measured vertically from toe to top of proposed cut
- Proposed slope is 1.5H:1V or flatter
- Estimated friction angle of soil from top of cut to a depth of at least the height of the cut below the toe of cut is at least 30 degrees.
- Ground slope above the top of cut is 10H:1V or flatter and ground slope beyond the toe of the cut slope is less than 4H:1V.
- Groundwater level is at or below the toe of the proposed cut
- A structure is not proposed or currently within or above the slope
- For cut slope widening, the existing cut slope is as steep or steeper than the proposed cut and shows no indication of instability.
- Meet OSHA requirements for Type C soil, or better
- Conform to OSHA requirements, including, but not limited to, placement of spoil, ingress or egress, and inspection.

(c) A slope stability analysis is required when:

- a temporary soil cut is required to build a structure, install a utility,
- an embankment is steepened for maintenance and protection of traffic or
- if a structure is proposed or currently within or above the slope.

Use a minimum factor of safety of 1.2 for slopes less than 20 feet in height that do not have a structure within or on top of the slope and have high quality subsurface data. For slopes that do not meet those requirements, use a minimum factor of safety of 1.3. Use Department approved software for slope stability analysis.

(d) Select the appropriate temporary excavation support and protection system to be used. Examples include anchored walls, mechanically stabilized earth walls, prefabricated modular walls, cantilever walls, cofferdams, and soil nailing walls. These systems may be comprised of one or more of the following: Soldier Piles, Timber Lagging, Steel Sheet Piling, Caissons, Slurry Walls, Tiebacks, Soil Nails, Shotcrete, Deadman Anchors, Wales, Cross lot Bracing, Raker Braces, Precast Concrete, Precast Lagging, Soil Cement Lagging, Cement Bentonite, Gabions, Micropiles, Concrete Reaction Blocks, Mechanically Stabilized Earth Walls or other methods.

(e) Design temporary excavation support and protection system based on the following soil parameters: (see *Project Specific Details* for following parameters):

- Effective angle of friction _____
- Moist unit weight of soil _____
- Saturated unit weight of soil _____
- Effective cohesion _____
- Static groundwater level at elevation _____

- Undrained shear strength of cohesive soil _____
- Shear strength for rock mass _____

Provide other soil and rock properties with test data, needed in the design of the temporary excavation support and protection system.

(f) Ensure that all components stay within the legal right-of-way unless an easement is obtained by the Contractor.

IV. CONSTRUCTION - Install temporary excavation support and protection system as specified in applicable Sections of Publication 408. Be responsible for adequacy, safety and compliance with Traffic Control Plan. If the design is not compliant with the approved Traffic Control Plan, furnish any additional traffic control devices at no additional cost to the Department. All steel and wooden components may remain in place to pavement subgrade or 2 feet below finish grade, whichever is the higher elevation. Treated wood is not required unless it is within 6 feet of finish grade and is to remain in place. Pressure treat to American Wood Preservers Association (AWPA) Standard U1. Finish grade is defined as top of pavement when a roadway is behind the temporary excavation support and protection system. Have a Professional Engineer, registered in the Commonwealth of Pennsylvania, certify that the temporary excavation support system or open cut excavation has been installed as shown on the Professional Engineer's signed and sealed drawings. Submit the certification to the Representative within 3 working days of completion of the system. Treat field cuts according to AWP Standard M4.

V. QUALIFICATIONS - The work must be supervised by a superintendent or foreperson who is experienced in the construction of temporary excavation support and protection system proposed. If the design height of the temporary excavation support and protection system exceeds 20 feet, provide the following with the design submission:

- For the superintendent or foreperson who will supervise the work, submit a list containing at least five projects which demonstrate a minimum of 3 years experience in the construction of the temporary excavation support and protection system proposed. Include a brief description of each project and the name and phone number of the owner's representative knowledgeable in each project listed.
- The name of the Professional Engineer, registered in the Commonwealth of Pennsylvania and having at least 3 years experience in the design and construction of temporary excavation support and protection systems, who will design and specify the sequence of construction of the temporary excavation support and protection of system.

VI. MEASUREMENT AND PAYMENT - Lump Sum.

This item will be measured and paid for in a proportionate manner, designated by the Department.

If an acceptable open cut excavation is provided instead of the temporary excavation support indicated, payment will be made for the as-bid lump sum temporary excavation support item, but no additional payment will be made for any class of excavation, structure backfill or additional shoring as a result of the open cut excavation or to restore the facilities to their original condition.

Project Specific Details:

The Soil Parameters as indicated in III. (e) are:

- 1.a Effective angle of friction: (fill in here)
- 1.b Moist unit weight of soil: (fill in here)
- 1.c Saturated unit weight of soil: (fill in here)
- 1.d Effective cohesion: (fill in here)
- 1.e Static groundwater level at elevation: (fill in here)
- 1.f Undrained shear strength of cohesive soil: (fill in here)
- 1.g Shear strength of rock mass: (fill in here)

Special Provision: **P2121A - c02121 ITEM 9212-2101 (ITEM 9212-0101) - GEOSYNTHETIC CLAY LINER**

Item(s) Associated:

Header:

ITEM 9212-2101 (ITEM 9212-0101) - GEOSYNTHETIC CLAY LINER

Provision Body:

I. DESCRIPTION - This work is the furnishing and installation of a geosynthetic clay liner (GCL), for swale or retention pond lining with cover material, as indicated or directed.

II. MATERIAL - Provide a manufactured, prefabricated, 3 layered product consisting of the following:

(a) Sodium Bentonite - That meets the following:

- Swell Index of 24 ml minimum in accordance with ASTM D 5890.
- Fluid Loss - 18 ml minimum in accordance with ASTM D 5891.
- Granular and continuously adhered throughout the liner and to the support fabrics so that no displacement of bentonite occurs when the liner is cut, punctured, or torn.
- Bentonite Content - 3670g/m² (0.75 lbs./sq.ft) minimum in accordance with ASTM D 5993.
- Permeability 5×10^{-9} cm/second maximum in accordance with ASTM D 5084.

(b) Primary Backing. Non-biodegradable, non-toxic, porous, woven, slit-film, polypropylene geotextile that meets the following:

- 105 gm per square meter (3.1 oz. per square yard) minimum in accordance with ASTM D 5261.

(c) Secondary Backing. Non-woven geotextile, for protecting and containing the granular bentonite during installation that meets the following:

- 200 gm per square (6.0 oz. per square yard) meter minimum in accordance with ASTM D 5261.

(d) Bentonite/geotextile composite in rolls having a minimum width of 4.0 meters (13 feet).

- Tensile Grab Strength 400 N (90 lbs.) minimum in accordance with ASTM D 4632.

(e) Supply Geosynthetic Clay Liner in rolls marked and tagged with the following information:

1. Manufacture's Name
2. Product Identification
3. Lot Number
4. Roll Number
5. Roll Dimension
6. Roll Weight

Provide to the Department from the fabricator, prior to installation of the bentonite liner, a certification (with product identification, lot number, and roll number) signed by an authorized employee of the manufacturer indicating that the GCL material meets the required specifications.

III. CONSTRUCTION -

(a) General. Install in drainage ditches with 0.02 meters (8 inches) depth minimum cover over all lined areas, as indicated including overlaps at field seams and anchor trenches. Submit a proposed GCL placement method for approval by the Engineer. Use a core pipe and spreader bar to handle the GCL roll.

Store bentonite liners in their original, unopened wrapping in a dry area. Protect from precipitation and the direct heat of the sun, especially when stored for a long period of time. Store the materials above the ground surface and beneath a roof or other protective covering. Keep the bentonite liner clean and free from debris prior to installation.

(b) Grade Preparation. Provide a smooth subgrade, removing protrusions and rocks larger than 0.05 meters (2 inches). Do not begin liner installation until a proper base has been prepared to accept the bentonite liner. Complete anchor trench excavation before liner installation begins. Lock the leading edge of the GCL into the anchor trench as indicated. Uniformly compact subgrade to the line and grade as indicated. Do not allow construction equipment to operate directly on the liner without the support of an adequate depth of backfill as indicated.

(c) GCL Installation. Complete all excavation as indicated prior to GCL placement. Place the GCL over the prepared surface in a manner to assure minimum handling and in accordance with the manufacturer's recommendations. Place GCL with the woven side down. Install geosynthetic clay liner so that all seams on slopes are perpendicular to the bottom of the excavation i.e., toe of the slope. Place the cover fill material over the GCL immediately after placement, as indicated. All GCL placed must be covered the same day. Do not place GCL in standing water or during rain. Minimize dragging the GCL on the ground and smooth out creases or irregularities during placement. Do not allow the GCL to be stretched to fit the swale cross section or profile.

(d) Seaming and Patching. When placing adjacent panels of GCL ensure that the upstream GCL liner panel is lapped over the downstream panel with a minimum 0.16 meters (16 inches) overlap. Remove all soil from the overlap area of the GCL and place a bead of granulated bentonite clay between the layers as directed by the manufacturer. Cover irregular shapes, cuts, or tears in installed GCL with sufficient material to provide 0.31 meters (12 inches) of overlap on all adjacent sides as directed. Place a bead of granular bentonite around the damaged area. Place a bead of construction adhesive around the perimeter of the bottom of the repair patch to secure the patch in place prior to placing the cover material.

IV. MEASUREMENT AND PAYMENT - Square Meter (Square yard)

Includes excavation for and placement of geosynthetic clay liner.

Includes backfill over the geosynthetic clay liner after placement.

Project Specific Details:

Special Provision: **I4132A - c04132 Hamburg Wheel Track and Cracking Tolerance Index Testing**

Item(s) Associated:

Header:

Item 9000-XXXX Hamburg Wheel Track and Cracking Tolerance Index Testing

Provision Body:

**SUPERPAVE MIXTURE DESIGN, STANDARD AND RPS
CONSTRUCTION OF PLANT-MIXED ASPHALT COURSES**

I. DESCRIPTION - This work is the testing of asphalt binder and wearing course mixtures using the Hamburg Wheel Track (HWT) and Cracking Tolerance Index (CT_{Index}) test according to AASHTO T 324 and ASTM D8225, and reporting the results to the Department.

II. MATERIAL— Section 413.2, with the following modifications:

e. Mixture Composition for Standard and RPS Construction.—Section 413.2(e) with the following additions:

3. HWT and CT_{Index} Testing. For each Binder and Wearing Course JMF on the project perform and report the results of CT_{Index} testing as specified in Section 413.2(e)3.a and HWT testing according to 413(e)3.b for information only. Designate one or more laboratories to perform HWT and CT_{Index} testing. At least 2 weeks before starting mix design work, submit a work plan to the DME/DMM outlining the proposed HWT and CT_{Index} testing laboratory location, AASHTO Materials Reference Laboratory documentation for subcontracted laboratory, proposed mix designs to be tested, and all previous JMF testing data.

Designated laboratories may include the contractor's or producer's laboratory or an AASHTO re:source proficiency assessed laboratory that is proficiency assessed for Asphalt Mixture. Notify the DME/DMM 48 hours before samples are produced. The DME/DMM or their Representative will witness HWT and CT_{Index} sample production.

Submit the results of all HWT and CT_{Index} testing to the Department by the project final inspection.

3.a. CT_{Index} Testing Protocols. Perform CT_{Index} Testing according to ASTM D8225 modified as follows:

- Prepare all CT_{Index} test specimens from laboratory-produced asphalt mixture. Do not prepare CT_{Index} test specimens from field-produced asphalt mixture.
- Compact each CT_{Index} specimen to an air void content of 7.0 ± 0.5 percent.
- Condition loose asphalt mixture for $2 \text{ h} \pm 5 \text{ min}$ at $140 \pm 3\text{C}$ ($285 \pm 5\text{F}$) for PG 58S-28, $145 \pm 3\text{C}$ ($293 \pm 5\text{F}$) for PG 64S-22, or $153 \pm 3\text{C}$ ($308 \pm 5\text{F}$) for PG 64E-22 final asphalt binder grade of the JMF.
- Test compacted test specimens at a test temperature of $77 \pm 2\text{F}$ ($25 \pm 1\text{C}$).
- Report CT_{Index} test results according to ASTM D8225, Section 11.

3.b. HWT Testing Protocols. Perform HWT testing according to AASHTO T 324 modified as follows:

- Prepare all HWT test specimens from laboratory-produced asphalt mixture. Do not prepare HWT test specimens from field-produced asphalt mixture.
- Compact each HWT test specimen to an air void content of 7.0 ± 0.5 percent.
- Condition loose asphalt mixture for $2 \text{ h} \pm 5 \text{ min}$ at $140 \pm 3\text{C}$ ($285 \pm 5\text{F}$) for PG 58S-28, $145 \pm 3\text{C}$ ($293 \pm 5\text{F}$) for PG 64S-22, or $153 \pm 3\text{C}$ ($308 \pm 5\text{F}$) for PG 64E-22 final asphalt binder grade of the JMF.
- Test compacted test specimens in the HWT device at a test temperature of $122 \pm 2\text{F}$ ($50 \pm 1\text{C}$).
- Test compacted test specimens in the HWT device for a maximum of 20,000 passes or a maximum impression depth of 15 mm, whichever occurs first.
- Report HWT test results according to AASHTO T 324 and include all listed parameters.

IV. MEASUREMENT AND PAYMENT— Section 413.4, with the following additions:

c. HWT and CT_{Index} Testing. – Dollar

The contract item will have a unit measure of DOLLAR, a unit price of \$1.00, and a quantity equal to the predetermined amount.

Due to the contingent or unpredictable nature of the work being performed, the provisions of Section 110.02(d) are not applicable to this item.

Payment amounts will only include testing services. Initial sample mixing and gyration to the required air void content will be done by the asphalt producer at no additional cost to the Department. Payment will be \$1,500 for each wearing or binder course JMF on the project that HWT and CT_{Index} testing is completed and the results are reported according to 413.2(e)3.a and 413.2(e)3.b. Do not submit JMFs for payment that the HWT and CT_{Index} testing has been paid for under another contract.

Project Specific Details:

Special Provision: **P4493A - c04493 ITEM _____ - _____ SUPERPAVE MIXTURE DESIGN, STANDARD AND RPS CONSTRUCTION OF PLANT-MIXED**

Item(s) Associated:

Header:

ITEM _____ - _____ SUPERPAVE MIXTURE DESIGN, STANDARD AND RPS CONSTRUCTION OF PLANT-MIXED HMA OR WMA COURSES USING ASPHALT RUBBER BINDER

Provision Body:

I. DESCRIPTION—This work is the standard and RPS construction of standard gap graded plant-mixed HMA or WMA wearing course using asphalt rubber (AR) binder on a prepared surface using a volumetric mixture design developed with the Superpave Gyratory Compactor (SGC).

II. MATERIALS—

(a) Bituminous Material.

1. General. Furnish AR binder conforming to the requirements within this specification. Furnish a AR binder that is a reacted and uniform blend of a base bituminous material and Crumb Rubber Modifier (CRM). Furnish AR binder that does not exhibit CRM floating on the surface of the AR or agglomerations of CRM particles within the AR binder. Furnish an AR binder that is based on a binder design blend profile that includes blend proportions, production temperatures, and reaction times. Furnish an AR binder that meets the requirements specified within this specification and has demonstrated, through laboratory testing, that when the AR binder is mixed with aggregate in an asphalt mixture it provides equivalent rut resistance, when compared to the same mixture mixed with PG 76-22. Produce the AR binder according to the binder design blend profile and the Producer QC Plan. Produce and furnish AR binder meeting the physical requirements of ASTM D 6114, Table 1, Type II. Note - it has been found that at least 15% CRM by weight of the total blend is usually necessary to provide acceptable binder properties of AR. Report the actual CRM content in the binder design profile.

1.a Base (Virgin) Bituminous Material [Performance Graded Asphalt Binder (PGAB)]. Provide and use a base bituminous material from a source listed in Bulletin 15 that is capable of meeting the requirements of Section II(a)1 after modification by the addition of CRM. Provide the grade and source of the virgin binder in the QC plan. Provide QC testing and certification as specified in Sections 106.03(b) and 702.1(b)1. Provide the Representative a copy of a signed Bill of Lading for bituminous material on the first day of paving and when the batch number changes.

When producing WMA (Asphalt Rubber Gap Graded) AR-GG mixtures, a WMA Technology may be provided or blended with the base PGAB as follows:

1.a.1 WMA Technology Additives or Modifiers Blended at the Bituminous Material Supplier Refinery or Terminal. Provide refinery or terminally blended bituminous material containing an approved WMA Technology additive or modifier from an approved WMA PGAB source listed in Bulletin 15. Include in the WMA PGAB Producer QC Plan the WMA Technology additive or modifier manufacturer name and source, dosage rates, blending method, QC testing, corrective action points, disposition of failed material, storage, handling, shipping, and bill of lading information following the applicable requirements in Section 702. Include the WMA Technology additive or modifier and dosage rate on the bill of lading. Provide certification that the refinery or terminally blended WMA PGAB meets the requirements of Section II(a)1.a for the indicated or selected grade of PGAB.

1.a.2 WMA Technology Additives or Modifiers Blended at the Bituminous Mixture Producer Plant. For WMA Technology additives or modifiers blended with the bituminous material at the bituminous mixture production plant, prepare a Producer QC Plan or an addendum to an existing Producer QC Plan as specified in Section 106 and conforming to the Producer QC Plan requirements in Section II (e)2.a. Provide QC testing of the base bituminous material blended with the WMA Technology additive or modifier and certify according to Section 106 and Section 702 that the blended base PGAB with the WMA Technology additive or modifier meets the requirements of the Section II(a)1.a for the indicated or selected grade of PGAB.

1.b CRM. Furnish processed CRM from a manufacturer listed in Bulletin 15. Certify, according to Section 106.03(b)3., that the CRM meets the CRM requirements as specified herein. Furnish and use CRM derived from the ambient temperature processing and granulating of recycled tires or derived from the tire retreading process (rubber tire buffings).

Provide the CRM in moisture resistant packaging containers consisting of disposable bags or bulk containers. Provide each packaging container labeled with the manufacturer name, manufacturer's designation for the CRM, CRM maximum nominal size, mass (weight), and manufacturer's batch or lot number designation.

Furnish and use CRM meeting the following requirements:

1.b.1 Gradation. Provide CRM that meets the following gradation as determined by sieve analysis according to ASTM D 5644 using 200 mm diameter sized sieves or Florida Department of Transportation, Test Method FM 5-559:

Gradation of CRM

Sieve Size	Percent Passing
2.36 mm (No. 8)	100
1.18 mm (No. 16)	75-100
600 μ m (No. 30)	20-75
300 μ m (No. 50)	5-30
75 μ m (No. 200)	0-5

1.b.2 Contamination, Moisture, and Specific Gravity. Provide and use CRM that is relatively free from fabric, fibers, metal, and other non-rubber materials. The CRM may contain up to 4% by mass (weight) of calcium carbonate or talc to prevent sticking and caking of the CRM particles and to ensure the CRM is free flowing. Determine the total percentage of other contaminants by separating out the other contaminants from the test sample and determining the total mass (weight) of the other contaminants to the nearest 0.1 g (0.004 oz). Provide and use CRM meeting the following requirements:

CRM Requirements

Requirement	Test Method	Criteria
Metal Contaminants	FM 5-559 (Note 1)	0.01%
Fabric/Fiber Contaminants	(Note 2)	Maximum 0.5%
Other Contaminants	(Note 3)	Maximum 0.25%
Specific Gravity	FM 5-559 (Note 1)	1.10 to 1.20
Moisture Content	FM 5-559 (Note 1)	Maximum 0.75%

Note 1: Florida Department of Transportation, Test Method.

Note 2: Determine the percentage of fabric/fiber contaminants by separating the fabric/fibers from the CRM particles in a 100 ± 1 g test sample and determining the total mass (weight) of the fabric/fibers to the nearest 0.1 g and calculating percentage by dividing the mass (weight) of fabric/fibers by the mass (weight) of the original sample and multiplying by 100.

Note 3: Determine the percentage of other contaminants by separating the other contaminants from the CRM particles in a 100 ± 1 g test sample and determining the total mass (weight) of the other contaminants to the nearest 0.1 g and calculating percentage by dividing the mass (weight) of other contaminants by the mass (weight) of the original sample and multiplying by 100.

1.c Rut Resistance Equivalency to PG 76-22. Design an AR binder to provide equivalent rut resistance as compared to a PG 76-22 from an approved manufacturer and source listed in Bulletin 15. Use PG 76-22 that has been tested and certified by the manufacturer to meet the requirements of Standard Specifications for Performance Graded Asphalt Binder, AASHTO M 320, except as revised in Bulletin 25. Determine equivalent rut resistance by conducting laboratory asphalt mixture rut resistance testing. Acceptable laboratory asphalt mixture rut resistance comparison test methods include AASHTO T 324, AASHTO T 340, or AASHTO TP 79, Procedure B, Unconfined.

For the comparison testing, use an asphalt mixture JMF to be used on the project with the only difference being the asphalt binder; one test mixture prepared with AR binder and one test mixture prepared with PG 76-22. If more than one crumb rubber modified JMF is used on the project, perform comparison testing using only one of the JMFs, but the JMF must be the JMF with the highest design Equivalent Single Axle Load (ESAL) range specified in the project. Prepare, mix and compact the two comparison asphalt mixtures in the exact same manner except for any specifics in mixing and compaction temperatures for the different asphalt binders. For all test methods compact all test specimens for use in the comparison testing to $7 \pm 0.5\%$ air voids. Rut resistance equivalency will be determined by comparison of test results between the asphalt mixture JMF using the as-designed AR binder and the same asphalt mixture JMF using the PG 76-22.

For AASHTO T 324, the AR binder and PG 76-22 rut resistance test results will be considered equivalent if the average rut depth measurements do not show a difference of more than 2.0 mm at either 20,000 cycles or 2.0 mm at the lowest number of cycles where one of the mixtures fails the test if the test automatically shuts off at a maximum rut depth value. Perform the test at a test temperature of 50 °C.

For AASHTO T 340, the AR binder and PG 76-22 rut resistance test results will be considered equivalent if the overall average rut depth measurements do not show a difference of more than 0.5 mm at 8,000 cycles when tested at 50 °C.

For AASHTO TP 79, Procedure B, Unconfined, the AR binder and PG 76-22 rut resistance test results will be considered equivalent if the difference in the average of $n=3$ specimens (each mixture) is within the multi-laboratory precision estimate $+ 5$ for the Nominal Maximum Aggregate Size (NMAS) of the tested JMF (e.g., the acceptable difference for a 9.5 NMAS mixture is $45+5 = 50$). Perform the test at a test temperature of 50 °C, a deviator stress of 600 kPa, and a seating load of 30 kPa.

1.d Terminal Blend AR Binder. If the AR binder is blended at an asphalt terminal, blend according to the design blend profile and Producer QC Plan. Prepare a QC Plan according to Section 702.1(a). Certify according to Section 702.1(b) and Section 106.03(b) except test the AR binder as required within this specification. Handle and transport according to Section 702.1(c).

1.e AR Binder Blended at the Asphalt Mixture Production Plant.

1.e.1 AR Binder Blending and Storage Equipment. Provide and use equipment designed for producing AR binder and capable of blending the base bituminous material and the CRM at the required proportions to produce a reacted and uniform AR binder. Ensure the equipment includes the following:

- A batch type or continuous type blending unit that provides accurate proportioning of the base bituminous material and the CRM by either weight or volume and is capable of thoroughly blending the individual CRM particles with the base bituminous material.

- A blending unit designed and accessible to the Representative that allows the Representative to readily determine the rate of proportioning for the base bituminous material and the CRM during production of the AR binder and provides a recordation of the base bituminous material and CRM proportions used to produce the AR binder.

1.e.2 AR Binder Production QC Testing. If the AR binder is blended at the asphalt mixture production plant, at least 3 weeks before its intended use, provide four 1-quart laboratory blended samples of the AR binder base bituminous material and CRM proposed for use on the project. Include the sources, grades, and proportions of the base bituminous material and CRM in the documentation.

Blend, produce, and test reacted AR binder according to the Producer QC Plan, at the frequencies identified in the Producer QC Plan, to meet the specified requirements. For QC testing, sample the reacted AR binder according to PTM No. 1 at the minimum frequencies below and provide a 1-quart split sample each time to the Department for verification testing.

- One sample per batch (batch blending)
- Two samples per day (continuous blending)

The Representative may direct the collection of additional random samples of AR binder in the presence of the Representative for Department verification purposes.

If the AR binder does not meet the specified requirements make appropriate adjustments in order to correct the blended material, and to correct the blending operation. These corrective actions, within the specified requirements of Section II(a)1., may include increasing the CRM content, lowering the blending temperature, changing the supply of CRM, or increasing the reaction time. Any change in the supply of asphalt or rubber shall include a verification of the design blend profile with the new material. In the event that the corrective actions fail to correct the problem, or the material consistently or frequently fails to meet the specified requirements, suspend all AR binder production operations and determine the cause of the problem. Provide a written explanation of the problem and a proposed solution to the Department. After the Representative reviews the problem and proposed solution and authorizes AR binder production to resume, resume production and sample and test the AR binder for the specified requirements and immediately provide the test results to the Representative. If the viscosity of the AR binder increases to the extent that plant production or paving operations of the mixture are adversely affected (i.e., density, pattern segregation, flushing, or texture problems occur), suspend AR binder production and paving operations and determine the cause of the problem. Provide a written explanation of the problem and a proposed solution to the Department. After the Representative reviews the problem and proposed solution and authorizes AR binder production and paving operations to resume, resume production and sample and test the AR binder for the specified requirements and immediately provide the test results to the Representative.

For each batch or continuous production lot of AR binder, provide the Representative with the following AR binder documentation:

- The source, grade, amount, and temperature of the base bituminous material before the addition of CRM.
- The source, gradation, and amount of CRM and the CRM content expressed as a percent by weight of the total AR binder.
- Dates and times of the CRM additions and resultant QC test results.
- A record of the temperature, with date and time reference, for each batch or continuous production lot. Begin recording from the time the CRM is added to the base bituminous material and continue until the batch or continuous production lot is used to produce asphalt mixture. Record temperatures at specific time intervals or at critical AR binder production points to monitor the AR binder production.

Provide a Certificate of Analysis (COA) for each batch or for each continuous production lot of AR binder produced stating that it meets the physical requirements of AASHTO M 320, as noted in Section II(a)1., based on the QC tests of the AR binder.

2. Virgin Mix, Mix Containing 5% to 15% RAP, or Mix Containing 5% Recycled Asphalt Shingles (RAS). Furnish AR binder as specified in Section II(a)1. Provide the Representative with a copy of a signed Bill of Lading for AR binder on the first day of paving when the batch number changes when providing terminal blended AR binder. Provide the Representative with a copy of the COA on the first day of paving and when the batch number changes when providing AR binder blended at the asphalt mixture production plant.

3. Mix Containing More than 15% RAP or Mix Containing Both 5% RAS and 5% or More RAP. The LTS will evaluate the asphalt cement in the RAP and, if applicable, the RAS source material. The LTS will determine the class (grade) of asphalt binder that the Contractor is required to use as the base bituminous material in the AR binder.

Furnish AR binder as specified in Section II(a)1. Provide the Representative with a copy of a signed Bill of Lading for AR binder on the first day of paving when the batch number changes when providing terminal blended AR binder. Provide the Representative with a copy of the COA on the first day of paving and when the batch number changes when providing AR binder blended at the asphalt mixture production plant.

(b) Aggregate.

1. General Requirements. Provide aggregate from sources listed in Bulletin 14. Provide aggregate conforming to the quality requirements specified for fine aggregate, coarse aggregate and filler. Provide coarse aggregate with at least the SRL designation specified. To achieve the specified SRL, the Contractor may provide a blend of two aggregates if the blend has an SRL designation equal to or better than that specified. Blends are 50% by weight of each aggregate. Blend the aggregates using a method approved by the District Materials Engineer/District Materials Manager (DME/DMM).

2. Fine Aggregate. Section 703.1 and as follows:

Determine the uncompacted void content according to AASHTO T 304, Method A, or use the value listed in Bulletin 14, and conform to AASHTO M 323, Table 5 for the specified design ESAL range. Determine the sand equivalent value according to AASHTO T 176 and conform to AASHTO M 323, Table 5 for the specified design ESAL range.

3. Coarse Aggregate. Section 703.2, Type A, except the Table C gradation does not apply and revise the following quality requirements of Table B:

Quality Requirement	Type A
Abrasion, Max. %	As specified in Bulletin 27, Chapter 2A, Table 5A
Thin and Elongated Pieces, Max. %	As Specified in AASHTO M 323, Table 5
Crushed Fragments, Min. %	As Specified in AASHTO M 323, Table 5 for Fractured Faces, Coarse Aggregate

4. Mineral Filler. Section 703.1(c)1. Do not use flyash if the design traffic is greater than or equal to 3 million ESALs. Furnish material with a maximum plasticity index of 4 as determined according to AASHTO T

90 and conforming to the grading requirements of AASHTO M 17. Submit a hydrometer analysis performed as indicated in AASHTO T 88 for mineral filler.

(c) Reclaimed Materials. Section 409.2(c)

(d) Filler. Section 409.2(d).

(e) Mixture Composition for Standard and RPS Construction. Section 409.2(e) with the following modifications and additions:

1. Virgin Material Mixtures. Develop a volumetric AR-GG mixture design using a SGC that can be produced through a mixing plant and that combines aggregate material fractions and AR binder material in proportions that conform to the mixture gradation and volumetric requirements as specified in Table A. Develop the volumetric AR-GG mixture design according to the Bulletin 27, Chapter 2A procedures except conforming to the materials, gradation and volumetric requirements specified for AR-GG mixtures.

After compacting SGC specimens containing AR binder, hold the specimen in the SGC with a sufficiently loaded top plate until the specimen cools a sufficient length of time to prevent swelling of the specimen that would affect the volumetric analysis of the compacted specimens.

If WMA Technology is used, Section 411.2(e) shall apply and the special SGC specimen handling above shall also apply.

TABLE A

Design Gradation and Design Volumetric Mixture Requirements for AR-GG Wearing Course Mixtures

Aggregate Gradation Requirements (Percent Passing based on dry aggregate weight)	
Sieve Size	12.5 mm NMAS AR-GG Mixture (Min. – Max.)
19.0 mm (3/4")	100
12.5 mm (1/2")	90-100
9.5 mm (3/8")	83-87
4.75 mm (No. 4)	28-42
2.36 mm (No. 8)	14-22
75 µm(No. 200)	0-6
Volumetric Mixture Design Requirements	
Parameter	Requirement
SGC Compaction Effort	As specified in Bulletin 27, Chapter 2A for the indicated Design ESAL Level
Design Voids in Mineral Aggregate (VMA), %	18.0 - 23.0
Binder Content, %	8.0 Minimum
Design Air Voids, %	3.5 - 4.0
Draindown	0.3% Maximum

Perform draindown testing according to AASHTO T 305 using a 1 hour reading. Design a AR-GG mixture meeting the requirements in Table A.

Submit a full copy of each completed JMF including a Form TR-448A, signed by a certified HMA Level 2 Plant Technician, to the DME/DMM at least 3 weeks before the planned start of mixture production. Include a list of all material sources and the AR-GG mixture producer on the Form TR-448A. Provide the ignition furnace calibration factors (Cf and 200 Cf) required by PTM No. 757 with the JMF. Do not start AR-GG mixture production until after the DME/DMM reviews the JMF.

Submit a new JMF when any material sources change or if a new JMF is necessary to produce the AR-GG mixture conforming to this specification.

2. Mixture Production.

2.a Producer QC Plan. Each Producer must prepare a QC Plan as specified in Section 106 and conforming to the additional QC requirements of this specification. Submit the QC Plan to the DME/DMM annually at least 3 weeks before the planned start of mixture production and do not start production until the DME/DMM reviews the QC Plan.

2.a.1 QC Organization Chart.

- Names of personnel responsible for QC.
- Area of responsibility of each individual.
- List outside agencies, e.g., testing laboratories and a description of services provided.

2.a.2 Testing Plan with Action Points.

- List of all tests to be performed on each material.
- Lot size and frequency of testing of each material.
- List action points to initiate corrective procedures.
- Recording method to document corrective procedures.
- Procedures for conducting JMF verification testing.
- Procedures for certifying the blended AR binder and produced mixture.
- Disposition of materials not meeting specifications.

2.a.3 Materials Storage, Handling and Methods of Blending or Mixing.

- Base bituminous material storage.
- CRM storage and method of blending with base bituminous material.
- WMA Technology additives storage and method of blending or mixing.
- Blended AR binder storage, minimum reaction time before mixing with aggregates, and method of mixing with aggregate
- Aggregate and RAM stockpiles.

- Cold-feed systems for aggregates and RAM.
- Surge/storage silos for mixture. Do not store more than one JMF in a surge/storage silo at any given time.
- All measuring, conveying, blending devices, including calibration procedures.
- Haul vehicle loading procedures.

2.b Plant Technicians. Section 409.2(e)1.b.

2.c Annual JMF Verification. At least 3 business days before the start of the initial annual production of each AR-GG JMF, notify the DME/DMM of the initial production start date. During initial production of each AR-GG JMF, verify according to the QC Plan, that the mixture conforms to all production requirements of this specification. If the mixture does not conform to all production requirements of this specification within 2 days of production, suspend shipping the mixture to the project. Do not resume shipping the mixture to the project until after the Representative reviews and verifies that results conform to all production requirements of this specification. During JMF verification, mixture acceptance is according to the method in this specification.

2.d Production. Size, uniformly grade, and combine AR binder, aggregate fractions, and reclaimed materials in proportions to conform to the JMF within the tolerances specified in Tables B and C.

After annual JMF verification, sample and test the mixture according to the QC Plan. For daily production of each JMF greater than 50 tons, determine asphalt content, gradation, and theoretical maximum specific gravity from the same sample at least once each day. For daily production of each JMF greater than 150 tons, determine asphalt content, gradation, theoretical maximum specific gravity, perform volumetric analysis of compacted specimens, and determine degree of particle coating from the same sample at least once each day. Perform additional sampling and testing as directed. Produce a mixture within the following production limits:

2.d.1 Apparent Moisture Content. Section 409.2(e)1.d.1

2.d.2 Asphalt Content. Section 409.2(e)1.d.2, except verify that the mixture conforms to the tolerances of Table B.

2.d.3 Gradation. Section 409.2(e)1.d.3, except RAP and RAS are not permitted and produce a mixture within the tolerances of Table B.

2.d.4 Theoretical Maximum Specific Gravity. Section 409.2(e)1.d.4

2.d.5 Volumetric Analysis of Compacted Specimens. Section 409.2(e)1.d.5, except produce a mixture with volumetric properties conforming to the tolerances of Table C.

2.d.6 Mixture Draindown. Sample the completed mixture according to PTM No. 1 a minimum of once each day of production. Determine percent draindown according to AASHTO T 305. Produce a mixture conforming to the maximum percent draindown in Table B.

2.d.7 Degree of Particle Coating. When producing WMA AR-GG mixtures, sample the mixture according to PTM No. 1 and at the frequency in the Producer QC Plan. Determine the degree of particle coating of the completed WMA AR-GG mixture according to AASHTO T 195. Produce a WMA AR-GG mixture with percent coated particles $\geq 95.0\%$, except $\geq 85.0\%$ for WMA AR-GG mixtures containing slag aggregate. Increase the plant mixing time or make other plant adjustments if the required percent of coated particles is not met. Produce a WMA AR-GG mixture capable of being handled, placed and compacted without stripping the AR binder from the aggregate.

TABLE B

**Plant Mixed Production Control Tolerances from the JMF for AR-GG Wearing Course Mixtures
(Based on Laboratory Sieve Tests, Square Openings)**

	Single Sample (n=1)	Multiple Samples (n ≥ 3)
Gradation		
Sieve Size		
Passing 19.0 mm (3/4") Sieve	±0%	±0%
Passing 12.5 mm (1/2") to 9.5 mm (3/8") Sieves	±5%	±4%
Passing 4.75 mm (No. 4) to 150 µm (No. 100) Sieves (Inclusive)	±4%	±3%
Passing 75 µm (No. 200) Sieve	±3.0%	±2.0%
AR Binder Content		
% by Mass (Weight)	±0.7%	±0.4%
Draindown		
% by Mass (Weight), Maximum	0.3%	
Temperature of Mixture (F)		
Class of Material	Minimum	Maximum
AR Binder	270	320
AR Binder with WMA Technology*	240	330
* When WMA AR-GG mixtures are produced, the minimum and maximum temperature of mixture is a master temperature range for a completed AR-GG mixture. The Producer must include, in the Producer QC Plan, a smaller completed mixture temperature range and compaction temperature range that does not exceed 50F and that does not fall outside the master temperature range. The Producer is required to compact the completed mixture in the SGC for QC volumetric analysis at the midpoint of the compaction temperature range in the Producer QC Plan. The Producer QC Plan mixture temperature range and compaction temperature range are to follow the guidelines provided by the WMA Technology Technical Representative or Manufacturer.		

TABLE C

**Volumetric Tolerance Requirements from the JMF of the Plant-Mixed, Laboratory
Compacted Mixture**

Volumetric Property	Each Specimen	Multiple Specimens
Air Voids at Ndesign (Va)	±2%	±1.5%
Minimum VMA % for 12.5 mm AR-GG mixtures	17.0	-

2.e Corrective Actions. Immediately take corrective actions if one or more of the following occurs during production:

- QC test results on a single sample (n=1) for percent passing the 4.75 mm (No. 4) sieve, the 2.36 mm (No. 8) sieve, the 75 µm (No. 200) sieve, or asphalt content are not within the tolerances in Table B.

- The average of multiple samples ($n \geq 3$) for percent passing any sieve or asphalt content, as determined according to Section II(e)2.d, are not within the tolerances of Table B.
- QC test results on a single specimen ($n=1$) or on multiple specimens ($n \geq 2$) are not within the tolerances in Table C.
- Draindown test results on a single sample ($n=1$) are not within the tolerances in Table B.
- Independent Assurance (IA) or QA sample results from testing performed at the Producer's plant laboratory are not within the tolerances of Tables B or C.

After taking corrective actions, sample the completed mixture within 150 tons of production. After sampling, test the mixture and provide test results to the Representative within 500 tons of production. If less than three samples are tested for mixture composition, determine conformance to Table B by comparing each test result to the multiple sample tolerances. If the mixture does not conform to the single and multiple sample tolerances in Table B and the single and multiple specimen tolerances in Table C, suspend production and shipping to the project and determine the cause of the problem. Provide a written explanation of the problem and a proposed solution to the Department. After the Representative reviews the problem and proposed solution and authorizes production and shipping to resume, resume production and perform JMF verification according to the Producer QC Plan. During corrective actions and JMF verification, mixture acceptance is according to the method in this specification.

(f) Mix Acceptance. Section 409.2(f)

(g) WMA Technology Requirements. Section 411.2(g), (h), (i) and (j)

III. CONSTRUCTION–

(a) Preplacement Requirements.

1. Paving Operation QC Plan. Section 409.3(a)1. and add the following:

When paving with WMA AR-GG mixtures, prepare and submit additional information specifically related to all aspects of the field control of WMA AR-GG mixture paving operations to the Representative as part of the paving operation QC Plan. Ensure the paving operation QC plan includes the recommendations and direction from the WMA Technology Technical Representative. Describe the construction equipment and methods necessary to control the WMA AR-GG paving operations including testing, delivery, placement, compaction, and protection of the WMA AR-GG pavement courses for all operations including handwork.

(b) Weather Limitations. Do not place AR-GG paving mixtures from October 1 to March 31 in Districts 1-0, 2-0 (except Juniata and Mifflin Counties), 3-0, 4-0, 5-0 (Monroe and Carbon Counties only), 9-0 (Cambria and Somerset Counties only), and 10-0; and from October 16 to March 31 in Districts 2-0 (Juniata and Mifflin Counties only), 5-0 (except Monroe and Carbon Counties), 6-0, 8-0, 9-0 (except Cambria and Somerset Counties), 11-0 and 12-0. No exceptions to paving weather limitations will be allowed, unless a written request is submitted with supporting reasons to the Representative and the request is approved in writing by the District Executive. Do not place AR-GG paving mixtures when surfaces are wet or when the air or surface temperature is 50F or lower. If work is halted because of weather conditions, the Representative may allow the Contractor to place limited quantities of mixture that are en route to the project.

(c) Bituminous Mixing Plant. Section 409.3(c) and when using WMA Technology, Section 411.3(c)

(d) Hauling Equipment. Section 409.3(d) except as follows:

Provide insulation on all sides of the truck body, a double-walled truck body, or a heated truck body when the air temperature is below 55F.

(e) Bituminous Pavers. Section 409.3(e)1.

(f) Rollers. Use steel-wheel, or vibratory rollers as specified in Section 108.05(c)3. Operate rollers according to manufacturer's recommendations. Use vibratory rollers with separate controls for vibration and propulsion. Use an appropriate additive to prevent roller pick up of the HMA or WMA.

Do not use rollers in vibratory mode unless it can be demonstrated during the trial demonstration specified in Section III(g) and to the satisfaction of the Representative that no breakage of aggregate or flushing of AR binder results from the vibration. Monitor pavement cores for aggregate breakage on every lot. Discontinue vibratory rolling if aggregate breakage or flushing of AR binder occurs.

(g) Demonstration. Before proceeding with the actual work, demonstrate to the Representative that the proposed AR-GG mixture can be produced, placed, and compacted to meet the requirements of this specification. Place a minimum of 100 tons for each trial demonstration. The 100 tons of demonstration pavement may be placed within or outside of project limits. Simulate the hauling time for the demonstration. Obtain and test three loose mixture samples at the plant for AR binder content and gradation and three pavement cores from the demonstration pavement for density. Test one set of volumetric specimens for Air Voids at Ndesign (Va) and test for one maximum specific gravity of the mixture value. If test results do not meet specification limits for both single and multiple sample tolerances for any parameter, perform another demonstration. Remove and replace any trial demonstration pavement placed within the project limits that does not meet specification limits.

This work is incidental to the wearing course. If vibratory rolling is proposed, demonstrate to the satisfaction of the Inspector-in-Charge that no breaking of aggregate or flushing of asphalt binder results from the vibration.

(h) Preparation of Existing Surface. Section 409.3(g)

(i) Spreading and Finishing.

1. General Requirements.

1.a Placing. Unless otherwise allowed, deliver, place, and compact AR-GG paving mixtures during daylight hours. Ensure the mixture does not contain lumps of cold material. Deliver and place AR-GG mixtures at the laying temperatures specified in Table B for the type and class of material used.

Use a Material Transfer Vehicle (MTV) as specified in Section 108.05(c)5. during placement of AR-GG mixtures. Have the MTV perform additional mixing of the AR-GG mixture and then deposit the mixture into the paver at a uniform temperature and consistency.

1.b Spreading and Finishing. Section 409.3(h)1.b and as follows: Plan and schedule operations to minimize hand work of AR-GG mixtures. Do not allow the finished pavement surface to flush. Flushing is continuous or repeated areas of excessive asphalt on the pavement surface. Areas that are determined to be flushed will be considered defective work.

1.c Field Technician. Section 409.3(h)1.c.

2. Pattern Segregation. Section 409.3(h)3.

3. Defective Pavement. Section 409.3(h)3.c.

4. Flushing. Section 409.3(h)4.

(j) Mixture and Density Acceptance.

1. Mixture Certification Acceptance. Acceptance by certification of AR-GG mixtures is appropriate for the following conditions or applications:

- Mixtures used by Department maintenance forces.
- Mixtures purchased by local or municipal governments.
- Mixtures placed in daily quantities not exceeding 450 tonnes (500 tons) in a continuous placement operation unless otherwise directed by the Representative.
- Other conditions or applications as approved by the Representative.

1.a General. Obtain certification from the mixture producer. Use all QC tests during mixture production as acceptance tests. Certify mixtures using Form CS-4171 or another acceptable form. Include, or attach, the QC test results on the form. Provide the form to the Inspector-in-Charge within 1 working day after completing the QC tests. Certify mixtures as specified in Section 106.03(b)3 and the requirements below.

1.b Certification of Mixture. Certify each mixture daily if QC test results conform to the single sample and multiple sample JMF production tolerances of Tables B and C. The acceptance values will be:

- AR Binder Content
- Percent Passing the 4.75 mm (No. 4) sieve
- Percent Passing the 2.36 mm (No. 8) sieve
- Percent Passing the 75 µm (No. 200) sieve

If using printed ticket results in place of laboratory test results for asphalt content, certify that at least 90% of each day's printed ticket results for AR binder content are within 0.2 percentage points of the JMF.

If the mixture does not conform to the above requirements, do not certify the mixture. Instead, provide all QC test results to the Inspector-in-Charge. If using printed ticket results for AR binder content, provide the percentage of daily printed ticket results within 0.2 percentage points of the JMF to the Inspector-in-Charge. Payment will be determined according to Section 409, Table H based on the QC test results.

If a day's production is interrupted by corrective action, material produced after the corrective action may be certified if QC test results conform to production tolerances.

1.c Maintaining Approval to Certify Mixtures. The Department may suspend a plant's approval to certify mixtures if QC is not performed according to the Producer QC Plan, mixtures are not produced according to Bulletin 27, a mixture cannot be certified on 2 consecutive production days, or as described below.

The Department may take IA samples of the completed mixture at the plant. In the presence of the Department, test the IA samples for asphalt content and gradation according to the test methods indicated in the Producer QC Plan. Take immediate corrective actions if the mixture does not conform to Table A.

The Department may take QA samples of the completed mixture at the plant or from directly behind the paver. The Department will test QA samples according to PTM No. 757 or PTM No. 702, Modified Method D, if previously identified problematic aggregates are used in the mixture, for conformance to Table B. If the results of the QA samples do not comply with Table B, review the Producer QC Plan and the QC test

results that followed the QA samples for conformance to Table B. If QC results do not conform to Table B, perform the corrective actions necessary to provide a mixture conforming to Table B.

After completing corrective actions or the sample review, the Department will perform an on-site evaluation of the Producer's plant operation and QC and then take a sample of the completed mixture at the plant. In the presence of the Representative, test the sample according to Section II.(e)2.d. If the sample does not comply with Tables B or C, the Department will suspend certification. Immediately suspend shipping mixtures accepted by certification to the project.

After testing verifies that the produced mixture conforms to Tables B and C and with the Representative present, conduct JMF verification according to the Producer QC Plan. After successfully completing JMF verification, resume both certification and shipping mixtures accepted by certification to the project.

2. Mixture Lot Acceptance. Lot acceptance is appropriate for construction placed in quantities that allow consistent operation of the plant.

2.a Lots and Sublots. Section 409.3(h)2.a, except that cores may be used in lieu of loose samples due to difficulty of performing hand work when repairing area where loose samples are taken.

2.a.1 Partially Completed Lots (n=2 or less). When process conditions change, to an extent that a partially completed lot cannot be combined with the most recently completed lot, samples will be independently evaluated on the partially completed lot. For AR binder content and percent passing the 75 μ m (No. 200) sieve, mixture acceptance samples will be evaluated individually using Section II.(e), Table B (n=1) criteria. For density, mat density acceptance samples will be evaluated individually using the criteria in Table D.

If samples tested for AR binder content and percent passing the 75 μ m (No. 200) sieve meet the n=1 criteria of Table B, and samples tested for density meet the criteria in Table D, payment will be 100% of the contract unit price. If samples tested for AR binder content and percent passing the 75 μ m (No. 200) sieve do not meet the n=1 criteria of Table B, the material will be considered defective work. If samples tested for density are no more than 2% below the minimum or no more than 2% above the maximum limits of Table D, payment will be 90% of the contract unit price. If samples for density are more than 2% below the minimum or more than 2% above the maximum limits of Table D, the pavement will be considered defective work.

Unless otherwise directed in writing by the District Executive, remove and replace defective work.

TABLE D

Density Limits for Partially Completed Lots

MIXTURE NMAS	DENSITY LIMITS
12.5 mm NMAS AR-GG Mixture	$\geq 92\%$ to $\leq 97\%$ of Theoretical Maximum Specific Gravity.

2.a.2 For JMF's placed in quantities less than 2,500 tons. Section 409.3(h)2.a.2.

2.b Mixture Acceptance Samples. Utilize LTS Testing unless otherwise indicated in the proposal.

2.b.1 Mixture Acceptance Sample Testing. The LTS will test the mixture acceptance samples according to PTM No. 757 or PTM No. 702, Modified Method D, if previously identified problematic aggregates are used in the mixture, to determine AR binder content and the percent passing the 75 µm (No. 200) sieve. The LTS will use the calibration factors (Cf and 200 Cf) provided with the JMF for PTM No. 757. The LTS will analyze the test results for extreme values according to PTM No. 4 at the 5% significance level. If discarding an extreme value reduces a lot to less than three remaining test results, the Department will accept the lot as specified in Section III.(j)2.a.1. The Department will accept lots with three or more test results as specified in Section IV.4(a)5.

(k) Compaction. Begin rolling material immediately after placement. Compact the AR-GG mixture to achieve the density acceptance requirements and to eliminate all roller marks while not producing flushing of the AR binder. Compact the mixture while it is in proper condition and adjust roller speed, pattern, and roller size (and/or amplitude and frequency if vibratory rolling is approved by the Representative) to eliminate displacement, shoving, cracking, and aggregate breakage as specified in Section III.(f). Satisfactorily correct displacement resulting from reversing roller directions and other causes.

Without using excess water, keep the wheels of steel-wheel rollers moist and clean to prevent the mixture from adhering to the wheels.

For areas inaccessible to rollers, compact with mechanical vibrating hand tampers.

(l) Mat Density Acceptance. The Department will accept AR-GG pavement course mat density by one of the following methods as determined by the Representative before placement. For courses with mixture acceptance by certification, the density acceptance level will be either non-movement or optimum-rolling pattern. Density acceptance will be according to Table E.

TABLE E
Density Acceptance

Density Acceptance Method	Density Acceptance Criteria
Non-Movement	Section 409, Table H, except as revised in Section IV.(a)4.
Optimum Rolling Pattern	Section 409, Table H, except as revised in Section IV.(a)4.
Pavement Cores*	Section 409, Table I
* Use only when mixture acceptance is by lots.	

1. Non-Movement. The Inspector-in-Charge will approve density acceptance by non-movement for the following conditions or applications if they are determined by the Representative to be non-critical for density:

- Areas of paving or patching less than 4 feet in width or narrow enough to cause bridging of the area by approved compaction equipment.
- Materials placed in small quantities not exceeding 500 tons in a continuous placement.
- Mixtures placed on unstable or non-uniform bases.
- Mixtures used for patching, road widening, shoulders, driveway adjustments, and other miscellaneous applications determined by the Representative. Shoulders where density is critical will be accepted by pavement cores as specified in Section III.(l)3.

The Department will accept the density when the mixture does not move under the compaction equipment.

2. Optimum-Rolling Pattern. The Inspector-in-Charge may accept density using an optimum-rolling pattern for the following conditions or applications:

- Materials placed in small quantities not exceeding 500 tons in a continuous placement.
- Mixtures placed on unstable or non-uniform bases.
- Mixtures used for patching, road widening, driveway adjustments, shoulders where density is not critical, and other miscellaneous applications determined by the Representative. Shoulders where density is critical will be accepted by pavement cores as specified in Section III.(I)3.

With the Inspector and the Contractor's certified HMA field technician present, determine density with an approved nuclear gauge according to PTM No. 402, or determine density with an approved electrical impedance gauge according to PTM No. 403. Nuclear gauges must be operated by a licensed nuclear gauge operator. In the presence of the Inspector, follow the control strip technique specified in PTM No. 402 to construct at least one control strip to establish the optimum-rolling pattern for each course. Document readings using the forms provided in PTM No. 402 and provide the completed forms to the Inspector. Compact the course according to the optimum-rolling pattern. During paving, the Representative may require the Contractor to construct a new control strip to verify the optimum-rolling pattern.

Use one of the following gauges or approved equal:

- Troxler Electronics, Model 3411B or Model 4640B
- Campbell Pacific Nuclear, Model MC-2
- Seaman Nuclear, Model MC-2
- TransTech Systems, Inc., PQITM, Model 300 or Model 301
- Troxler Electronic Laboratories, PaveTrackerTM

Submit a copy of the certificate of nuclear gauge annual calibration according to ASTM D 2950 and documentation of training of the nuclear gauge operator. Recalibrate any nuclear gauge that is damaged or repaired.

3. Pavement Cores.

3.a General. Pavement cores are appropriate for accepting the density of AR-GG mixture construction if all of the following conditions or applications exist:

- Mixture acceptance is by lots.
- Materials placed on stable and uniform bases.

3.b Lots and Sublots. Section 409.3(h)2.a.

3.c Density Acceptance Samples. Section 409.3(j)4.C

3.d Density Acceptance Sample Testing. Utilize LTS Testing unless otherwise indicated in the proposal.

3.d.1 LTS Testing. The LTS will test the density acceptance samples according to PTM No. 715, and if necessary PTM No. 716, to determine the percent compaction. The Department will determine acceptance,

with respect to density, as specified in Section IV(a)5.

If cores are not taken within 1 day after placing the mixture, or if the density for two consecutive lots or for a total of three lots does not meet the density payment factor percentage of 100, stop paving operations for the project as directed. Review and evaluate the operation and determine the cause of the problem. Do not resume paving until after the Representative reviews the proposed solution and authorizes paving to continue.

(m) Joints. Section 409.3(k), except delete 409.3(k)1.c Notched Wedge Joints. Do not construct Notched Wedge Joints for AR-GG pavements.

(n) Surface Tolerance. Section 409.3(l)

(o) Tests for Depth. Section 409.3(m)

(p) Protection of Courses. Section 409.3(n)

(q) Defective Work. As specified in Section 409.3(o) and as follows:

Department acceptance and QA testing does not relieve the Contractor of responsibility for material or workmanship that the Representative determines is defective before the Department issues the acceptance certificate. Remove and replace or repair defective work as directed. The BOPD will review Representative determinations of defective material or workmanship.

Unless otherwise directed in writing by the District Executive, remove and replace pavement defective for flushing as specified in Section III(i)4, surface tolerance as specified in Section III(n) and depth as specified in Section III(o). Remove and replace pavement defective for percent within tolerance or Payment Factor Percentage as specified in Section 409, Table H and Table I.

IV. MEASUREMENT AND PAYMENT–

(a) HMA or WMA Asphalt Rubber Gap Graded Construction.

1. Superpave Asphalt Rubber Gap Graded Mixture Design, HMA Wearing Course. Square Yard or Ton

2. Superpave Asphalt Rubber Gap Graded Mixture Design, WMA Wearing Course. Square Yard or Ton

3. Bituminous Tack Coat. Section 460.4.

4. Mixture Acceptance by Certification and Density Acceptance by Non-Movement and Optimum-Rolling Pattern. Section 409.4(a)3, except revise the Table H references to Section 409.3(j)2 and Section 409.3(j)3, to Section III(l)1 and Section III(l)2, respectively.

5. Mixture Acceptance by Lot and Density Acceptance by Non-Movement, Optimum-Rolling Pattern, or Pavement Cores. The Department will pay on a lot-by-lot basis at the contract unit price, adjusted for Payment Factor Percentages as specified in Table F. For the payment factor percentages based on percent within tolerance, the Department will determine the percent within tolerance according to Section 106.03(a)3, using the upper and lower specification limits in Table G.

TABLE F

Contract Unit Price Adjustments - Mixture Acceptance by Lots

Mixture NMAS	Test Criteria	Test Value	Payment Factor Percentage
Asphalt Content			
12.5 mm AR-GG	Acceptance Sample Testing	All individual subplot acceptance sample test results for the lot are within the n=1 tolerances in Table B and the lot average is within the n≥3 tolerances in Table B*	100
		Percent Within Tolerance if any individual subplot acceptance sample test result for the lot is not within the n=1 tolerances in Table B or the lot average is not within the n≥3 tolerances in Table B	Section 409, Table K
Gradation			
12.5 mm AR-GG	Acceptance Sample Testing for % Passing 75 μm (No. 200) Sieve	All individual subplot acceptance sample test results for the lot are within the n=1 tolerances in Table B and the lot average is within the n≥3 tolerances in Table B*	100
		Percent Within Tolerance, if any individual subplot acceptance sample test result for the lot is not within the n=1 tolerances in Table B or the lot average is not within the n≥3 tolerances in Table B	Section 409, Table K
Mat Density			
12.5 mm AR-GG	Non-Movement	Section III(l)1.	100
	Optimum-Rolling Pattern	Section III(l)2.	100
12.5 mm AR-GG	Acceptance Sample Testing of Pavement Cores	All individual subplot test results for the lot are ≥ 92% and ≤ 97% of maximum theoretical density	100
		Percent Within Tolerance if any individual subplot test result for the lot is not ≥ 92% and ≤ 97% of maximum theoretical density	Section 409 Table K

* The Department may elect to randomly select and test only one subplot mixture acceptance sample from each lot to verify conformance to the specifications. If only one subplot mixture acceptance sample is tested, tighter tolerances than those in Table B will be used to verify conformance to the specifications for the entire lot. If the one subplot is within $\pm 0.2\%$ of the JMF for asphalt content and within $\pm 1.0\%$ of the JMF for percent passing the 75 μ m (No. 200) sieve, the lot will be considered to conform with the specifications and the lot's payment factor percentage will be determined according to this table. If the one subplot fails to meet the tighter tolerances, all mixture acceptance samples from the lot will be tested to determine the payment factor percentage according to this table.

TABLE G

Upper and Lower Specification Limits for Calculating Percent Within Tolerance

	Testing Criteria	
Mixture NMA S	Lower Specification Limit (L)	Upper Specification Limit (U)
	Asphalt Content from JMF Value, %	
12.5 mm AR-GG	-0.4	+0.4
	Percent Passing the 75 µm (No. 200) Sieve from JMF Value, %	
12.5 mm AR-GG	-2.0	+2.0
	Mat Density*	
12.5 mm AR-GG	0.91T	0.98T
* Where T = Current Maximum Theoretical Density, lbs./cu. ft.		

5.a Payment. Section 409.4(a)4.a.

5.b Dispute Resolution. Section 409.4 (a).4.B

(b) HMA or WMA Asphalt Rubber Gap Graded RPS Construction. Square Yard or Ton

Project Specific Details:

Special Provision: **I4801A - c04801 ITEM 2480-__ (ITEM 0480-__) and/or ITEM 2481-__ (ITEM 0481-__) BITUMINOUS SURFACE TREATMENT**

Item(s) Associated:

Header:

ITEM 2480-__ (ITEM 0480-__) and/or ITEM 2481-__ (ITEM 0481-__) BITUMINOUS SURFACE TREATMENT

Provision Body:

Section 480.2(b) Coarse Aggregate. Revise as follows:

Type A, No. 8 and No. 67, Section 703.2; except, revise the entry for Bituminous Surface Treatment in Table D, Material Passing the No. 75 um (No. 200) Sieve, as follows: 2.0% MAXIMUM

Having the SRL designation as indicated in the bid proposal and supplied from acceptable sources for use in wearing courses. An aggregate designation or blends, equal to or better than that specified, may be supplied. Blends are 50% by mass(weight) and mixed by an approved method.

Project Specific Details:

Special Provision: **P5031A - c05031 ITEM 9503-2152 (ITEM 0503-0152) PROTECTIVE COATING FOR REINFORCED CONCRETE PAVEMENT**

Item(s) Associated:

Header:

ITEM 9503-2152 (ITEM 9503-0152) PROTECTIVE COATING FOR REINFORCED CONCRETE PAVEMENT.

Provision Body:

I. DESCRIPTION - This work is application of boiled linseed oil or penetrating sealers to cement concrete pavements and shoulders, as directed.

II. MATERIAL -

(a) Boiled Linseed Oil. Section 503.2

(b) Penetrating Sealers. Provide a penetrating sealer from a manufacturer listed in Bulletin 15 as follows:

1. Silicates in Water. Certify as specified in Section 106.03(b)3. Meet the following requirements:

	Property	Test Method	Requirements
	Freeze/ Thaw Resistance	ASTM C 666, Procedure A, modified as follows: Use Class AA cement concrete for the test specimens. Test 4 specimens; 2 with sealer, 2 without sealer. Apply penetrating sealer to all sides of specimens as per manufacturer's recommendations. Repeat using Class AA cement concrete without air entrainment.	No visible cracking, powdering, hairline cracking or spalling.
	Chlorine Ion Penetration	Chloride Ion Penetration AASHTO T 259, Section 3.6, modified as follows: Use Class AA cement concrete with water/cement ration of 0.55 for the test specimens. Apply penetrating sealer to top surface of specimens as per manufacturer's recommendations. Sandblast treated surface, removing approximately 2 mm (1/16-inch) before ponding with NaCl.	Maximum Chloride Content Absorbed: 1.6 mm (0.0625-inch) to 13 mm (0.5-inch) -0.31% >13 mm (0.5-inch) to 25 mm (1.0-inch) -0.06%

	Skid Resistance	ASTM E 274 and ASTM E 524 (Smooth Tire)	Acceptable to MTD
	Concrete Discoloration	Visual	Provide a penetrating sealer that does not discolor cement concrete

III. CONSTRUCTION - Section 503.3 with revisions and additions as follows:

(b) Application.

1. Boiled Linseed Oil. Apply protective coating in two coats, at a rate of 1 L/11 m² (0.02 gallon per square yard) for each coat. Apply, as directed, by pressure spray equipment, by portable hand spray equipment, by brushing, or by a combination of methods, to insure complete coverage of treated concrete surfaces.

Unless otherwise permitted, apply in weather suitable for drying, when the air temperature and concrete surface temperature are between 2 degrees C (35 F) and 40 degrees C (100 F).

Allow the first application to dry for a period of at least 24 hours prior to the second application. When the initial application is made on concrete surfaces carrying traffic, close these surfaces for a period of at least 4 hours, until penetration is complete and tackiness has disappeared.

After the second application, close surface to traffic for a period of at least 6 hours or until tackiness has disappeared and no pickup results from use.

2. Penetrating Sealers. If curing compounds have been applied to pavement, do not apply penetrating sealers until curing compounds have been removed by sand or water blasting, or traffic has been allowed on the surface for at least six months or, as otherwise recommended by the manufacturer and approved by the Engineer.

Follow the manufacturer's recommendations for air and/or surface temperatures and, if applicable, other climatic conditions, to properly apply the penetrating sealer. Each day before and during application, mix, stir, or otherwise prepare the penetrating sealer, if required, in accordance with the manufacturer's recommendations. Use rollers, brushes, sprayers, or other applicators, in accordance with the manufacturer's recommendations, to apply the penetrating sealer. Apply the penetrating sealer in two or more coats and at application rates as recommended by the manufacturer. Cure each coat in accordance with the manufacturer's recommendations. If for any reason and in the opinion of the Engineer, the penetrating sealer does not penetrate the surface, remove the penetrating sealer by sand blasting and reapply at no cost to the Department.

On new cement concrete pavements or shoulders, do not apply pavement markings until 7 days after the application of penetrating sealer.

On existing cement concrete pavements or shoulders, remove pavement markings, apply penetrating sealer, and cure the penetrating sealer in accordance with the manufacturer's recommendations before reapplication of pavement markings.

IV. MEASUREMENT AND PAYMENT - Section 503.4 with additions as follows:

Includes the cost of additional sand or water blasting, if required, for surface preparation.

Project Specific Details:

**I6001B - c06001 ITEM 9600-1025 (ITEM 9600-3025) - REPAIR OF
ACCESS ROADS**

Special Provision:

Item(s) Associated:

Header:

ITEM 9600-1025 (ITEM 9600-3025) - REPAIR OF ACCESS ROADS

Provision Body:

I. DESCRIPTION - This work is the repair of damage to the road(s) identified herein when utilized for access to the project site, or to the local road(s) selected by the Contractor and approved by the Department for use as an alternate access route. Perform repair work in accordance with the applicable sections of Publication 408 and as directed.

(list details here)

II. MATERIAL - Furnish material for repair work that is compatible with the existing roadway, as determined by the Engineer.

III. CONSTRUCTION - Present a hauling schedule to the Engineer. Repair or reconstruct damaged roadway to restore the profile and/or cross slope to original or like condition, to the satisfaction of the Engineer.

IV. MEASUREMENT AND PAYMENT - Dollar

The proposal will include an item and a predetermined amount of money for this item. The contract item will have a unit of measure of Dollar, a unit price of \$1.00, and a quantity equal to the predetermined amount.

Due to the contingent or unpredictable nature of the work being performed, the provisions of Section 110.02(d) are not applicable to this item.

All work performed as repair of access roads will be paid under this item, measured by determining the actual amount of equipment, tools, labor, material, and engineering required to acceptably perform the work, and paid as follows:

(a) Contract Items. For performance of work identified as having similar items listed in the contract, the contract unit price will be paid.

(b) Non-Contract Items. Items of work not identified in the contract will be paid as follows:

1. Negotiated Price. At an agreed upon price. This price will be agreed upon with the Department before performing the work. When applicable, agreement is also required with the FHWA.

2. Force Account Basis. Section 110.03(d)

Project Specific Details:

**P6051A - c06051 ITEM 9605-2101 (ITEM 9605-0101) - HIGH
DENSITY POLYETHYLENE GRADE ADJUSTMENT RING**

Special Provision:

Item(s) Associated:

Header:

ITEM 9605-2101 (ITEM 9605-0101) - HIGH DENSITY POLYETHYLENE GRADE ADJUSTMENT RINGS

Provision Body:

I. DESCRIPTION - This work is the furnishing and installation of high density polyethylene grade adjustment rings for adjusting existing manhole frames to final grade.

II. MATERIAL -

(a) Manufacture plastic adjustment rings from polyethylene plastic as identified in ASTM D 1248 (Standard Specification for Polyethylene Plastic Molding and Extrusion Materials). Test and qualify material properties for usage per the ASTM Test Methods referenced in ASTM D 1248.

Recycled material meeting the above requirement may be used.

(b) Manufacture plastic adjustment rings utilizing the injection molding process as defined by the Society of Plastic Engineers (SPE).

(c) Test adjustment rings to assure compliance with impact and loading requirements per AASHTO's Standard Specification for Highway Bridges.

(d) Certify as specified in Section 106.03(b)3.

III. CONSTRUCTION -

(a) General

1. Install plastic adjustment rings according to manufacturer's recommendations and the following procedure.

2. A maximum height of 300 mm (12 inches) is permitted for adjustment rings.

(b) Preparation

1. Prepare and clean the concrete cone or top slab to provide a flat seating surface free of protrusions and debris.

2. Measure the distance from the cone or top slab to the projected finish grade and deduct for the cover frame.

Determine the net buildup of rings necessary to come within 6 mm (1/4-inch) of grade with the cover frame in place.

3. Determine the best ring height combination to attain necessary adjustment. Use molded slope rings to match grades of paved surfaces that are not flat.

4. Dry stack rings on cone. Index any slope rings as necessary. Place cover frame casting on top of the assembly and verify height and slope match.

5. Mark the entire stack with a vertical line and disassemble. 6. Use mortar to create a flat sealable surface if the cone or top slab is too badly chipped or damaged to attain a good seal. Apply 5 mm (3/16-inch) to 6 mm (1/4-inch) bead of approved butyl sealant to the cone or top slab (Use a double bead of sealant if surface irregularities are present).

6. Use mortar to create a flat sealable surface if the cone or top slab is too badly chipped or damaged to attain a good seal. Apply 5 mm (3/16-inch) to 6 mm (1/4-inch) bead of approved butyl sealant to the cone or top slab (Use a double bead of sealant if surface irregularities are present).

(c) Placement

1. Place the first ring onto the cone or top slab with the male lip into the opening, aligning the vertical line.

2. Apply 5 mm (3/16-inch) to 6 mm (1/4-inch) bead of a butyl sealant, recommended by the ring manufacturer, on the bottom of the next ring, as close to the male lip as possible around the entire 360 degrees of the ring.

3. Place the second ring onto the first ring with the male lip interlocking. 4. Continue the assembly per steps 2 and 3 for each adjustment ring being used.

5. Prior to setting the cover frame in place, apply a 5 mm (3/16-inch) to 6 mm (1/4-inch) bead of approved butyl sealant on top of the last ring. Apply the sealant in a location to contact the cover frame the full 360 degrees.

6. Set the cover frame in place, centered on the top ring.

IV. MEASUREMENT AND PAYMENT – Set

Project Specific Details:

Special Provision: **P6052A - c06052 ITEM 9605-2300 (ITEM 9605-0300) ENDWALL STAY-IN-PLACE FORM SYSTEMS**

Item(s) Associated:

Header:

ITEM 9605-2300 (ITEM 9605-0300) ENDWALL STAY-IN-PLACE FORM SYSTEMS

Provision Body:

I. DESCRIPTION - This work is construction of endwalls for circular metal, reinforced concrete or thermoplastic pipe culverts of the type indicated, using stay-in-place forms.

II. MATERIAL - Section 605.2 with additions as follows:

(d) Other Material.

- o Endwall Stay-in-Place Form System. Linear Low Density Polyethylene (LLDP). From a manufacturer listed in Bulletin 15. Certify as specified in Section 106.03(b)3.

- o Coarse Aggregate. No. 2A, Section 703.2.

- o Flowable Backfill. Section 220.

III. CONSTRUCTION - Section 605.3, RC 31M, as shown on approved shop drawings, and as follows:

- o At the location of endwall, excavate an additional 300 mm (1-foot) depth below the stay-in-place form. Excavate maximum 600 mm (2-foot) width in each direction around the stay-in-place form.

- o Construct bedding by placing No. 2A aggregate, compacted to 95% of Standard Proctor Density (SPD).

- o Insert adapter collar to adjust opening for smaller pipe sizes. Attach galvanized screws at spaces provided on the collar. Place galvanized screws through the inside of the collar but do not penetrate the outside. Slide collar into stay-in-place form matching male to female plug on the bottom of back of stay-in-place form collar. Complete the insertion of the galvanized screws into the stay-in-place form.

- o Position the endwall. Slide pipe culvert into stay-in-place form. Adjust as necessary. Place galvanized screws through the stay-in-place form, according to predetermined spacing, and into the pipe. Avoid placing any galvanized screws in the invert of the pipe. Set and adjust endwall prior to completing pipe backfill.

- o Place Class A concrete into stay-in-place form. Consolidate as necessary.

- o Place the height-adjustment section onto the concrete filled, stay-in-place form and attach with galvanized screws at each of the inside corners. Place concrete as specified.
- o Place cap and attach with galvanized screws at each corner.
- o Place No. 2A aggregate backfill or flowable backfill, Section 601.3(e), around stay-in-place form.

IV. MEASUREMENT AND PAYMENT - Each

Project Specific Details:

Special Provision: **I6053A - c06053 ITEM 6605-____ - TYPE __ (ITEM 4605-____ - TYPE __) INLET, REMOVAL**

Item(s) Associated:

Header:

ITEM 6605-____ - TYPE __ (ITEM 4605-____ - TYPE __) INLET, REMOVAL

Provision Body:

I. This work is the removal of the existing inlet, backfilling, and construction of shoulder/pavement to match the existing shoulder/pavement structure.

Materials and construction to be in accordance with applicable parts of the current specifications.

Remove existing inlet by sawcutting to the neat lines delineated by the Engineer.

Satisfactorily repair any damage beyond the limits of this work due to the Contractor's operations at no expense to the Department.

II. MEASUREMENT AND PAYMENT - Each

Project Specific Details:

Special Provision: **D6092A - c06092 ITEM 0609-YYYY - INSPECTOR'S FIELD OFFICE AND INSPECTION FACILITIES, DESIGN-BUILD PROJECT**

Item(s) Associated:

Header:

ITEM 0609-YYYY - INSPECTOR'S FIELD OFFICE AND INSPECTION FACILITIES, DESIGN-BUILD PROJECT

Provision Body:

In accordance with Section 609, modified as follows:

609.3 CONSTRUCTION – Replace Section 609.3 with the following:

Install the indicated facilities no later than 5 (*modify as required*) days before the scheduled start of physical construction work, exclusive of Design activities, as identified in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD. Anchor the facilities to withstand high winds. Maintain the facilities from installation until 30 days after physical work (including punch list items from final inspection) has been satisfactorily completed, unless released earlier by the Representative. Satisfactorily clean or arrange for the indicated facilities to be cleaned at least once per week. Provide an adequate number of accessible parking spaces immediately adjacent or in close proximity to the offices or laboratory for exclusive use by Department personnel. Provide proper maintenance of parking areas. Ensure that there is sufficient lighting to illuminate the exterior of offices or laboratory and all parking areas. Designate a specific individual to serve as the contact person for service-related problems. After physical work has been completed, but before release by the Representative, arrange to meet with the Inspector-in-Charge to examine and determine the condition of all specialized equipment that is contractor-owned. Report any unresolved disputes over the condition of such equipment to the Representative. Failure to meet with the Inspector-in-Charge or to report problems with the condition of specialized equipment will create a presumption that, except for expected wear resulting from normal usage, the equipment is in good condition and remains fully functional. Specialized equipment that is lost or determined to be damaged beyond repair will be replaced or reimbursement will be made as specified in Section 110.03, provided such loss or damage is not the result of carelessness or negligence on the part of the Contractor or any other responsible third party. The Representative may direct that the facilities be maintained for more than 30 days after physical work has been satisfactorily completed, as necessary, to allow time for Department personnel to process outstanding project records. Remove and dispose of furnishings, equipment, and materials upon release by the Representative.

609.4 MEASUREMENT AND PAYMENT – Replace Section 609.4 with the following:

The proposal will include separate pay items for the Inspector's Field Office and Inspection Facilities, Field Laboratory, Proportioning Plant Office, and Equipment Package, as applicable.

Each contract item will be paid, as specified in Section 110.05, in two equal payments, according to the following schedule:

- When work is completed in an amount equivalent to at least 10% of the original contract amount, excluding the bid price for the applicable item and the bid prices for the items for the Design activities identified in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, the first payment will be made.
- When work is completed in an amount equivalent to at least 60% of the original contract amount, excluding the bid price for the applicable item and the bid prices for the items for the Design activities identified in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, the second payment will be made.

(a) Price Adjustments. Adjustments to the lump sum prices bid for the indicated office or laboratory facilities and equipment package, as applicable, will be made as follows:

1. Time Extensions and Reductions. In the event the time for completion of all work on the project is extended or reduced, as specified in Section 108.06, an appropriate adjustment (payment to the Contractor or rebate to the Department) will be made to the lump sum prices bid for the indicated office or laboratory facilities and equipment package, as applicable, for the days in excess of (payment) or less than (rebate) the original contract time, at the following daily rate:

$$\text{Daily Price Adjustment Rate} = \frac{75\% \times \text{Contract Lump Sum Price}}{\text{Original Contract Time in Days}}$$

No adjustment will be made when the cause for the extension or reduction of Contract Time occurs during the time before the indicated office or laboratory facilities and equipment package were installed.

2. Facilities Maintained for More than 30 Days After Physical Work Completion. In the event the Representative directs that the office or laboratory facilities and equipment package be maintained for more than 30 days after the date of physical work completion, as specified in Section 609.3, an appropriate adjustment (payment to the Contractor) will be made to the lump sum prices bid for the indicated office or laboratory facilities and equipment package, as applicable, for the days in excess of 30 until released by the Representative, at the Daily Price Adjustment Rate specified in Section 609.4(a)1.

No adjustment will be made if the Representative directs that the office or laboratory facilities and equipment package be maintained for more than 30 days after the date of physical work completion due to the Contractor's failure to submit, complete, and/or correct required certificates or documents, as established during the final inspection.

Project Specific Details:

Special Provision: **P6241A - c06241 ITEM 9624-2__ (ITEM 9624-0__) - TYPE 1, RIGHT OF WAY FENCE WITH COMPOSITION POS**

Item(s) Associated:

Header:

ITEM 9624-2__ (ITEM 9624-0__) - TYPE 1, RIGHT OF WAY FENCE WITH COMPOSITION POS

Provision Body:

I. DESCRIPTION - This work is the furnishing and installation of Type 1, Right of Way Fence with Composite Posts.

II. MATERIAL

(a) Wire Fabric and Components - Section 1110.01(a)

(b) End Posts, Corner Post and Pull Posts, Line Posts, Braces, Stretcher Bars, Truss Rods, Fittings, and Hardware - As shown on the Standard Drawings and as follows:

- Straight posts true to section.
- Composite posts - solid core, composite tube, not capable of being driven into the ground.
- Tensile modulus of tube to be not less than 1.79E4 Mpa (2600Ksi). Posts to have bending strength meeting the test load and moment capacity requirements of Table A, shown for steel posts of the same diameter.
- Post core properties - 3.45E4 kPa (5000 psi) minimum compression strength, nonshrinking concrete, with frictional resistance between tube and core to be 159 kPa/25 mm (23.0 psi/inch) of tube length minimum.
- Braces, fittings, and hardware of commercial-quality steel or malleable iron.
- Satisfactory moisture-excluding caps, firmly and rigidly secured to the post top.

1. Type 1 Right of Way Fence.

1.a. End Posts. Composite posts, must meet the test load and moment capacity requirements of Table I for a particular fabric height.

1.b Corner and Pull Posts. - paragraph (b)1.1a above, except finish brace clamps or attaching devices, adjustable to various horizontal and vertical angles.

1.c Line Posts. Space 3050 mm (10 feet) on center maximum, unless otherwise indicated. Composite posts, meeting paragraph (b)1.1a above.

1.d Braces, Stretcher Bars, and Truss Rods. - Section 1110.02(a)4.

		LINE POSTS			END POSTS		
	Fabric Height mm(ft.)	Post Dia. mm(in.)	Moment Capacity Newton Meters (foot lbs)	Test Load Newtons (Pounds)	Post Dia. mm(in.)	Moment Capacity Newtons Meters (foot lbs)	Test Load Newtons (Pounds)
	1220(4)	60(2.375)	1080(800)	7120 (1600)	60(2.375)	1290(950)	8450(1900)
	1520(5)	60(2.375)	1360(1000)	8900 (2000)	60(2.375)	1560(1150)	10230(2300)
	1830(6)	60(2.375)	1630(1200)	10680 (2400)	73(2.875)	1900(1400)	12460(2800)
	2130(7)	60(2.375)	1900(1400)	12460 (2800)	73(2.875)	2240(1650)	14690(3300)
	2440(8)	60(2.375)	2170(1600)	14240 (3200)	102(4.000)	2580(1900)	16910(3800)

Test Load a 914 mm (36-inch) section of composite post for bending capacity about the major axis of its cross section. Apply a concentrated load at span center with supports spaced at 610 mm (24.0 inches). Have test section support the minimum load as indicated in Table A, within the elastic limit of the material.

(c) Gates - Section 1110.03

(d) Galvanizing - Section 1110.04 except remove the word "posts".

(e) Inspection - Section 1110.05

(f) Certification - Section 106.03(b)3.

III. CONSTRUCTION - Section 624.3. Set Composite Posts in concrete footings not less than four (4) times the diameter of the post itself. Concrete should be 152 mm (6 inches) deeper than the post. Footings should be a minimum of 1067 mm (42 inches) in depth and deeper where climatic or soil conditions warrant. Trowel finish post footing caps with slight slope away from the post.

IV. MEASUREMENT AND PAYMENT -

(a) End Post, Corner Post, and Pull Post. Each

(b) Right-of-Way Fence. Section 624.4(a).

(c) Gate. Section 624.4(c).

(d) Class 2 Excavation. Section 624.4(d)

Project Specific Details:

Special Provision: **I6261A - C06261 ITEM 9626-2001 (ITEM 9626-0001) CORROSION RESISTANT GABIONS, TYPE A, USING RPCC AGGREGATES AN**

Item(s) Associated:

Header:

ITEM 9626-2001 (9626-0001) - CORROSION RESISTANT GABIONS, TYPE A, USING RPCC AGGREGATES

ITEM 9626- 2002 (9626-0002) - CORROSION RESISTANT GABIONS, TYPE B, USING RPCC AGGREGATES

Provision Body:

I. DESCRIPTION - This work is the furnishing, assembling, filling, and placing of open mesh wire baskets with Reclaimed Portland Cement Concrete (RPCC) aggregates, forming gabions of the type indicated.

II. MATERIAL - Section 626.2 except exclude Section 626.2(c)1 and conform to the following:

- Certify RPCC aggregates meet PENNDOT's Environmental Due Diligence requirements for Clean Fill.
- Provide RPCC aggregates free of exposed metal reinforcement or mesh.
- Provide RPCC aggregates or blends of RPCC aggregates [minimum 30% RPCC] with conventional aggregates in proportions to meet gradation requirements.
- Aggregate supplier must submit samples to MTD for petrographic examination for durability before use. Use freeze-thaw testing in accordance with ASTM D 5312 with the following modifications:
 - Dry the samples obtained in accordance with Section 8 of ASTM D 5312 in an oven to constant mass at a temperature of $60 \pm 3^{\circ}\text{C}$ ($140 \pm 5^{\circ}\text{F}$).
 - Run a total of 50 freeze-thaw cycles on the samples.
 - At the end of the test, the largest remaining portion of each sample will be considered the passing portion, and the remaining smaller portions of each sample will be considered the failing portions.
 - The largest allowable loss for any individual sample, and the largest allowable average loss for all the samples, is 5.0% by mass (weight).
- Certify RPCC aggregates with less than 5 percent by mass (weight) of foreign materials, as specified in Section 106.03.

III. CONSTRUCTION - Section 626.3 and as follows:

- Do not place gabions in direct contact with perennial streams, 91.44 m (300 feet) of Exceptional Value (EV) waters or a high quality (HQ) waters without prior approval from DEP.

IV. MEASUREMENT AND PAYMENT - Cubic Meter (Cubic Yard)

Project Specific Details:

Special Provision: **I6291B - c06291 ITEM 9629-0001 HIGH TENSIONED CABLE BARRIER SYSTEM**

Item(s) Associated:

Header:

ITEM 9629-0001 HIGH TENSIONED CABLE BARRIER SYSTEM

Provision Body:

I. DESCRIPTION -

This work is furnishing and installing a new High Tensioned Cable Barrier System with concrete foundation line posts (socketed) as indicated, including all appurtenances and hardware.

Includes all related hardware, grading, embankment, and excavation not separately specified, as required by the manufacturer and the Representative.

Maximum allowable dynamic deflection of the installed system is (*fill in length*) foot.

II. MATERIAL -

Furnish all material needed to complete a continuous segment of barrier including, but not limited to, end anchor terminals, cables, turnbuckles, threaded swaged cable ends, intermediate anchor assemblies, bolts, nuts, and other hardware required by the Manufacturer.

(a) High Tensioned Cable Barrier - Meet NCHRP Report 350 or Manual for Assessing Safety Hardware (MASH) Test Level 4 requirements (minimum) utilizing a 4 cable system. Have the manufacturer provide documentation indicating that the system is accepted by FHWA for use on the National Highway System.

(b) High Tensioned Cable Barrier End Anchor Terminal - Meet NCHRP Report 350 or MASH Test Level 3 requirements (minimum) and must be accepted by FHWA for use on the National Highway System.

(c) Class A and Class AA Cement Concrete - Section 704

(d) Reinforcement Bars - Section 709.1

III. CONSTRUCTION -

(a) General - Submit shop drawings in accordance with Section 105.02(d).

(b) (Technical Representation - Furnish the services of a technical representative from the system manufacturer at the beginning of operations and, when requested, during installation operations.) (District's option to keep or remove)

(c) High Tensioned Cable Barrier

1. Install at the locations indicated and in strict accordance with the manufacturer's instructions, specifications and installation procedures.

2. Set line posts in sleeves encased in concrete foundations (sockets) extending to the End Anchor Terminal Assembly. Construct sockets and End Anchor Terminal assemblies in strict accordance with the manufacturer's instructions and specifications. Place concrete for all concrete foundations and anchor terminals in undisturbed ground. In areas where random boulders, hardpan, or bedrock are encountered and the specified socket cannot be constructed to full depth, drill a specified minimum diameter hole to the required depth in accordance with manufacturer's recommendations. Completely fill excavation with the same class of concrete used in the socket or in accordance with installation instructions.

3. Install top of line post sockets from a minimum of 1 inch to a maximum of 2 inches above finished ground.

4. Replace any post damaged during installation, as determined by the Representative at no additional cost to the Department.

5. Tension cables according to manufacturer's instructions. Recheck tension and adjust, if necessary, within 3 to 5 days (maximum) after initial tensioning. At the completion of work, furnish the Representative with documentation (tension log) showing the date, time, location, and final tension reading, signed by the person performing the reading, of all tension readings.

6. *(Provide delineation on posts when any individual run of the system is within 2 feet of edge of shoulder.) (District's option to keep or remove)*

IV. MEASUREMENT AND PAYMENT - Linear Foot

Include all labor, tools, equipment, test equipment, and materials necessary to construct a complete and functional High Tensioned Cable Barrier System.

Project Specific Details:

Special Provision: **P7051A - c07051 ITEM 9705-2101 (ITEM 9705-0101) - POLYMER MORTAR FOR BRIDGE JOINT EXPANSION DAM**

Item(s) Associated:

Header:

ITEM 9705-2101 (ITEM 9705-0101) - POLYMER MORTAR FOR BRIDGE JOINT EXPANSION DAM
ITEM 9705-2102 (ITEM 9705-0102) - SILICONE SEALANT FOR BRIDGE JOINT EXPANSION DAM

Provision Body:

I. DESCRIPTION - This work is the furnishing and installation of expansion dams using polymer mortar nosing with two part, Rapid Cure Silicone Joint Sealant for Bridge Joints. The dimensions for the dams and joint widths are as specified or shown on plan drawings.

II. MATERIAL -

(a) Joint Backing Material. Section 705.9. Provide backer rod material as extruded, soft type, low density, polyethylene, with a skin-like outer texture that will not bond to silicone sealant.

(b) Silicone Sealant. Provide a two-part, rapid curing, 100%, silicone sealant from a manufacturer listed in Bulletin 15 and meeting the following physical requirements:

1. AS SUPPLIED PART A TEST METHOD

- Flow Self Leveling ASTM C 639 Type I
- Extrusion rate 200-550 g/min MIL-S-8802
- Specific Gravity
As installed at
25C(77F)
and 50% relative
humidity. 1.25-1.34 ASTM D 792 Method A

2. AS SUPPLIED PART B

- Flow.....Self Leveling ASTM C 639 Type I
- Extrusion Rate.....180-550 g/min
(6-19 oz/min) MIL-S-8802
- Specific Gravity.....1.25-1.34 ASTM D 792 Method A
As installed at 25C (77F)
And 50% relative humidity.

3. AS CURED (MIX PART A WITH PART B, MIX RATIO 1:1)

- Skin over time at 25C (77F) 20 min maximum MIL-S-8802
- Nonvolatile Content
5g/2h/150C/A1 cup 93-99% ASTM D 2822
- Elongation* 600% minimum ASTM D 412, Die C
- Modulus* @150% 310 kPa (45 PSI) maximum ASTM D 5893,
Sections 6.9.1 & 6.9.2
- Movement Capability Cyclic movement: ASTM C 719
and Adhesion +100%/-50%
(extension/compression)
No adhesive or cohesive failure
after 10 cycles @-18C (0F)

*Cured 72 hours at $25 \pm 1.1^{\circ}\text{C}$, ($77 \pm 2^{\circ}\text{F}$) at $50 \pm 5\%$ relative humidity.

(c) Primer for Silicone Sealant. As recommended by the silicone sealant manufacturer.

(d) Polymer Mortar Nosing. A two-component, rapid curing, flexible epoxy with aggregate, that cures to a dense, semi-flexible, weather, abrasion, and impact resistant epoxy concrete, having the following physical requirements:

- Compressive strength at 17237 kPa minimum ASTM C 579 Method B
24 hours (2500 PSI minimum)
- Shear Strength** 5171 kPa minimum ASTM C 882
(750 PSI minimum)
- Abrasion Resistance 1.5 maximum ASTM C 501, TABER H22
- Resilience 70% minimum OKLA Test, OHD L6
- Thermal Compatibility PASS ASTM C 844

**Or until concrete failure.

(e) Accelerator. Recommended by the polymer mortar manufacturer.

(f) Aggregate. Section 703 and as furnished by a manufacturer, listed in Bulletin 14. Do not use limestone aggregate or limestone sand.

(g) Certify. Section 106.03(b)3.

III. CONSTRUCTION - Construct as shown on the plans and as follows:

Have a manufacturer's qualified representative present during the installation. Submit the manufacturer's written installation instructions to the Engineer prior to the start of any work. Prepare joints and install polymer mortar and silicone sealant material in accordance with the manufacturer's written recommendations and as follows:

Inspect joints for proper depth, width and surface preparation as detailed in the plans. Abrasive blast clean the joints. Filter any compressed air used, to separate oil and moisture. Approval of the Engineer is required before installing the polymer mortar and silicone sealant.

Mix, place and cure the polymer mortar only when the deck surface temperature is at least 7C(45F) and rising. Apply accelerator and heat to improve the curing time of the polymer mortar.

When the polymer mortar has completely cured remove the temporary joint form and abrasive blast the joint faces to remove all residual form material. Prime the joint faces. Install the backer rod to the proper depth. Mix the silicone sealant and extrude into the joint. Check for leak-by, by verifying the silicone sealant remains uniformly supported by the backer rod.

IV. MEASUREMENT AND PAYMENT

(a) Polymer Mortar for Bridge Joint Expansion Dam - Cubic Meter (Cubic yard).

(b) Silicone Sealant for Bridge Joint Expansion Dam - Linear Meter (Linear foot). The backer rod and primer are incidental to this item.

Measured outside-to-outside along the joint, including curb parapets and sidewalks if applicable

Project Specific Details:

Special Provision: **P7081A - c07081 ITEM 9708-2600 (ITEM 9708-0600) EMBEDDED GALVANIC ANODES:**

Item(s) Associated:

Header:

ITEM 9708-2600 (ITEM 9708-0600) EMBEDDED GALVANIC ANODES

Provision Body:

I. DESCRIPTION - This work is the furnishing and installation of Embedded Galvanic Anodes designed to mitigate corrosion in concrete rehabilitation.

II. MATERIAL -

(a) Embedded Galvanic Anode. Provide anodes having a maximum dimension of 63 mm (2 1/2-inch) diameter by 25 mm (1-inch) thickness, are pre-manufactured and consist of a zinc core in compliance with ASTM B418-95a, Type I, cast around a pair of steel wires in compliance with bright annealed ASTM A82-97a and encased in a highly alkaline cementitious shell with a pH of 14 or greater.

(b) Reinforcement tie wire. Uncoated, black annealed wire, 1.5 mm (0.60 inches) diameter or heavier.

(c) Repair mortars, concrete and associated materials. In accordance with Section 516.2, except non-conductive repair materials such as epoxy, urethane, or magnesium phosphate are prohibited. Resistivity readings for any repair materials must be less than 15,000 ohm-cm.

III. CONSTRUCTION - The dimensions and locations for installation are as specified or indicated on the plan drawings. Install as recommended by the manufacturer and as follows:

(a) Concrete Pavement Patching. Section 516

(b) Cleaning and Repair of Reinforcing Steel

1. Clean exposed reinforcing steel of rust, mortar, etc. to provide sufficient electrical connection and mechanical bond.
2. Replace or install supplemental reinforcement if significant reduction in cross section of reinforcing steel has occurred as directed by the Engineer.
3. Secure loose reinforcing steel by tying tightly to other bars with steel tie wires.

(c) Embedded Galvanic Anode Installation

1. Install galvanic anodes along the perimeter of the repair or interface at spacing as specified on the drawings. Anode spacing distance not to exceed 750 mm (30-inches).
2. Provide sufficient clearance between anodes and substrate to allow repair material to encase the anodes.
3. Secure the galvanic anodes as close as possible to the patch edge. Tighten the tie wires to allow little or no free movement.
4. For anodes wired to a single bar or if less than 25 mm (1-inch) of concrete cover is expected, place the anode beneath the bar and secure to cleaned reinforcing steel. If concrete cover exceeds 25 mm (1-inch), the anode may be placed at the intersection between two (2) bars and secured to each clean bar.

(d) Electrical Continuity

1. Confirm electrical connection between anode tie wire and reinforcing steel by measuring DC resistance (ohms) with a multimeter. Electrical resistance less than 5 ohms should register on the multimeter.
2. Confirm electrical continuity of all exposed reinforcing steel within the repair area. Use steel tie wires, if necessary, to ensure complete electrical continuity. Acceptable electrical continuity is less than 5 ohms when measured with a multimeter.
3. Use an external junction box connected to pre-wired anodes for those anodes being individually monitored to measure standard potential voltage as specified on the drawings.

IV. MEASUREMENT AND PAYMENT

(a) Patching Joint. Section 516.4(a)

(b) New Pavement Joint. Section 516.4(b)

(c) Concrete Pavement Patching. Section 516.4(c)

(d) Embedded Galvanic Anodes. Each installed.

Project Specific Details:

Special Provision: **P7141A - c07141 ITEM 9714-2201 (ITEM 9714-0201) - DURA-HOLD DRYCAST RETAINING WALL**

Item(s) Associated:

Header:

ITEM 9714-2201 (ITEM 9714-0201) - DURA-HOLD DRYCAST RETAINING WALL

Provision Body:

I. DESCRIPTION - This work is the design, manufacture, storage, delivery, installation, and assembly of drycast reinforced concrete units along with construction of footing as indicated and specified on the approved Drawing No. 95-144 PE.

II. MATERIAL - Drycast Retaining Wall. Dura-Hold Drycast Retaining Wall. Drawing No. 95-144 PE (Dated 02/18/99), including design and fabrication requirements is available upon request from District Bridge Engineer office. Obtain Drycast retaining wall units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III. CONSTRUCTION –

(a) Design. Provide design in accordance with Drawing No. 95-144 PE.

(b) Shop Drawings. Provide approved shop drawings before fabricating drycast units. Provide shop drawings meeting the general requirements of Section 105.02(d).

(c) Installation. Install as per Drawing No. 95-144 PE.

IV. MEASUREMENT AND PAYMENT - Square Meter (Square Foot).

Project Specific Details:

Special Provision: **I8501B - c08501 ITEM 9850-0XXX RECLAIMED PORTLAND CEMENT CONCRETE (RPCC) AGGREGATE FOR ROCK LINING, CLASS R-__**

Item(s) Associated:

Header:

ITEM 9850-0XXX RECLAIMED PORTLAND CEMENT CONCRETE (RPCC) AGGREGATE FOR ROCK LINING, CLASS R-__

Provision Body:

I. DESCRIPTION - This work is the construction of rock lining using Reclaimed Portland Cement Concrete (RPCC) aggregate.

II. MATERIAL - Section 850.2 and as follows:

- Certify RPCC aggregates meet PennDOT's Environmental Due Diligence requirements for Clean Fill.
- Provide RPCC aggregates free of all metal reinforcement or mesh for the top 18-inch layer of rock lining.
- Provide RPCC aggregates free of exposed metal reinforcement or mesh for layers of rock lining placed deeper than 18 inches.
- Provide RPCC aggregates or blends of RPCC aggregates [minimum 50% RPCC] with conventional aggregates in proportions to meet gradation requirements, with a minimum specific gravity of 2.5, as determined according to AASHTO T 85, bulk-saturated, surface-dry basis.
- Aggregate supplier must submit samples to LTS for petrographic examination for durability before use. Use freeze-thaw testing in accordance with ASTM D 5312 with the following modifications:
 - Dry the samples obtained in accordance with Section 8 of ASTM D 5312 in an oven to constant mass at a temperature of 140 ± 5 F.
 - Run a total of 50 freeze-thaw cycles on the samples.
 - At the end of the test, the largest remaining portion of each sample will be considered the passing portion, and the remaining smaller portions of each sample will be considered the failing portions.
 - The largest allowable loss for any individual sample, and the largest allowable average loss for all the samples, is 20.0% by weight.
- Certify RPCC aggregates with less than 5 percent by weight of foreign materials, as specified in Section 106.03.

III. CONSTRUCTION - Section 850.3, as indicated, and as follows:

- Do not use RPCC aggregates or blends in applications with direct contact with aluminum or galvanized steel pipes or other non-corrosion resistant incidental construction items.
- Do not place RPCC material in direct contact with perennial streams, 300 feet of Exceptional Value (EV) waters or high quality (HQ) waters without prior approval from DEP.

IV. MEASUREMENT AND PAYMENT - Section 850.4

- RPCC aggregate. Square Yard or Cubic Yard.

Project Specific Details:

Special Provision: **I9012A - c09012 ITEM 6901-0203(ITEM 4901-0203) - ARROW PANEL, PENNSYLVANIA TURNPIKE RIGHT OF WAY**

Item(s) Associated:

Header:

ITEM 6901-0203(ITEM 4901-0203) - ARROW PANEL, PENNSYLVANIA TURNPIKE RIGHT OF WAY

Provision Body:

I. DESCRIPTION - This work is furnishing, installing, maintaining, relocating, and removing arrow panel(s) to provide advance warning traffic control at all "crossovers" used to transfer traffic from one side of the Turnpike median to the other and for all "single-lane" operations where Turnpike traffic is restricted from normal "two-lane" or "three-lane" unidirectional travel, as specified and as directed by the Engineer.

II. MATERIAL -

(a) Arrow Panel. From a manufacturer listed in Bulletin 15 and meeting the following requirements:

1. Power Supply. Arrow panel to be powered by a 12 v battery pack, solar assisted battery pack, or solar powered battery pack that will supply electrical power to the sign panel continuously for a period of at least 72 hours between charges.
2. Size. Dimensions of arrow panel to be not less than 1.22 m(48 inches) high x 1.93 m(76 inches) wide.
3. Mount. Arrow panel to be mounted on 2 wheel type trailer capable of being towed as well as being operated in a stationary, stable position.
4. Mode. Arrow panel to be capable of operating in both the "flashing arrow" and "sequential arrow" modes.

III. CONSTRUCTION - Install and relocate arrow panel(s) within Turnpike right of way as required by the construction staging of the project and as specified in Section 901.

Immediately repair or replace damaged arrow panel(s).

IV. MEASUREMENT AND PAYMENT - Each

Project Specific Details:

Special Provision: **P10081B - c10081 ITEM 9008-2101 (ITEM 9008-0101) - SILICONE JOINT SEALING SYSTEM; ITEM 9705-2201 (ITEM 970**

Item(s) Associated:

Header:

ITEM 9008-2101 (ITEM 9008-0101) - SILICONE JOINT SEALING SYSTEM; ITEM 9705-2201 (ITEM 9705-0201) - JOINT BACKING MATERIAL

Provision Body:

I. DESCRIPTION - This work is the furnishing and installation of a preformed, silicone joint sealing system in an existing expansion joint, with the dimensions specified or shown on plan drawings.

II. MATERIAL -

(a) Joint Sealing System.

1. Joint Gland. Furnish joint gland made of silicone, preformed by extrusion and formed into its completed configuration by hot vulcanization, having the following physical requirements:

- o Durometer (Shore A) 55 + 5 ASTM D 2240
- o Tensile 3790 kPa (550 psi) ASTM D 412
- o Durometer (Shore A) 55 + 5 ASTM D 2240
- o Tensile 3790 kPa (550 psi) ASTM D 412
- o Elongation 350% min ASTM D 412

- o Tear (die B) 36Kg/25 mm min ASTM D 624

(80 lb/in min)

- o Compression Set (350F, 22 hrs) 30% ASTM D 395

- o Operating Temperature Range* -51C to 232C

(-60F to 450F)

- o Specific Gravity 1.51

*The operating temperature range indicates the material remains elastomeric in nature at these temperatures.

2. Silicone Locking Adhesive. A one-part, non-sag, high modulus silicone adhesive as recommended by the manufacturer and having the following physical requirements:

- o Sag/Flow 5 mm (3/16-inch)max ASTM C 639

- o Color Visual Black

- o Hardness 20-25 ASTM C 661

- o Tack Free Time 30 minutes max ASTM C 679

- o Color Visual Black

- o Hardness 20-25 ASTM C 661

- o Tack Free Time 30 minutes max ASTM C 679

- o Cure Through to 6 mm, 16 hrs max @ 399 C (750 F) 50%RH

(1/4-inch) thickness

- o Skin over time 5 minutes max @ 399C (750F)/ 50%RH

- o Resistance to UV No cracking, ozone ASTM C 793

chalking or degradation

- o Peel adhesion to substrates 23 Kg/25 mm ASTM C 794

(50 lbs/inch)

3. Cleaning Solvent. Recommended by Joint Sealing System Manufacturer.

4. Primer. Recommended by Joint Sealing System Manufacturer.

(b) Joint Backing Material. Section 705.9, as necessary.

(c) Certification. Submit a materials certification for the joint sealing system, certifying the conformance of the system's materials as required by Section 106.03(b)3.

III. CONSTRUCTION - As shown on the plans and as follows:

(a) General. Have a manufacturer's qualified representative present during the installation of the joint system, to provide aid and instruction on installation. Have on site all necessary product information relative to the proper installation of the joint system.

Store materials in their original containers and protect from damage.

Clean joint opening of existing debris by disc grinding or abrasive blasting. If sandblasting is used, demonstrate to the Engineer that the equipment will deliver oil-free air to the joint surfaces. Upon completion of surface preparation, vacuum the opening or blow clean the debris with compressed air.

Repair existing, spalled joint faces with materials deemed by the manufacturer's representative to be compatible with the joint materials of this specification, and in accordance with the Manufacturer's written instructions.

Insure ambient temperature, at the time of joint installation, is a minimum of 13 C (55F). No installations may be performed in rainy weather. All surfaces must be completely dry prior to applying silicone locking adhesive.

Prior to installation, clean the joint gland seal using a solvent saturated cloth and prime the joint surfaces.

(b) Other Installations.

1. Irregular joint openings or joints larger than 76 mm (3 inches). These joint openings may require the use of a Joint Backing Material, to properly position the joint gland. Install the joint gland in one continuous length from gutter line to gutter line. Apply a bead of silicone locking adhesive approximately 64 mm (2.5 inches) below the deck surface on both sides of the joint opening. Position the joint gland to the proper depth and apply a second bead of silicone locking adhesive along each side to the top of the serration. Apply silicone locking adhesive in excess of the minimum dimension recommended by the Manufacturer. Tool the silicone locking adhesive twice to insure complete contact with the vertical surfaces of the joint edge. Splicing of the joint gland is not permitted.

2. Curbs. Where permitted, the joint gland is to run continuously from the roadway into the safety walk or parapet. Curve the joint gland gradually upward in the safety walk or parapet to provide a watertight seal. Cut an additional piece of the joint gland to fit and place parallel to the outside edges of the curb joint opening as directed by the Engineer. Where this treatment is not possible, miter cut the joint gland and rejoin into a configuration at the gutter line as required and install in accordance with the Manufacturer's instructions.

IV MEASUREMENT AND PAYMENT -

(a) Silicone Joint Sealing System. Linear Meters (Feet). Measured on a horizontal line along the centerline of the joint gland, including any extra joint gland required to seal curb areas.

(b) Joint Backing Material. Linear Meters (Feet). As needed.

Project Specific Details:

Special Provision: **P10191A - c10191 ITEM 9019-2152 (ITEM 9019-0152)
PROTECTIVE COATING FOR REINFORCED CONCRETE
SURFACES.**

Item(s) Associated:

Header:

ITEM 9019-2152 (ITEM 9019-0152) PROTECTIVE COATING FOR REINFORCED CONCRETE

SURFACES.

Provision Body:

I. DESCRIPTION - This work is applying a protective coating of the type specified and as directed.

II. MATERIAL - Section 1019.2 with revisions and additions as follows:

Section 1019.2(c) revise title as follows:

(c) Penetrating Sealers (for Reinforced Concrete Surfaces Not Exposed to Vehicular Traffic).

(d) Penetrating Sealers (for Reinforced Concrete Surfaces Exposed to Vehicular Traffic). Furnish a penetrating sealer from a manufacturer listed in Bulletin 15 as follows:

1. Silicates in Water. Certify as specified in Section 106.03(b)3. Meet the following requirements:

	Property	Test Method	Requirements
	Freeze/ Thaw Resistance	ASTM C 666, Procedure A, modified as follows: Use Class AA cement concrete for the test specimens. Test 4 specimens; 2 with sealer, 2 without sealer. Apply penetrating sealer to all sides of specimens as per manufacturer's recommendations. Repeat using Class AA cement concrete without air entrainment.	No visible cracking, powdering, hairline cracking or spalling.
	Chlorine Ion Penetration	Chloride Ion Penetration AASHTO T 259, Section 3.6, modified as follows: Use Class AA cement concrete with water/cement ration of 0.55 for the test specimens. Apply penetrating sealer to top surface of specimens as per manufacturer's recommendations. Sandblast treated surface, removing approximately 2 mm (1/16-inch) before ponding with NaCl.	Maximum Chloride Content Absorbed: 1.6 mm (0.0625-inch) to 13 mm (0.5-inch) -0.31% >13 mm (0.5-inch) to 25 mm (1.0-inch) -0.06%
	Skid Resistance	ASTM E 274 and ASTM E 524 (Smooth Tire)	Acceptable to MTD
	Concrete Discoloration	Visual	Provide a penetrating sealer that does not discolor cement concrete

III. CONSTRUCTION - Section 1019.3 with revisions and additions as follows:

(c) Penetrating Sealers (for Reinforced Concrete Surfaces Not Exposed to Vehicular Traffic).

1. Surface Preparation. Thoroughly dry and clean the surfaces of any dirt, debris, oil, grease and foreign matter which would prevent protective coating penetration, adhesion, or drying.

2. Application. Apply penetrating sealer, which does not discolor the concrete, to areas indicated in accordance with the manufacturer's specifications.

(d) Penetrating Sealers (for Reinforced Concrete Surfaces Exposed to Vehicular Traffic).

1. Storage. Keep the product under cover and at temperatures above freezing.

2. Surface Preparation. Thoroughly clean the surfaces of any dirt, debris, oil, grease, and foreign matter, which would prevent penetration, adhesion, or drying. For bridge decks, seal cracks greater than 2 mm (1/16-inch) as specified in Section 1091, as indicated, or as directed by the Engineer. For pavements and other areas, seal cracks greater than 2 mm (1/16-inch) as specified in Section 590. Repair surfaces as indicated or directed by the Engineer. Do not apply penetrating sealer until cement concrete is cured as specified in Section 1019.3(a)1.b, and crack sealers have completely cured.

3. Application. Follow manufacturer's recommendations for air and/or surface temperatures and, if applicable, other climatic conditions, to properly apply the penetrating sealer. Each day before and during application, mix, stir, or otherwise prepare the penetrating sealer, if required, in accordance with the manufacturer's recommendations. Use rollers, brushes, sprayers, or other applicators, in accordance with the manufacturer's recommendations, to apply the penetrating sealer. Apply the penetrating sealer in two or more coats and at application rates as recommended by the manufacturer. Cure each coat in accordance with the manufacturer's recommendations. If for any reason and in the opinion of the Engineer, the penetrating sealer does not penetrate the surface, remove the penetrating sealer by sand blasting and reapply at no cost to the Department.

On new reinforced concrete surfaces, do not apply pavement markings until 7 days after the application of penetrating sealer.

On existing reinforced concrete surfaces, remove pavement markings, apply penetrating sealer, and cure the penetrating sealer in accordance with the manufacturer's recommendations before reapplication of pavement markings.

IV. MEASUREMENT AND PAYMENT - Section 1019.4 with additions as follows:

Includes the cost of additional sand or water blasting, if required, for surface preparation.

Project Specific Details:

Special Provision: **P10431B - c10431 ITEM 9043-2101 (ITEM 9043-0101) - EPOXY-BASED SURFACE TREATMENT FOR BRIDGE DECKS**

Item(s) Associated:

Header:

ITEM 9043-2101 (ITEM 9043-0101) - EPOXY-BASED SURFACE TREATMENT FOR BRIDGE DECKS

Provision Body:

I. DESCRIPTION - This work is preparing deck surfaces, furnishing and construction of a multiple layer wearing surface of epoxy resin or epoxy-urethane resin and aggregate on in-service bridge decks.

The indicated or specified depth of the wearing surface is minimum.

II. MATERIAL -

(a) Epoxy Resin. A two-component, (base and hardener), 100% solids, thermosetting, moisture insensitive, flexible, high elongation epoxy resin, from a manufacturer listed in Bulletin 15, and meeting the following physical requirements at 24 +/- 1 C (75 +/- 2 F) when base and hardener are combined:

Viscosity (ASTM D 2393-86, Model RVT Brookfield, Spindle No. 3 at 20 rpm)	10-25 poises
Gel Time (ASTM C 881, para. 11.2 modified, 70 ml sample)	15-45 minutes
Tensile Strength (neat), 7-day (ASTM D 638) (2,500-5,000 psi)	17.2 - 34.4 MPa
Tensile Elongation (neat), 7-day (ASTM D 638)	30-70%
Absorption (neat), 24-hour (ASTM D 570)	1%, Maximum
Compressive Strength (mixed with aggregate), 3 hrs. (1,000 psi, minimum) (ASTM C 109, 50 mm square mortar cube with plastic inserts)	6.9 MPa
Compressive Strength (mixed with aggregate), 24 hrs. (5,000 psi, minimum) (ASTM C 109, 50 mm square mortar cube with plastic inserts)	34.4MPa
Permeability to chloride ion, 28-days (AASHTO T277)	100 coulombs, Maximum
Thermal Compatibility (Mixed with aggregate) (ASTM C 884)	No delamination of overlay or cracks in the concrete
Infrared spectrum (AASHTO T237, para. 4 & 5)	Established for each for each component for each Manufacturer

(b) Epoxy-Urethane Resin. A two-component, (base and hardener), 100% solids, thermosetting, moisture insensitive, flexible, high elongation epoxy-urethane resin, from a Manufacturer listed in Bulletin 15, and meeting the following physical requirements at 24 +/- 1 C when the base and hardener are combined:

Viscosity (ASTM D 2393-86, Model RVT Brookfield, Spindle No. 3 at 20 rpm)	35-70 poises
Gel Time (ASTM C 881, para. 11.2 modified, 70 ml sample)	15-45 minutes
Tensile Strength (neat), 7-day (ASTM D 638) (2,500-5,000 psi)	17.2 - 34.4 MPa
Tensile Elongation (neat), 7-day (ASTM D 638)	30-70%
Absorption (neat), 24-hour (ASTM D 570)	1%, Maximum
Compressive Strength (mixed with aggregate), 3 hrs. (1,000 psi, minimum) (ASTM C 109, 50 mm square mortar cube with plastic inserts)	6.9 MPa

Compressive Strength (mixed with aggregate), 24 hrs. (5,000 psi, minimum) (ASTM C 109, 50 mm square mortar cube with plastic inserts)	34.4MPa
Permeability to chloride ion, 28-days (AASHTO T277)	100 coulombs, Maximum
Thermal Compatibility (Mixed with aggregate) (ASTM C 884)	No delamination of overlay or cracks in the concrete
Infrared spectrum (AASHTO T237, para. 4 & 5)	Established for each for each component for each Manufacturer

(c) Certification.

Certify each lot of epoxy or epoxy-urethane resin as specified in Section 106.03(b)3.

Independent quality assurance sampling and testing may be performed by the Bureau of Construction and Materials and will be used for the purpose of making independent checks on the certification acceptance procedure as specified in Section 106.03(b)1.

(d) Fine Aggregate. Provide aggregate from an approved source of Type A fine aggregate listed in Bulletin 14 and/or approved by the Bureau of Construction and Materials, and also approved by the epoxy-based concrete overlay Manufacturer. This aggregate consists of angular silica sand, basalt, or other highly siliceous metamorphic or igneous rock having less than 0.2 percent moisture, and free of dirt, clay asphalt and other foreign or organic materials. Provide an aggregate with a minimum Mohs' scale hardness of 7, and meeting the following gradation:

Sieve Size	Percent Passing by Weight
4.75 mm (#4)	100
2.36 mm (#8)	30 - 75
1.18 mm (#16)	0-5
600 m (#30)	0-1

(e) Manufacturer Technical Representative. Have a trained, Manufacturer Technical Representative present during every phase of the application, unless a factory trained, licensed installer, as indicated by written approval from the Manufacturer, applies the epoxy-based concrete overlay. Manufacturer Technical Representative will provide recommendations to the Engineer on approval or disapproval of deck surface preparation, equipment, mixing of components, type and method of application, and finish.

III. CONSTRUCTION -

(a) Delivery and Storage. Order, stock and store the material necessary to perform the entire overlay application prior to any field preparation. Deliver and store all epoxy-resin and epoxy-urethane resin materials in containers, with the manufacturer's name, date of manufacture, batch number, trade name, quantity and mixing ratio printed on the label.

Store and protect the materials from the elements to insure their quality and fitness for the work. Keep the storage space clean and dry, and do not allow the temperature of the storage space to fall below 16 C (60 F) or exceed 38 C (100 F). Avoid contact with flame.

Immediately remove from the work site any material which is rejected because of failure to meet the required tests or that has been damaged.

(b) Equipment. Have all equipment for the deck preparation, mixing and placement of the epoxy-based concrete overlay approved by the Engineer prior to the start of any work.

1. Surface Preparation Equipment. Provide shotblasting equipment capable of removing partially loosened chips of concrete, cleaning the bridge deck surface, roughening the bridge deck surface, and removing rust and/or corrosion from steel expansion joint assemblies or steel-grid decking. Do not use scarifiers, milling machines, or sandblasting in lieu of shotblasting, unless otherwise approved by the Engineer.

Provide a self-propelled vacuum capable of picking up dust and other loose material from the shotblasting operation.

Provide air compressors equipped with an oil/water separator capable of drying all moisture from the bridge deck.

2. Epoxy Resin or Epoxy-Urethane Resin Application Equipment. Of the following types:

2.a Mechanical Application Equipment. Provide mechanical metering, mixing, and distribution equipment that accurately meters and blends the base and hardening components, and uniformly applies the blended epoxy-based resin at the specified rate to the bridge deck in order to cover 100% of the work area. Provide equipment approved by the epoxy-based overlay Manufacturer.

Provide a fine aggregate spreader that uniformly applies the aggregate at the specified rate in order to cover 100% of the epoxy-based resin material.

Provide a self-propelled vacuum truck.

Provide lighting for work performed at night.

2.b Hand Application Equipment. Provide calibrated containers for proper proportioning of the base and hardening components.

Provide a clean, dry, container large enough to blend and mix the proper proportions of base and hardening components.

Provide a powered, paddle-type mixer for blending the base and hardening components.

Provide squeegees, rollers or brooms that are suitable for applying the mixed epoxy-based resin on the bridge deck surface at the specified application rate.

Provide shovels, hand spreaders, and/or other hand tools that are suitable for applying the aggregate at the specified rate.

Provide brooms or air compressors equipped with an oil/water separator to remove excess aggregate after each layer of the overlay has cured.

(c) Surface Preparation. Remove any unsound concrete and repair the areas in accordance with Section 1040, as directed by the Engineer. Do not use patching material containing magnesium phosphate.

Do not apply the epoxy-based concrete overly on hydraulic cement concrete that is less than 28 days of age. Not more than 24 hours before overlay placement begins, clean the surface of the bridge deck by shotblasting and/or other approved methods to expose the coarse aggregate, and to remove any asphaltic material, oils, dirt, rubber, curing compounds, paint carbonation, laitance, weak surface mortar, and other detrimental materials that would interfere with the bond or cure of the overlay. After shotblasting, vacuum the bridge deck surface to remove all dust and other loose material. Brooms are not to be a substitute for the vacuum. Protect the existing expansion dams in a manner acceptable to the engineer during surface preparation.

Use compressed air that is free of oil and water to remove all moisture from the surface of the bridge deck before application of the overlay. Maintain a completely dry surface during the application of the epoxy-based concrete overlay.

Protect the deck against damage, contamination and traffic until the overlay operation is completed. Satisfactorily repair damaged areas prior to placing succeeding construction.

(d) Placing Epoxy-Based Concrete Overlay. Satisfy the Engineer that all necessary equipment, tools, materials, and workforce are on hand at the site of work, and that all workers are familiar with the blending and application of the overlay.

If required by the Engineer, place the overlay on a small test strip not to exceed 9 square meters (100 square feet) off the project site. Use the test strip for equipment calibration and to establish procedures, and techniques for the actual overlay placement on the bridge deck.

Cover exposed areas not to be overlaid with the epoxy-based concrete overlay, such as curbs, sidewalks, railings, parapets, or inlets with suitable coverings.

Premark the bridge deck surface as a guide to obtain the proper application rate when applying the mixed epoxy-based resin by hand.

Combine and mix the base and hardener components as specified by the Manufacturer. Immediately after mixing, apply the mixed epoxy-based resin by a distributor, squeegee, or paint roller, or combinations thereof. Apply the material smoothly, uniformly and continuously over 100 percent of the deck surface. do not allow the mixed epoxy-based resin to puddle or accumulate in holes or depressions in the deck.

Apply the epoxy-based concrete overlay using a minimum of two (2) separate courses at the following application rates:

Course	Mixed Epoxy-Based Resin Application Rate	Aggregate Application Rate
	Liters/Sq. Meter (gal./100 sq. ft.)	Kg/Sq. Meter (lbs./sq.yd.)
1	1.0 (2.5) minimum	5.4+ (10)
2+	2.0 (5.0) minimum	7.6+ (14)

Apply the aggregate at the specified rate, in a uniform manner, such that the aggregate just covers the epoxy base resin. Apply the aggregate within five minutes after application of the mixed epoxy-based resin or as recommended by the Manufacturer.

Repair areas of individual courses identified by the engineer that did not receive a uniform and sufficient application of aggregate before the epoxy based resin is cured. Sandblast areas identified as having insufficient aggregate. Clean sandblasted areas of all loose material. Apply the epoxy-based resin and aggregate to the clean, sandblasted areas in accordance with these specifications.

Remove the excess aggregate from each course after the course has completely cured. Use brooms, vacuums, compressed air free from oil and water, or other approved methods to remove the excess aggregate. Do not remove excess aggregate until vacuuming or brooming can be performed without tearing or damaging the surface.

Protect the existing expansion dams with suitable covers during application of the multilayer epoxy based concrete overlay.

(e) Limitation of Operations. Do not apply the epoxy-based concrete overlay at surface, air, or resin and aggregate component temperatures lower than 16 C (60 F). Do not apply the epoxy-based concrete overlay if the

temperature is expected to drop below 13 C (55 F) within 8 hours after application, or the gel time of the mixed epoxy-based resin experienced becomes less than 10 minutes.

Do not allow vehicular traffic on the first course. Do not allow vehicular traffic on any course during the cure period.

Cure each course for the minimum cure period as follows unless longer periods are recommended by the Manufacturer.

Average temperature of deck surface, resin, and aggregate components in C (degree F):

Course	16-18 (60-64)	19-21 (65-69)	22-23 (70-74)	24-26 (75-79)	27-29 (80-84)	30 + (85 +)
1	4 hrs	3 hrs	2.5 hrs	2 hrs	1.5 hrs	1 hr
2+	6.5 hrs	5 hrs	4 hrs	3 hrs	3 hrs	3 hrs

(f) Defective Work. In accordance with Section 105.12 and as follows:

If temperatures fall below 16 C (60 F), the Engineer will require a longer curing period. If, at any time during the curing period, the temperature falls below 10 C (50 F), the work may be considered unsatisfactory and rejected.

Protect freshly applied epoxy-based concrete overlays from sudden or unexpected rain Contractor operations. Stop all application operations when it starts to rain. The Engineer may order removal and replacement of any material damaged by rainfall or Contractor operations that cannot be satisfactorily repaired.

Remove the replace rejected or damaged epoxy-based concrete overlay in rectangular sections by milling or saw cutting to the top of the concrete deck surface. Remove and replace at no additional cost to the Department.

(g) Application of Live Loads. Do not allow vehicular equipment or the traveling public on the epoxy-based concrete overlay before the overlay is cured.

IV. MEASUREMENT AND PAYMENT - Square Meter (Square Yard).

Payment includes surface preparation, furnishing and applying all courses and saw cutting the joints.

Repairs to the bridge deck will be paid separately for type of concrete bridge deck repair indicated.

Project Specific Details:

Special Provision: **P10611B - c10611 ITEM 9061-2101 (ITEM 9061-0101) SHOP METALLIZING AND PAINTING OF NEW . . .**

Item(s) Associated:

Header:

ITEM 9061-2101 (ITEM 9061-0101) SHOP METALLIZING AND PAINTING OF NEW STRUCTURAL

Provision Body:

I. DESCRIPTION -

This work is the metallizing and painting seal coating of new structural steel including bearings, rockers, pot bearings, and all other bearing surfaces in the shop. Finish coating can be painted either in the shop or in the field as specified.

The coating system as specified herein consists of 85% zinc and 15% aluminum (85/15 zinc/aluminum) wire thermally sprayed as metallizing, a seal coat and a finish coat that is compatible with the seal coat.

All steel to be metallized must be cut large enough to accommodate the reduction in size resulting from grinding of the flame hardened edge.

II. MATERIAL -

(a) Painting Contractor/Shop Applicator Qualifications. Use a Painting Contractor/Shop Applicator certified by the American Institute of Steel Construction (AISC) Sophisticated Paint Endorsement (SPE) quality program or under the Society for Protective Coatings (SSPC) QP3 program, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators" to apply the metallizing and painting.

In addition to the certifications, the Painting Contractor/Shop Applicator must have completed a minimum of three structural steel metallizing/painting projects involving 85/15 zinc/aluminum. Provide a list of project locations, approximate metallizing/painting project cost, dates of the work, and the name and telephone number of a person in contact with the Owner.

Individually qualify the person(s) applying the metallizing as follows:

- Each person must complete practical tests designed to demonstrate the ability to set up and operate the equipment, to apply the material to the specified thicknesses in two passes to a minimum of 0.93 m² (10 square feet) of representative steel surfaces, and to successfully pass the bend, tensile adhesion, and cut tests as specified in Section III(c)6. Administer the qualification testing, document the results in writing, and retain the bend test coupons for the duration of the project. Provide the Chief Structural Materials Engineer with a minimum 5-day notice before qualification testing, in order to afford the Engineer with the opportunity to witness the tests.
- Persons who fail to pass the above qualification tests cannot be used for the application of metallizing on the project.
- At the discretion of the Engineer, requalify the applicators to reconfirm their proficiency and the quality of work. This can be required at any time due to poor results of the bend test, tensile adhesion test, or cut test.

(b) Technical Representation. It is mandatory to obtain the services of qualified technical advisors, employed by the manufacturer(s) of the metal wire and coatings. Have the technical advisors assist in establishing correct application methods for the metallizing, seal, and finish coats. Have the technical advisors make routine shop and field visits at the beginning of the respective operations and whenever required during the operations.

(c) Metallizing Coat. Provide 85/15 zinc/aluminum wire meeting the compositional requirements listed under AWS Classification W-ZnAl-2 of Table C1 of SSPC CS 23, "Specification for the Application of Thermal-Spray Coatings (Metallizing) of Aluminum, Zinc, and Their Alloys and Composites for the Corrosion Protection of Steel." Once a manufacturer is approved, they must be used for the entire project.

(d) Seal Coat. Provide one of the following seal coats:

- Carboline - Carboguard 888
- Devoe - Devran 201

- Sherwin Williams - Recoatable Epoxy B67 Series

The Engineer will provide the completed Form TR 447 to the MTD.

(e) Finish Coat. Only on fascia beams/girders, and/or as indicated, provide the finish coat from the approved list in Bulletin 15, Section 1060, that is compatible with the seal coating chosen from Section II(d). Use manufacturer's technical data sheets and recommendation for final compatibility of seal coat with chosen finish coat. Use the same manufacturer as the seal coat and throughout all work.

(f) Inorganic Zinc Primer. Section 1060.2

(g) Material Certification. Section 106.03(b)3 and modified as follows for the zinc/aluminum wire, seal coat, and finish coat:

- Submit a dated certification, Form CS-4171 supplied by the Department, from the wire and coating manufacturer(s), that each batch of the system meets specifications and meets Section 106.10(a) "Buy America" requirements.
- Provide a Certified Mill Test Report from the manufacturer for each lot of zinc/aluminum alloy wire.
- Provide coatings that are lead and cadmium free.
- Provide the following for the seal and finish coats:

- Infrared curves (2.5 to 15 μm (2.5 to 15 microns))

- Mass per liter (weight per gallon), at 25°C (77F)

- Viscosity in Krebs Units, at 25°C (77F)

- Percent solids by mass (weight)

- Verification Sample: Obtain two, 1.14L (1 quart) samples from each coat of the coating system to be provided to the project. Provide these samples for each production batch manufactured for the project. A production batch is one distinct, identifiable unit of production of material outlined in the manufacturer's quality control plan. Test one, 1.14L (1 quart) sample and forward the results to the MTD. Forward the remaining 1.14L (1 quart) sample to the application site for sampling by the Inspector. The MTD will evaluate quality control based on three consecutive verification samples.

(h) Submittal Requirements. Submit the following information to the District Engineer/Administrator a minimum of 14 days before beginning the work:

1. Finish Coat Color Chips. Provide color chips (with Federal Standard 595 color number) in conformance with no greater than Delta E of 6.

2. Metal Wire Certification. Provide written confirmation and test reports that the wire meets the requirements of Section II(c) and (g) for the certification of Class B slip coefficient and creep resistance, rating of $K_s = 0.50$ in accordance with AASHTO and Publication 15M 6.13.2.8-3 including the thickness range required to meet the certification.

3. Coating Certifications. Provide the brand names of the products selected for the seal and finish coats in accordance with Section II(d) and (e), and the test results for the coatings identified in Section II(g).

4. Manufacturers' Data Sheets, Instructions, and Procedures. Provide Materials Safety Data Sheets (MSDS) for the metallizing, seal coat, and finish coat; specific application procedures for all coats, including thinning; coating repair procedures in accordance with Section III(d); and a table indicating recoat times versus ambient

temperatures. In the event of a conflict between the date/instruction sheets or procedures and these specifications, the specification requirements will govern unless otherwise specified. Work will not be allowed to proceed until this information is received.

5. Department of Environmental Protection (DEP) Notification. Written acknowledgement that the regional office (based on bridge location) of the DEP was contacted and that they are aware of the controls to be exercised.

Work will not be allowed to proceed until the Department receives written acknowledgement that the regional office of DEP was contacted and is aware of the controls to be exercised to complete the work in compliance with its regulations. No extension of contract time will be allowed for delays caused by failure to make a timely submission for this acknowledgement. Costs to comply with requirements of regulatory agencies are incidental to this item.

Conviction of a criminal summary complaint issued by DEP may be cause for suspension of prequalification.

6. Quality Control Plan. Provide written plans for verifying the quality of surface preparation, cleaning, and the application of the metallizing and paint coats, in accordance with the inspection points identified in Section III(g). Include the bend, tensile adhesion, and cut tests for the metallizing and address work performed in both the shop and field.

7. Work Schedule. Provide the schedule for surface preparation, shop metallizing, seal coating, finish painting, shipping, and field touch up/field painting. Notify the Engineer a minimum of 1 week before starting shop surface preparation.

(i) Pre-Application Meeting. Arrange for a meeting at the shop 1 month in advance of starting the work to discuss the project requirements with the Department and to allow for an examination of the surface preparation, metallizing, and coating application equipment, including inspection instrumentation.

(j) Quality Control. Section 106.03(a)2.

III CONSTRUCTION -

(a) General.

1. Surfaces to be Metallized and Painted. Abrasive blast clean all structural steel. Then shop metallize all structural steel with the exception of the entire top sides of those top flanges that will have shear connectors attached. Surfaces to be metallized include, but are not limited to beams and girders, cross girders, steel components of the bearings, diaphragms and cross frames, structural steel utility supports, and non-galvanized structure mounted sign supports.

Shop apply an inorganic zinc primer in accordance with Section 1060, to the top sides of the top flanges that will have shear connectors attached.

Do not paint shear connectors.

Shop apply the seal coat to all surfaces that are metallized except for faying surfaces, connection areas, bottom surfaces of bearing sole plates, and all steel within 50 mm (2 inches) around the connection areas. Mask or otherwise protect these surfaces to prevent the application of the seal coat to these areas. Exercise special care to assure that the seal coat completely and thoroughly covers all metallized steel surfaces.

Shop apply the finish coat to the same surfaces that are coated with the seal coat, except to the outside and underneath surfaces of the fascia beams.

Field apply another coat of the seal coat and the finish coat to the exterior surfaces of all connections and all fasteners, and to the outside and underneath surfaces of the fascia girders.

2. Protection of Structure, Persons, and Property. Conduct all activities associated with the coating work in accordance with all applicable Federal (OSHA), Environmental Protection Agency, Commonwealth of Pennsylvania, and local (based on bridge location) safety regulations and SSPC-PA Guide 3, A Guide to Safety in Paint Application.

Furnish and have available to the Engineer at all times during the metallizing and painting operations, and at no additional expense to the Department, four NIOSH/MESA approved respirators, and other safety equipment needed to allow proper inspection of ongoing work. Furnish the required safety equipment before the start of work. Use scaffolding and rigging in compliance with OSHA regulations to enable safe and ready access to the work areas for inspection purposes.

Protect pedestrians, vehicular, and/or other traffic upon or under the bridge, the bridge superstructure and substructure, surrounding property, surfaces, buildings, grounds, etc., against damage or disfigurement from surface preparation media, or spatters, splashes, overspray, and smirches of paint or material. Furnish adequate containment materials for protection.

Remove paint dropped or sprayed on concrete and other surfaces not designated to receive coatings, debris from the cleaning operations, empty paint containers, and other refuse. Correct all damage created at no additional cost to the Department.

3. Pollution Controls. Prevent environmental pollution including stream and air pollution caused by surface preparation media, paint spills or overspray, paint chips, dust, or other harmful materials.

Comply with the regulations of DEP and the State Fish and Game Commission.

(b) Surface Preparation.

1. Shop Test Areas. Prior to proceeding with the production blast cleaning operations in the shop, prepare test sections of at least 0.93 m² (10 square feet), in locations considered by the Inspector to be representative of existing surface conditions and structural characteristics. Blast clean test section areas using the same equipment, materials, and procedures to be used for the production blast cleaning. Provide safe access for close visual inspection and testing. Do not proceed with the production blast cleaning operation until the Inspector agrees that the surface of each test section complies with the specified requirements.

In addition to preparing the test sections on the steel members, prepare a minimum of five, 0.09 m² (1 square foot) test plates. Blast clean one side of each plate using the same equipment and abrasive that will be used for the production work. After acceptance of the surface cleanliness and profile, apply the metallizing to half of each plate. After the metallizing has been applied and accepted for thickness, perform the tensile adhesion test (as specified in Section III(c)6.b) and the cut test (as specified in Section III(c)6.c) and seal all five plates with a clear urethane to prevent oxidation. Retain the plates for future reference.

2. Solvent Cleaning. Where oil and grease are present on the bare steel, remove it in accordance with SSPC Surface Preparation Specification No. 1 Solvent Cleaning (SSPC-SP1) before blasting. If contamination remains after blasting, reclean with solvent before painting.

3. Weld Spatter, Sharp Edges, Flame-Cut Steel, Holes Fins, and Slivers. Remove slag, flux deposits, and weld spatter from the steel. Grind any resulting burrs smooth, including burrs around holes. Prior to abrasive blast cleaning remove the surface of flame hardened or carburized steel by grinding. Grind the surface until the follow up abrasive blast cleaning is able to generate a sufficient surface profile for the metallizing to pass the tensile adhesion test criteria. Break all flame-cut and sheared edges to an approximate 1.6 mm (1/16-inch) radius. The rolled edges of angles, channels, and wide flange beams do not require rounding unless specifically directed by the Engineer.

All steel, that will be flamed cut or has hardened edges should be 3 mm (1/8-inch) larger and/or wider on the edge for grinding.

Remove fins and slivers in the steel by grinding. If the steel has already been blast cleaned before these surface conditions are observed, or if additional grinding of weld spatter, burrs, or edges are required, reblast the ground areas in accordance with the requirements of this specification.

4. Shop Blast Cleaning and Abrasives. Blast clean all steel to a White Metal condition, as defined in SSPC-SP5.

Determine the SSPC-SP5 condition by use of SSPC-VIS 1-89. In the event of a conflict between the pictorial standard and the written SSPC definition, the written definition prevails.

For blast cleaning that utilizes compressed air, utilize only clean, dry air. Conduct blotter test(s) in accordance with ASTM D4285 a minimum on one time each shift for each compressor system in use to verify that the air supply is free of moisture and oil contamination. Conduct the test(s) in the presence of the Inspector.

Select abrasive size and type based on the type, grade, and surface condition of the steel to be cleaned, the finished surface condition to be attained, and to achieve the bend, tensile adhesion, and cut tests criteria for the metallizing. Select abrasives that create a dense, uniform pattern of sharp, angular depressions and ridges. The surface profile created by the abrasive cannot be less than 102 microns (4 mils). Determine the surface profile depth using the Keane-Tator Surface Profile Comparator (Grit/Shot disc), or Testex Press-O-Film Replica Tape-Extra Coarse Tape in accordance with ASTM D4417. Measure the profile at the frequencies specified in SSPC CS 23. If the profile is outside of the specified range, obtain different abrasives and reclean the steel.

Use abrasives that are clean and dry. On the final (angular) profiling blasting operation, if recyclable abrasives are used for cleaning, do not use steel shot and do not increase steel shot into the abrasive mixture. Use angular abrasives such as steel grit or aluminum oxide of sufficient size and hardness to create the required sharp, angular, anchor profile with no peening effect, and is clear and free of embedded friable material. Frequently add new abrasives to the blast cleaning system in order to maintain the angularity of the surface profile.

If non-recyclable abrasives are used, select low dust, sharp, angular abrasives and use the abrasive only once. Select the non-recyclable abrasives in accordance with SSPC-AB1.

5. Field Surface Preparation. After the deck is placed and before field touch up and field painting, remove soil, concrete spatter, drawing compounds, salts, grease, oil, diesel smoke, or other foreign matter from all surfaces by Low Pressure Water Washing in accordance with SSPC-SP12 utilizing a minimum of 10.3 MPa (1,500 pounds per square inch), supplemented by solvent cleaning and brushing with stiff fiber wire brushes and scraping. Use biodegradable cleaners as necessary and as recommended by the coating manufacturer, and follow by a fresh water rinse. Remove all lubricants, however, residual dye within the profiles of the substrat is allowed from nuts and bolts, and detrimental deposits from new weld areas. Do not apply any coatings until the Inspector has accepted the surface cleanliness.

Use hand and power tool cleaning in accordance with SSPC-SP2 and SP3 to prepare damaged seal coat or finish coat, to repair coatings damaged in the welding heat effected zone, and to remove oxidation from the unsealed metallizing surrounding connection points. When cleaning the surface of the metallizing, use tools that will not polish or burnish the surface. If the metallizing is damaged in areas less than 100 mm x 100 mm (4 inches x 4 inches), clean the surface to SSPC-SP11 in preparation for a spot coat or organic zinc primer. For damage greater than 100 mm x 100 mm (4 inches x 4 inches), blast clean the areas in accordance with the requirements of this specification in preparation for spot-applying additional metallizing.

(c) Metallizing and Coating Application.

1. Storage and Mixing. Store the wire and all paints under cover, out of direct sunlight, and between 4.5°C (40F) and 38°C (100F). If the requirements of the manufacturer are more restrictive, comply with the more restrictive requirements. Mix the coatings as follows:

1.a Seal Coat. Mix, thin, and strain the seal coat in accordance with Section III(c)1.c and Section III(c)1.d. Unless prohibited by the manufacturer, mix the coating with a high shear mixer (such as a jiffy mixer). Mix the

coating to achieve a smooth, lump free consistency. Assure that all of the coating solids that might have settled to the bottom of the container are thoroughly dispersed. Mix in the original containers.

1.b Finish Coat. Mix, thin, and strain the finish coat in accordance with Section III(c)1.c and Section III(c)1.d, to achieve and maintain a homogeneous mixture.

1.c Thinning Paint. Thin the paint using thinners provided by the manufacturer and in proportions as recommended by the manufacturer. Thin the seal coat in accordance with the manufacturer's instructions in order to penetrate, and seal the porosity of the metallizing. Do not exceed local VOC regulations for any coat at the time of application.

1.d Straining. Strain the mixture through a 30-60 mesh screen to remove large particles.

2. Conditions for Application. Apply the metallizing and paint to clean dry surfaces and only during periods of favorable weather. Comply with the conditions specified below or the written requirements of the manufacturer, whichever is most stringent. Do not apply materials when:

2.a Temperature. The temperature of the air, paint, or metal is below 4.5°C (40F) or greater than 43°C (110F), or is forecasted to drop below 4.5°C (40F) before the coating dries in accordance with the times specified in the manufacturers' technical data sheet.

2.b Dew Point. The temperature of the surface is less than -15°C (5F) greater than the dew point.

2.c Relative Humidity. The relative humidity is above 85%.

2.d Dampness. The air is misty, the surfaces are damp or frosted, or when weather conditions are otherwise unsatisfactory.

In damp or cold weather, keep the coating work protected until thoroughly dry in accordance with the manufacturers' instructions, before exposing the steel to the elements.

3. Methods of Application. Apply all coats using equipment acceptable to the manufacturer, consistent with environmental constraints, and provides a finish acceptable to the Department. When compressed air is used, provide suitable traps or separators to exclude oil and water from the air. Conduct blotter test(s), in accordance with ASTM D4285, a minimum of one time each shift for each compressor system in use to verify that the air supply is free of moisture and oil contamination. Conduct the tests in the presence of the Inspector.

3.a Metallizing. Apply the metallizing using electric arc equipment in accordance with the recommendations of the manufacturer and SSPC CS 23.

3.b Seal and Finish Coats. Use brushes, rollers, spray equipment, or any combination of equipment recommended by the manufacturer and as authorized by the Engineer that give the results specified, herein.

Unless prohibited by the manufacturer, equip paint containers with a mechanical agitator so the mixture is in motion throughout the application period.

If rollers are used, select rollers that do not leave a stippled texture in the paint film. Use rollers only on flat, even surface to produce a paint film of even thickness with no skips, runs, sags, or thin areas. Do not use rollers if prohibited by the manufacturer.

If brushes are used, manipulate the paint under the brush to produce a uniform, even, coat. Work the paint into corners and crevices. Move the brush in a series of small circles to thoroughly fill irregularities in the surface, and then brush out and smooth by a series of parallel strokes until the paint film has an even thickness. Do not use brushes if prohibited by the manufacturer.

4. Shop Application and Field Touch-Up Requirements.

4.a Shop Application. Apply the metallizing within 6 hours after the final cleaning is performed and only after the Inspector had accepted the prepared surface. If the steel is blast cleaned and remains unpainted for longer than 6 hours, or if cleaned steel exhibits evidence of rust back, blast clean it again before metallizing. Remove abrasive residue and dust from the surface. Pay specific attention to pockets and corners. Unless restricted (e.g., in the case of lead-containing paint), conduct the cleaning using clean bristle, fiber, or hair brushes; vacuuming; blowing with clean, dry, compressed air; or a combination thereof.

Apply the metallizing in accordance with the requirements of the manufacturer and SSPC CS 23. Do not metallize the top sides of the top flanges that will have shear connectors attached. Apply inorganic zinc primer to these surfaces in accordance with Section 1060, but do not follow with seal and finish coats.

Apply the seal coat to the metallizing in accordance with the manufacturers' instructions as soon as possible after the application of the metallizing, but in no case greater than 8 hours and after the Inspector has accepted the metallizing. If longer than 8 hours provide written recommendations from the manufacturer(s) of the wire for metallizing, seal coating, and finish coating indicating what steps need to be taken to remove the oxidation from the metallized surface before painting. Do not implement the steps without written approval from the Engineer. Verify that the metallized surface is clean and dry before the application of the seal coat. If grease, oil, or similar contaminants become deposited on the metallizing, remove it in accordance with SSPC-SP1 before the application of the seal coat.

Apply the finish coat after the seal coat is dry to recoat in accordance with the manufacturers' instructions and the Inspector has accepted the seal coat.

Verify that the surface is clean and dry before the application of the finish coat. If grease, oil, or similar contaminants become deposited on the seal coat, remove it in accordance with SSPC-SP1 before the application of the finish coat.

Before the application of the full finish coat, apply a stripe coat of the finish to all edges, bolts, welds, corners, crevices, and other irregularities. Apply the stripe coat by brush and/or spray. Extend the stripe coat approximately 25 mm (1 inch) from edges, bolts, welds, corners, crevices, and other irregularities.

Do not apply the full finish coat for a minimum of 15 minutes after the application of the stripe coat in order to allow inspection personnel to verify that the stripe coat was applied. Do not apply the full finish coat until verification and approval of the striping is provided by the Inspector.

4.b Shipping, Storage, and Erection of Metallized Steel. Use extreme care in handling, storing, shipping, and erecting the steel to avoid damage to the metallizing/coating system. Do not move coated steel in the shop until sufficient dry-to-handle time, as recommended by the coating manufacturer(s), has elapsed to ensure no damage will occur to the fresh coatings.

Install padding on hooks and slings used to hoist the steel and use softeners approved by the Engineer to insulate the steel from binding chains. Space small structural pieces in such a manner that no rubbing will occur during shipment that could damage the coating.

Do not ship the steel until the Inspector has examined the loading and authorized its release.

Store the steel at the job site on pallets or other means approved by the Engineer, so the members do not fall onto each other or rest directly on the ground.

4.c Field Touch Up and Application. Do not apply coating in the field between October 31 and April 1 unless otherwise allowed in writing by the District Engineer.

Before painting, verify that all surfaces, including installed nuts and bolts and unsealed metallizing around connection plates are thoroughly cleaned by pressure washing, hand and power tool cleaning, blast cleaning,

and/or solvent cleaning in accordance with the requirements of Section III(b)5. Do not proceed with painting until the Inspector has accepted the surface cleaning.

Apply the same seal and finish coats used in the shop to nuts, bolts, and connection plate areas that had not previously received the finish coat. Apply the seal coat and the finish coat to the surfaces of fascia members that only received the seal coat in the shop. Comply with the intercoat cleanliness, film continuity, thickness, and recoat times as established for the shop painting work. Do not apply subsequent coats until the Inspector has accepted the previous coat.

5. Coating Thickness and Continuity. Apply the shop and field coats to the dry film thicknesses specified below and to achieve a surface that is free of shadow-through, runs, sags, overspray, dry spray, pinholes, skips, misses, and other film discontinuities.

Determine the cumulative dry film thickness of each coat using a Magnetic Dry Film Thickness Gage in accordance with SSPC CS 23 and SPC-PA2 with the following exceptions:

- Measure each 9.3 m² (100 square feet) increment of the surface.
- The minimum specified thickness of the metallizing must be achieved at each individual spot measurement location (i.e., the 20% under run allowed by SSPC-PA2 is not permitted for the metallizing).

Determine the thickness of each coat by subtracting the thickness of the underlying coats from the cumulative readings. If question are raised regarding the thickness of an individual coat, use the Tooke Gage. Repair any damage created by the Tooke Gage.

If the thickness of any coat (metallizing, seal coat, or finish coat) is less than specified, apply additional material in accordance with the manufacturer's instructions and as specified herein, unless otherwise directed by the Engineer, before applying the next coat. Before applying additional metallizing, visually confirm that there is no evidence of oxidation on the surface.

If the thickness of the metallizing is more than 406 microns (16 mils), notify the Engineer and conduct testing for delamination and adhesion at Contractor's expense. If testing fails remove and replace the metallizing as specified at not additional cost to the Department. If the seal coat or the finish coat exceeds the specified maximum or exhibits runs, sags, dry spray, overspray, or other discontinuities, remove the excessive thickness or discontinuity by power tool cleaning or abrasive blast cleaning. If the thickness is reduced to below the specified minimum, recoat the area. If the excessive thickness or discontinuity being removed is in the finish coat, apply a thin coat of finish material to the surface and smooth out any surface irregularities resulting from the removal process.

5.a Metallizing. Apply the metallizing to a total dry film thickness of 356 to 406 microns (14 to 16 mils) (above the surface profile). In faying surfaces, apply the metallizing to the thickness as certified for the Class B slip coefficient as specified in Section II(h)2.

5.b Seal Coat. Apply the seal coat to penetrate and seal the porosity of the metallizing. Completely cover the surface of the metallizing with dry film a, thickness of 38 to 76 microns (1.5 to 3 mils) above the metallizing. Field apply another coat of seal coat with a thickness of 38 to 76 microns (1.5 to 3 mils) to the exterior surfaces of all connections and fasteners and the outside and underneath surfaces of the fascia girders.

5.c Finish Coat. Apply the finish coat to a total dry film thickness of 51 to 102 microns (2 to 4 mils) above the seal coat(s), unless the requirements of the coating manufacturer exceed this thickness range, then comply with the manufacturer's recommendations.

6. Bend Testing, Tensile Adhesion Testing, and Cut Testing for Evaluation of the Metallizing. Conduct bend tests of the metallized coating before application of the metallizing each day. Conduct tensile adhesion and cut

tests on the production work before to the application of the seal coat.

6.a Bend Testing. For each metallizing applicator, blast clean five carbon steel coupons measuring 1.3 mm (0.050-inch) in thickness, 50 mm (2 inches) in width, and between 100 mm (4 inches) and 203 mm (8 inches) in length. Use the same equipment and abrasive used for the production work. Have each applicator apply the metallizing to all five coupons in accordance with the requirements specified in Section III(c)3.a and 5.a.

Conduct 180° bend testing on all five coupons using a 13 mm (1/2-inch) mandrel in accordance with the requirements and acceptance criteria of SSPC CS 23. Minor cracks that cannot be lifted from the substrate with a knife blade are acceptable. If lifting on any of the coupons occurs, modify the surface preparation/metallizing process until acceptable results are achieved before proceeding with production work.

6.b Tensile Adhesion Test. Evaluate the tensile adhesion of the metallizing in accordance with the test procedures and frequencies outlined in SSPC CS 23 (one test for every 46.5 m² (500 square feet) of surface area). Use the PATTI pneumatic adhesion tester in accordance with ASTM D4541. Select an epoxy adhesive that will cure in sufficient time to allow the testing to be performed, without exceeding the maximum time that the metallizing can remain uncoated.

Comply with the acceptance criteria provided in SSPC CS 23 4 (4.8 MPa (700 pounds per square inch) minimum for 85/15 zinc/aluminum). If the results are less than the specified values, remove the metallizing by blast cleaning and replace it.

If the test removes the metallizing to the substrate and the substrate is not rusted, reapply the metallizing. If the substrate is rusted, spot blast the test area before applying the metallizing. If the test separates the metallizing, remove all loose material and proceed with the application of the seal coat. If the test separates at the epoxy adhesive, completely remove the adhesive and apply the seal coat.

6.c Cut Test. Conduct a minimum, of one cut test for every 46.5 m² (500 square feet) of surface metallized. Use a hammer and sharp chisel at a low angle to make a single 38 mm (1.5 inch) long cut through to the substrate. The bond of the metallizing is considered unsatisfactory if any part of the metallizing lifts from the substrate. Remove unsatisfactory metallizing by blast cleaning, as specified in Section III(b)4, and replace it.

(d) Removal/Repair of Unsatisfactory Material. The system is unsatisfactory if it is damaged; if rusting occurs; a coat(s) lift, blister, or wrinkle; has excessive runs or sags; shows evidence of application under unfavorable conditions; the quality is poor; impure or unauthorized paint has been used; or for other reasons determined by the Engineer.

Remove unsatisfactory metallizing and paint. Repair and recoat damaged or defective areas. Do all removal, repair, and recoating of damaged and/or defective areas at no additional cost to the Department.

Comply with the surface preparation requirements of Section III(b)5 and as follows:

1. When the defective paint or damage extends to the substrate or substrate is exposed in areas less than 100 mm x 100 mm (4 inches x 4 inches), clean the surface by power tool cleaning to the requirements of SSPC-SP11. Feather and roughen the surrounding metallizing and coating exposing a minimum of 13 mm (1/2-inch) of each coat to provide a smooth transition with good adhesion into the surrounding intact, adherent material. Solvent clean and apply a spot coat of organic zinc primer to the prepared surface. Select an organic zinc rich primer recommended by the manufacturer of the seal and finish coating system.

2. When the defective paint or damage covers an area greater than 100 mm x 100 mm (4 inches x 4 inches), blast clean the areas, feather the surrounding coatings, and remetallize the area.

3. When the damage or defective paint does not expose the substrate, and for areas around and on connection plates where the seal coat was not applied, clean the surface by hand or power tool cleaning in accordance with SSPC-SP2 or SP3 to remove oxidation from the metallizing, defective material, and loose coating. Do not

burnish or polish the surface. Feather and roughen the surrounding material exposing a minimum of 13 mm (1/2-inch) of each coat to provide a smooth transition with good adhesion into the surrounding intact, adherent material. Solvent clean and apply the effected coats.

(e) Stenciling of Final Product. After the final coat has cured to recoat, stencil the following information on the inside face of the fascia member at the near and far abutment ends unless otherwise directed by the Engineer:

- The bridge identification number.
- The month and year of completion
- The specification identification of the cleaning method.
- Identification of the system (85/15 Zinc/Alum, E, U) with the name of manufacturer(s).

Stencil using waterproof black paint to provide uniform block lettering 50 to 75 mm (2 to 3 inches) high.

(f) Inspection Equipment. Furnish the Shop Inspector with the following Equipment and Standards:

- PTC Surface Temperature Thermometer
- Psychron 566 Psychrometer (battery operated) with two sets of new batteries
- Psychometric Charts for Dew Point and RH
- SSPC VIS 1-89 Standards
- Testex Press-O-Film Replica Tape-Extra Coarse 38-115 microns (1.5 - 4.5 mils), required: one roll (100 pieces) per bridge span
- Spring Micrometer for Testex Tape
- Keane-Tator Surface Profile Comparator with Grit/Shot Disc
- Wet film thickness gage
- Positector 6000 Coating Thickness Gauge
- NIST (NBS) Calibration Standards
- SSPC Surface Preparation and Dry Film Thickness Standards
- PATTI Pneumatic Adhesion Test Instrument with an ample supply of gas cylinders, pull stubs, and epoxy adhesive
- Cylindrical Mandrel Test Apparatus ASTM D-522
- Tooke Gage

(g) Contractor Inspection and Quality Control Program. Perform the Quality Control Inspections necessary to assure all work is performed in strict compliance with the manufacturer's instructions and as specified herein. Conduct the inspections at the minimum frequencies specified in this specification and describe the test procedures in a Quality Control Program. Submit the Quality Control Program for Engineer to review and acceptance before beginning the work.

Include the following items in the Quality Control Program:

- All items before the start of surface preparation work.
- Ambient conditions/compressed air cleanliness.
- Suitability of personal protective equipments and containments.
- Surface cleanliness and profile.
- Material storage, mixing, and application.
- Thickness and continuity of metallizing including bend, tensile adhesion, and cut tests.
- Dry film thickness and continuity of each coat.
- Dry time, curing, and cleanliness of each coat.
- Touch up and repair of damaged or defective coats.

(h) Access for Engineer Inspection. Provide safe access and time for Department inspections, as requested by the Engineer, for any and all phases of the work, including but not limited to surface preparation, the application of each coat, including stripe coats, and for an inspection of the completed system.

IV. MEASUREMENT AND PAYMENT - Lump Sum

Includes surface preparation, cleaning, waste disposal, metallizing, seal coat painting, finish coat painting, field power washing, field coating, all materials, equipment, tools, labor, services of the technical advisors and compliance with environmental and safety regulations.

No additional payment will be made for the containment system for field touch-up painting and finish coating or for the disposal of debris and materials.

Project Specific Details:

Special Provision: **I10902B - c10902 ITEM 3090-____(ITEM 1090-____) - ASPHALTIC PLUG EXPANSION DAM SYSTEM,____MM(") DEPTH...**

Item(s) Associated:

Header:

ITEM 3090-____(ITEM 1090-____) - ASPHALTIC PLUG EXPANSION DAM SYSTEM,____MM(") DEPTH, ASPHALT OVERLAY

ITEM 3090-____(ITEM 1090-____) - ASPHALTIC PLUG EXPANSION DAM SYSTEM,____MM(") DEPTH, CONCRETE DECK

Provision Body:

I. DESCRIPTION - This work is the furnishing and installation of asphaltic plug expansion dams for bridge joints. The indicated or specified depth of the expansion dam is minimum.

II. MATERIAL -

(a) Joint Backing Material. Section 705.9. Provide material that is capable of withstanding the 210 °C (410F) placement temperature of the asphalt material.

(b) Bridge Plate. AASHTO M270(ASTM A709), Grade 36 with the following dimensions: 6 mm (1/4 inch) thick, 200 mm (8 inch) wide, and 1.2 m (4 feet) minimum long. Provide 3 mm (1/8 inch) diameter holes drilled, 300 mm (12 inches) center to center along the longitudinal center line of the plate.

Certify as specified in Section 106.03(b)3.

(c) Locating Pins. 16d common nail or equivalent, galvanized in accordance with ASTM A53.

(d) Asphaltic Plug Expansion Dam Asphalt Material. Provide a thermoplastic, polymer modified asphalt cement meeting the following physical requirements and from a Manufacturer listed in Bulletin 15:

METRIC

- Softening Point R&B Method 82 °C, min. (AASHTO T53)
- Flow 5 hours @ 60 °C 3 mm, max. (ASTM D5329)
- Penetration @ 25 °C 150 g, 5 sec 9 mm, max. (ASTM D5329)
- Resilience @ 25 °C 40%, min. (ASTM D5329)
- Asphalt Compatibility Pass (ASTM D5329)
- Ductility @ 25 °C 40 cm, min. (AASHTO T51)
- Tensile Adhesion 700%, min. (ASTM D5329)
- Pouring Temperature 188 to 199 °C
- Safe Heating Temperature 199 to 210 °C

ENGLISH

- Softening Point R&B Method 180F, min. (AASHTO T53)
- Flow 5 hours @ 140F 3 mm, max. (ASTM D5329)
- Penetration @ 77F 150 g, 5 sec 9 mm, max. (ASTM D5329)
- Resilience @ 77F 40%, min. (ASTM D5329)
- Asphalt Compatibility Pass (ASTM D5329)
- Ductility @ 77F 40 cm, min. (AASHTO T51)
- Tensile Adhesion 700%, min. (ASTM D5329)
- Pouring Temperature 350F to 390F
- Safe Heating Temperature 390F to 410F

Certify each lot of asphalt material as specified in Section 106.03(b)3.

(e) Asphaltic Plug Expansion Dam Aggregate. Provide a crushed, dried granite or basalt from a Producer of Type A coarse aggregate listed in Bulletin 14 and/or approved by the MTD with a size and gradation as specified by the Manufacturer of the expansion dam system. Clean the aggregate by providing a double washed aggregate or by rotating the aggregate in a vented mixer under high pressure air and heat.

(f) Fine Aggregate. Type B, Section 703.1.

III. CONSTRUCTION - Construct as shown on the attached Drawings and as follows:

Prepare the expansion joint for placement of the asphaltic plug-type expansion dam system by measuring, marking, saw-cutting, and removing the material in the specified block out area, including water-proofing material. Remove all loose or deteriorated concrete and repair the areas by approved methods and materials as directed. Clean and dry all horizontal and vertical surfaces of the block out area and 150 mm (6 inches) of the road surface on each side of the block out area using compressed air and a hot compressed air lance. Use a lance with a flame retarded air stream temperature of 1650 °C (3000F) at a velocity of 915 m/s (3000 feet per second) and a 10,568 kg/m² (15 pounds per square inch) chamber pressure. Ensure that damage to the surrounding pavement area from overheating does not occur. If the cleaning and drying operation is interrupted by weather or other causes, repeat the entire operation before placing any asphalt material.

Cover all surrounding areas of the specified block out area with tape or other suitable materials before placement of the asphaltic plug asphalt material. Maintain a straight and neat installation of the expansion dam. Remove coverings upon complete installation of the expansion dam.

Insert joint backing material into the joint opening to the specified depth and sized to prevent the escape of liquid asphalt material through the joint opening.

Heat the asphalt material in an air or oil jacketed melter equipped with a continuous agitation system, a temperature control, and a calibrated thermometer. Maintain the temperature of the asphalt material to the specified pouring temperature. Do not allow the temperature of the asphalt material to exceed 210 °C (410F), or exceed 199 °C (390F) for more than 1 hour.

Pour heated asphalt material over the recessed joint backing material to fill the joint opening. Coat the adjacent horizontal surface areas where the bridge plate will be placed.

Place the bridge plates in the block out area on the layer of asphalt material. Place bridge plate end to end to cover the length of the joint opening. Cut bridge plates to cover the entire out-to-out length of the joint opening. Place bridge plates flat with the bottom of the block out area. Center and anchor the bridge plates over the joint opening by placing the locating pins through the drilled holes in the bridge plates into the expansion joint opening. Seal all bridge plate joints with heated asphalt material.

After placing the bridge plate, coat all vertical and horizontal surfaces in the block out area including the bridge plate with a thin layer of heated asphalt material.

Heat the aggregate to a temperature as recommended by the Manufacturer using a rotating drum mixer equipped with an attached heat source or a hot compressed air lance. Heat the aggregate until all moisture is removed.

Combine heated aggregate and heated asphalt material in proportions as recommended by the Manufacturer. Mix until all aggregate is evenly coated with the asphalt material. Place the mixture in the block out area in a minimum of three layers or as recommended by the Manufacturer. Keep depth of the uncompacted mixture uniformly high to provide for a level finished grade with the surrounding roadway surface after compaction. Compact the final layer with a vibratory plate or a 1.81 tonne (2 ton) roller until nonmovement. Make all compaction passes in a longitudinal direction with the roadway across the width of the joint. Finish the surface of the joint to match the existing bridge deck or roadway cross section. Include any existing wheel ruts, but maintain the required minimum joint thickness.

Immediately after compaction, pour heated asphalt material over the expansion dam system to fill surface voids. Dress the surface of the joint with a fine aggregate while asphalt material is still tacky.

Do not allow traffic on the completed expansion dam system until 30 minutes after completion or as determined by the Representative.

IV. MEASUREMENT AND PAYMENT – Meter (Linear Foot).

Measured out-to-out along the centerline of the exposed surfaces of the expansion dam system, including sidewalks if applicable, following the vertical and sloped faces of curbs and parapets resulting in a true length as opposed to a horizontally projected length.

Project Specific Details:

Special Provision: **D29900A - c29900 ITEM 8912-YYYY - DESIGN ROADWAY**

Item(s) Associated:

Header:

ITEM 8912-YYYY - DESIGN ROADWAY

Provision Body:

I. DESCRIPTION - This work is the design and preparation of plans for the construction of roadway and associated work as indicated on the Conceptual Drawings. Also included are *(List the other design items not identified or quantified on the Conceptual Drawings, e.g., guide rail replacement and upgrades. Do not duplicate information provided on the Conceptual Drawings).*

Provide all geotechnical investigation and engineering services required for the determination of possible utility conflicts and for the design of stable embankments and subgrade. This includes all geotechnical exploration and testing, inspection of site conditions, test borings, and sampling of the test boring materials, as required to ensure that the design and the construction of stable embankments and subgrade is achieved.

II. DESIGN -

(a) General. The Department will provide conceptual design plans that indicate Line, Grade and Typical Sections.

All computations must be computed and checked by Lead Design Engineer staff and initialed as such. Format all design computations on 8½ inch x 11 inch sheets. All computations must be neat and legible.

(b) Additional Designer Qualifications. *(list any additional qualifications necessary for the particular project over and above those listed in the Special Provision titled SPECIAL BIDDING – DESIGN BUILD. Delete if none, state “None”)*

(c) Information/Data Made Available to the Contractor by the Department *(Make sure this list is correct for the project).*

- Conceptual Roadway Plan
- The Department has obtained environmental clearance for this project. The environmental clearance level obtained is a (insert level). The Lead Design Engineer must submit a written response for approval to the District Representative describing how the design will comply with the approved *(insert environmental document – CEE, EA, or EIS)*. Refer to the Special Provision titled ENVIRONMENTAL COMMITMENTS AND MITIGATION TRACKING SYSTEM (ECMTS) REPORT.

(d) Design Specifications. Design the roadway construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications, and identify the publications they supersede)*

(e) Design Requirements

1. Geometry. Maintain the horizontal and vertical alignments, and superelevation rates provided on the conceptual drawings.

Develop and provide all pertinent survey information required for the design and construction of the project. Specify type of Construction Surveying required, and include with the design submission for review and approval.

(Describe special requirements, if any.)

2. Pavement Design. *(if provided by Department, identify pavement designs by type, such as new construction, overlay, roadway widening, shoulders, and/or temporary pavement; and delete the following:)* Develop the pavement design for work indicated on the Conceptual Drawings, and show on the typical sections.

(Describe the pavement types and where each would be placed by stations and segments/offsets)

(If appropriate (bridge included), either provide approach slabs as indicated on the Conceptual TS&L drawings, or in none indicated, on both approaches to the bridge as follows. Extend the far (up-Station) (Abutment 2) approach slab longitudinally a minimum of 4 feet beyond the limit of the temporary excavation support system. Once the far (Abutment 2) approach slab length is determined, utilize a similar approach slab length at the near (Abutment 1) approach. Extend the approach slab width to full width to include the integral flared barriers.)

3. Typical Sections. Develop typical sections in accordance with Publication 14M Design Manual Part 3, Chapter 2, Section 2.3.J. Develop these typical sections based on the sections provided in the conceptual plans. Do not reduce lane and shoulder widths.

4. Drainage. Design drainage in accordance with Publication 13M, Design Manual Part 2, Chapter 10; Publication 584 Drainage Manual; and permit requirements. Design new drainage features indicated on the Conceptual Plan. Review the existing drainage system and design improvements to conform to Publication 584 and permit requirements.

Conceptual plan based on the following:

(Describe the Conceptual Drainage Plan, and include pipe, inlet, and ditch cleaning where appropriate.)

5. Guide Rail, Cable Barrier, and Concrete Barrier. Design guide rail, end treatments, and guide rail to barrier connections, including determining length of need and guide rail warrants to meet the current (at time of advertisement) Department criteria.

For "Long Post Guide Rail" 8 feet details and requirements see Publication 72M Roadway Construction Standard RC-50M. Install the "Long Post Guide Rail" when the minimum clearance from the rear face of the guide rail post to the fill slope break point cannot be maintained.

Indicate on the Final Roadway Drawings the locations of existing guide rail to be removed.

(Describe any connections to existing guide rail or concrete barrier)

6. Utilities. Provide for the safety and protection of all utility facilities within the project limits. Refer to the Conceptual Plan.

7. Environmental. Comply with the approved environmental document. Refer to the Special Provision titled ENVIRONMENTAL COMMITMENTS AND MITIGATION TRACKING SYSTEM (ECMTS) REPORT.

8. Soil Erosion and Sediment Pollution Control Plan / National Pollutant Discharge Elimination System (NPDES) Approval. Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

9. Maintenance of Permanent Erosion and Sediment Pollution Control Devices. Upon final acceptance of the project, the Department will maintain the permanent Erosion and Sediment Pollution Control.

10. Geotechnical Design Requirements. *(Edit as necessary, or delete if not required)*

10.a. Geotechnical Investigation. Develop and execute a subsurface investigation program in accordance with Publication 15M, Design Manual Part 4 (DM 4), Chapter 6, Publication 293M, Publication 281, and the approved Environmental Document.

- Provide a Problem Statement and Draft Exploration Plan and a Schedule of Borings for Final Design of both the structure and earthwork for roadway elements of the project. Prepare the Schedule of Borings in accordance with Publication 222M, Attachment 1.

Obtain approval of any investigative equipment for collection of subsurface data before mobilization to the site. Drill a sufficient number of borings and perform geotechnical testing as necessary to provide the required designs.

- Obtain drilling services from a subcontractor currently entered on ECMS as pre-qualified for Work Class Code C6. Advance the borings in accordance with the methods provided in Publication 222M.
- Provide full time drilling inspection services with personnel qualified as Level 1 and Level 2 Drilling Inspectors as defined in Publication 222M. Provide a minimum of one full time Level 2 Drilling Inspector during all subsurface exploration activities. Provide a minimum of one drilling inspector for each operating drilling machine.
- Log and classify materials in accordance with Publication 219M BC-795M and Publication 293M requirements. Prepare typed engineer's boring logs on forms provided in DM 4. Require the drilling Contractor to prepare independent boring logs.
- Store all soil and rock samples in core boxes constructed in accordance with Publication 222M. Deliver all soil samples and rock samples in core boxes to the respective District Engineering Office upon completion of subsurface exploration activities. Prepare Engineer's Field Boring Records, Structure Boring Tracings and Subsurface Profiles using LOGDRAFT 4.0 software. Prepare Subsurface Profiles in accordance with Publication 14M Design Manual Part 3, Chapter 5 requirements.
- Prepare Structure Boring Tracings in accordance with the requirements of Publication 15M Design Manual Part 4. Include foundation information for each substructure unit on the tracings.

10.b. Geotechnical Design.

- Submit a proposed geotechnical laboratory-testing program to the District Geotechnical Engineer for approval after completion of test drilling. Include type of test, boring and sample numbers to be tested, purpose for the test, and appropriate test method designation.

- Use a CBR value of ***(Insert Value)*** and a heave rate of ***(Insert Value)*** mm/day to perform pavement design analysis in accordance with Publication 242 using DARWin software.
- Perform geotechnical designs and develop geotechnical details. The details listed in this Section II(e)10b are the minimum requirements. Develop more stringent requirements as may be required to provide for stable embankments and subgrade, including greater widths and depths of excavation/benching, as well as increased thicknesses of Section 206 Rock for strength and drainage.
- Utilize the follow embankment material requirements:
 - 2:1 or flatter slopes - ***(Insert requirements)***
 - 2:1 to 1.5:1 slope - ***(Insert requirements)***
 - 1.5:1 to 1:1 slope - Rock as specified in Section 850. Slopes steeper than 1:1 are not allowed.
- Perform slope stability analyses for embankments and analyses of global stability including the structure using PASTABLE. Assume the following soil parameters for stability analyses:
 - Existing Fill: ***(Insert Parameters for c, f, gm, and gsat)***
 - Alluvium: ***(Insert Parameters for c, f, gm, and gsat)***
 - Weathered Bedrock: ***(Insert Parameters for c, f, gm, and gsat)***
 - Bedrock: ***(Insert Parameters for c, f, gm, and gsat)***
 - Common Embankment: ***(Insert Parameters for c, f, gm, and gsat)***
 - Section 206 Rock: ***(Insert Parameters for c, f, gm, and gsat)***
 - R-3 & R-4 Rock: ***(Insert Parameters for c, f, gm, and gsat)***

(Insert Other Soil Parameters as appropriate with c, f, gm, and gsat)

- Submit all typical details ***(provide specific approval criteria)*** to the District Geotechnical Engineer for review and approval.
- Stabilize the subgrade to a non-movement condition for the entire project length, as per Section 210.
- Backfill all pipe trenches under pavement with Section 703 No. 2A coarse aggregate up to subgrade level.
- Provide the roadway recommendations in the Geotechnical Report for Final Design.
- Include all as constructed geotechnical treatments in the "As-Built" roadway cross-sections.

(f) Submittals

1. Pre-Final Plan Submission. Submit a Pre-Final Plan, (e.g. 60% to 70% plans) with the Lead Design Engineer's Seal in accordance with Publication 14M, Design Manual Part 3 (DM 3), Section 2.1.K and Figure 2.1, for review and approval by the Department prior to plan completion. Include the following minimum information:

- Existing Topography
- Roadway Plans (including ***(list all required supplemental plans)***)
- Survey References
- Typical Sections
- Proposed Guide Rail
- Proposed Utility Relocation

- g. Right of Way location & cut/fill limits
- h. Proposed limits of Roadway Construction
- i. Proposed pavement geometry (superelevation rates, runout lengths, spot elevation details)
- j. Final TS&L (in accordance with DM 4)
- k. Structure Boring Plan and Foundation Design Parameters (as applicable)
- l. Proposed Drainage Items and location
- m. Erosion & Sediment Pollution Control Plan (approved by DEP or County Conservation District)
- n. Cross Sections (as required)
- o. Surveying and Mapping deliverables in accordance with Publication 122M (as applicable)

Also submit the Geotechnical Report for Final Design.

The Lead Design Engineer will be responsible to address all plan review comments. The District will conduct a final review to ensure that all comments have been addressed. Include the plan review dates in the CPM schedule for the project.

2. Signing and Pavement Markings. Submit a Permanent Pavement Marking, and Signing Plan (in accordance with applicable publications and the Pavement Marking, and Delineation sheets) for review and approval by the District Traffic Unit.

Apply pavement markings on *(Insert Route Number)* with a *(Insert desired width)* -inch wide center.

Apply Type II waterborne paint as specified in Section 962.

Place pavement markers as determined necessary during design.

Place approved delineator devices at all drainage structures.

Replace all signs disrupted by construction activities with new signs. Show these signs on the Permanent Pavement Marking and Signing Plan. Include applicable sign nomenclatures, sizes, mounting types, etc., on the plan. Provide sign fabrication plans as applicable.

3. Final Roadway Drawings. After all applicable reviews and all comments have been addressed to the satisfaction of the District Executive, submit Final Roadway Drawings prepared in accordance with the procedures discussed in DM 3, Section 1.5. Follow the naming convention for standard ANSI D size, 34 inches x 22 inches plan sheets, which has been established for the Department's Electronic Document Management System (EDMS), and is outlined in DM 3, Appendix A. Provide Final Roadway Drawings include but not limited:

- a. Title Sheet
- b. Index Sheet
- c. Typical Section Sheet
- d. Summary of Quantities Sheets
- e. Tabulation of Quantities Sheets

- f. Plan Sheets
- g. Profile Sheets
- h. Final Structure Plans (in accordance with DM 4 and the Design Special Provisions in this Contract)
- i. Cross Sections (as required)
- j. Permanent Pavement Markings and Signing (as described above)
- k. Soil Profile Plans
- l. Supplemental Plans *(list required Supplemental Plans. If none, delete Item l.)*

The above requirements must be in accordance with the appropriate Sections of DM 3 and DM 4. Show a breakdown of quantities by station/location on the Tabulation of Quantities sheet for the Final Construction Roadway Drawings. Follow the format in DM 3 Section 2.5 and 15.2. The Final Roadway Construction Plans may not be the same as the Final "As-Built" Roadway Plans.

Provide a complete set of computations, including any submitted previously, for the design and additional calculations as needed by the Department to evaluate any details throughout the life of the Contract. Submit an electronic copy if requested by the Department.

Designs copied directly from approved Department Standards need not be documented through independent computations. List these designs on the submission by referencing the drawing number of the applicable standard, sheet number, table, or graph.

Upon completion of Quality Assurance Review, or Owner's Perspective Review, as applicable, and receipt of all drawings stamped "Released for Construction" for the project, provide the Department with one *(Specify: "paper", "linen", "drafting film", or "vellum")* copy of the Title Sheet for signature by the Department.

The signed Final Roadway Drawings and computations become the Final Construction Plans for the project.

4. "As-Built" Plans

Provide "As-Built" roadway plans as per Design Manual Part 1. Comply with Publication 10, Design Manual, Part 1 and Publication 10C, Design Manual Part 1C criteria. Final "As-Built" Roadway Drawings include all Contract Drawings including Roadway Plans, Quantity Tabulations, Erosion & Sediment Pollution Control Plans, Traffic Control Plans and Structure Plans. Conform the "As-Built" drawings to the procedures as outlined in Section 5.7 of Design Manual Part 1C and prepare per plan presentation procedures as stated in DM 3 and DM 4.

Take Final "As-Built" Cross Sections at critical locations and at least 20 meter (50 foot) intervals on the Main Line and Side Roads. Template Cross Sections to reflect "As-Built" details and prepare in accordance with DM 3 Section 2.7.

All "As-Built" plans are the sole responsibility of the Contractor and must be submitted to the District within 3 months of final inspection acceptance as defined in Section 110.08(a).

(g) Submittal Review, Approval, and Distribution.

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD.

III. MEASUREMENT AND PAYMENT - Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Complete Geotechnical Investigation *(delete if not needed)*
- Pre-Final Plan Approval
- Signing and Pavement Marking Plan Approval
- Final Roadway Drawings Approval
- As-Built Drawings

Project Specific Details:

Special Provision: **D29901A - c29901 ITEM 8913-YYYY - CONSTRUCT ROADWAY**

Item(s) Associated:

Header:

ITEM 8913-YYYY - CONSTRUCT ROADWAY

Provision Body:

I. DESCRIPTION - This work is the construction of the roadway and associated work of the type bid in the corresponding specification entitled "ITEM 8912-~~YYYY~~ - Design Roadway" and in accordance with the approved Final Roadway Drawings.

II. MATERIAL - As indicated and as specified for each respective item included in the roadway and associated work.

III. CONSTRUCTION - In accordance with the Publication 408, approved plans and permits, Publication 72M, the Special Provisions of the Contract, and additional requirements specified herein.

Work for the entire project area also includes seeding and mulching as required by the installation, maintaining, and removal of the erosion and sediment pollution control measures required by the *(insert respective county)* County Conservation District and the approved plan.

Do not start work until plans stamped “Released for Construction” are transmitted by a letter indicating which work can proceed. Construction may start on partial submissions stamped “Released for Construction” are transmitted by a letter indicating which work can proceed.

Do not start construction work until Erosion & Sediment Pollution Control plans are approved, and required permits are obtained.

Do not start construction work until Right-of-Way clearance is obtained, once Right-of-Way clearance is obtained for the subject area and construction approval issued.

Do not start construction work until utility clearance is obtained, construction may begin within sections or stages where utility clearance has been obtained and approved for construction.

Do not start incorporated utility work until an executed agreement or agreement signed by the utility is received by the Central Office Utility Unit. *(Delete if incorporated utility work is not in design-build contract)*

Be responsible for the cost and delay of any additional utility relocation that results from changes in the Lead Design Engineer's plans or construction sequences made subsequent to (1) acceptance of the utility's relocation plans and (2) where the utility has physically moved its facilities based on those relocation plans. Additional contract time will not be considered for additional utility relocation work or any additional work associated with an alternate construction method.

Existing guide rail removed during construction will become the property of the Contractor unless specified otherwise.

IV. MEASUREMENT AND PAYMENT - Lump Sum

Partial payment will be made for all work indicated on the Final Roadway Drawings based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD.

Project Specific Details:

Special Provision: **D29902A - c29902 ITEM 8914-YYYY DESIGN TRAFFIC CONTROL PLAN**

Item(s) Associated:

Header:

ITEM 8914-YYYY - DESIGN TRAFFIC CONTROL PLAN

Provision Body:

I. DESCRIPTION - This work is the design and plan preparation for required maintenance and protection of traffic during construction.

II. DESIGN –

(a) General. Provide design and drawings in the units of measurement shown on the Conceptual Roadway Plans.

Design Traffic Control Plan is to be in agreement with Design Roadway Plan (including also plans).

Include in the Traffic Control Plan (TCP) all the Maintenance and Protection of Traffic General Notes, Index Sheets, a legend showing all traffic control devices and symbols, a sequence of construction and construction narrative, and tabulation of traffic control devices included in 'Construct Maintenance and Protection of Traffic'.

(b) Additional Designer Qualifications. *(List any additional qualifications necessary for the particular project over and above those listed in the Special Provision entitled SPECIAL BIDDING – DESIGN BUILD. If none, indicate "None")*

(c) Design Specifications. Design a TCP in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications, and identify the publications they supersede)*

(d) Design Requirements.

Maintenance of Traffic During Construction.

1. Develop an Incident Management Plan (IMP). Provide traffic management details and coordination (police, EMS, local officials, fire departments, etc.) procedures for dealing with an incident. Submit the IMP and have it approved before starting work. *(If none required, delete text and indicate "None")*

2. Develop a TCP. Meet the requirements of and maintain traffic as shown on the Conceptual TCP. Detour routes and traffic restrictions must follow the Conceptual TCP. *(Add District preferences, such as situations when phasing and detour routes can be changed, and what requirements a contractor must meet in order to modify phasing or detour routes. If no Conceptual TCP provided, delete text and insert criteria such as minimum lane widths, lane restriction requirements, time restrictions, event restrictions, and District preferences, etc.)*

3. Develop Final Transportation Management Plan. Follow procedures outlined in Publication 46 Traffic Engineering Manual and Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures utilizing the Draft Transportation Management Plan as a basis. Include requirements into TCP. *(If none required, delete text and indicate "None")*

(e) Submissions.

1. Preliminary Plan Submission. In accordance with Publication 14M, Design Manual Part 3, Chapter 4. Submit the plans at required scale including:

- Plans for each required stage
- Proposed Temporary Signing and Pavement Markings
- Traffic Control Details as required

Include phases and sequences, detours, traffic flow arrows (one per each lane of traffic), line striping, channelizing devices, arrow panels, temporary concrete barrier, temporary impact attenuators, barricades, and construction areas hatching.

2. Final Plans and Computations. In accordance with Design Manual, Part 3, Chapter 4. Submit the plans at required scale indicating all phases and sequences, and all signs and devices. Provide tabulation of all items associated with each phase, site, sequence and detour as shown on the TCP.

Upon release of the Contractor's design plans and computations, the plans become the Final Traffic Control Plans for the project. Upon written notice of completion of review by the Department and receipt of the Final Traffic Control Plans stamped "Released for Construction," submit *(insert number)* sets of signed and sealed prints and an electronic PDF copy (if required by District).

3. Revisions During Construction. Any changes to the Final Traffic Control Plans must be submitted as revisions for review by the Department. Do not deviate from the Final Traffic Control Plans until notice of completion of review of the revisions by the Department.

(f) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as follows;

- Partial Plans Submissions: Partial submissions meeting the above requirements will be acceptable after approval of the Preliminary Plan Submission. Partial submissions must show one complete phase with all associated sequences and detours. *(Specify partial plans submission review procedure, or delete text and indicate "None")*

III. MEASUREMENT AND PAYMENT - Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Incident/Transportation Management Plan Approval *(Delete if not required)*
- Preliminary Plan Approval
- Final Plan Approval

Project Specific Details:

Special Provision: **D29903A - c29903 ITEM 8915-YYYY - CONSTRUCTION OF MAINTENANCE AND PROTECTION OF TRAFFIC**

Item(s) Associated:

Header:

ITEM 8915-YYYY - CONSTRUCTION OF MAINTENANCE AND PROTECTION OF TRAFFIC

Provision Body:

I. DESCRIPTION - This work is the construction of the maintenance and protection of traffic according to the approved Traffic Control Plan developed as part of the ITEM 8914-YYYY - Design Traffic Control Plan.

II. MATERIAL - As indicated and as specified in the Traffic Control Plan.

III. CONSTRUCTION - In accordance Publication 408; the Special Provisions of the contract; and any additional requirements specified herein.

(Add District preferences, such as requirement for Traffic Control Supervisor, etc.)

Do not start construction until the Traffic Control Plans stamped “Released for Construction” are transmitted by a letter indicating which work can proceed. Construction may start on stages or phases of the Traffic control Plans provided that partial plans stamped “Released for Construction” are transmitted by a letter indicating which work can proceed.

IV. MEASUREMENT AND PAYMENT - Lump Sum

The Department will measure and pay for this item in a proportionate manner based on current estimates. If an item or device is required for maintenance and protection of traffic, the cost of the item is incidental to this item, without exception.

Project Specific Details:

Special Provision: **D29904A - c29904 ITEM 8916-YYYY - RIGHT-OF-WAY DESIGN AND ACQUISITION SERVICES**

Item(s) Associated:

Header:

ITEM 8916-YYYY - RIGHT-OF-WAY DESIGN AND ACQUISITION SERVICES

Provision Body:

I. DESCRIPTION - This work is the preparation of a Final Right-of-Way Plan and completion of Right-of-Way Services for real properties impacted by the Design Activities identified in Section IV of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, or as indicated on the Conceptual Drawings.

II. SERVICES

(a) General

Provide drawings in the units of measurement shown on the Roadway Construction Plan.

In addition to providing a Professional Engineer's P.E. seal and signature, provide a Professional Land Surveyor's seal and signature on plan sheets in accordance with the Department's Design Manuals.

All computations must be computed and checked by qualified personnel and initialed as such. All computations must be neat and legible.

The District's Right-of-Way Administrator is the Department's point of contact for all right-of-way issues.

(b) Additional Professional Service Qualifications

Right-of-Way Services. All Right-of-Way Acquisition Services must be completed by a firm pre-qualified by the Department to perform work under WBS Code 2.10.7. A list of those pre-qualified firms is attached. The District Right-of-Way Administrator must approve the resumes of the staff members for each project and reserves the right to exclude individual staff members from an approved/selected firm from completing Right-of-Way Acquisition Services in that District. All appraisals must be completed by firms pre-qualified by the Department under the Appraisal ITQ Contract Number 357101. All contracted appraisal reviews will be completed by the firm pre-qualified by the Department to perform this work under RFP Contract Number 358R08 – Appraisal Review Services. All tasks identified in WBS Code 2.10.7 (Right-of-Way Acquisition Services) are required, with the exception of Task 7: "Other Services"; maintaining a project site office is not required. Other requirements include the following:

Have available to the project escrow closing and settlement services for all claims; submit all photography and video in a standardized digital format approved by the District; describe specific quality assurance plan for appraisal tasks, including updates; payment package/settlement document preparation through payment delivery, including specific details and steps in this process.

Right-of-Way Appraisals. The Right-of-Way Acquisition Services consultant is to contract for appraisals as permitted by ITQs. Right-of-Way appraisals are to be coordinated by the Right-of-Way Acquisition Services consultant with an approved firm or individual on the latest "Invitation to Qualify" (ITQ for Right-of-Way Appraisal Services, Contract Number 357101) list. The resulting contract for appraisals will be between the Department and the fee appraiser. Certain Appraisal Planning/Services under Task 2 of WBS Code 2.10.7 may be completed by the Right-of-Way Acquisition Services consultant.

(List any other additional qualifications necessary for the particular contract over and above those listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD.)

(c) Information/Data Made Available by the Department

(List any information/data that will be furnished relative to Right-of-Way status and needs, otherwise indicate "None")

(d) Specifications

Prepare a Right-of-Way Plan in accordance with the most current edition of Publication 14M, Design Manual, Part 3.

Provide services required for Right-of-Way Acquisition in accordance with the Pennsylvania Eminent Domain Code, The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, (The Federal Uniform Act) and promulgated rules in 49 CFR 24; the regulations found in 23 CFR 710.313 Design-Build Projects; and 23 CFR 635.309(p) for design-build certification requirements; and the PennDOT Right-of-Way Manual (Publication 378). Provide the following general services as a minimum: appraisal planning/services, negotiations, acquisitions and property management. The Department will pay the property owner just compensation for property acquired for the projects identified in Section II(e)5 of this Special Provision and will also pay fees for appraisal reports and contracted appraisal reviews.

In the event that a difference in interpretation of the policies and procedures for the preparation of the Plan and Right-of-Way Services cannot be resolved, the District Right-of-Way Administrator will be the arbiter and his/her decision will be final.

(e) Requirements

1. Right-of-Way Plan. Prepare a Right-of-Way Plan with property plots including all improvements and all contiguous parcels with unity of use in accordance with Publication 14M, Design Manual Part 3, Publication 16M, Design Manual Part 5, Utility Right-of-Way Chapter, and the Pennsylvania Eminent Domain Code. A simplified Right-of-Way Plan may be prepared in lieu of a standard Right-of-Way Plan, if agreed to in writing by the Department. Required area descriptions must be shown on the plots. In addition to the items listed, Property Plots are required for every property that is impacted by the Contractor's design. Parcel numbers are required for each plot and plan sheets.

Titles to all affected properties will be searched back a minimum of 60 years and establish the previous owner or arms length transaction or a sufficient time period in order to explain any easements, adverse, and provide legal description. The following support documents are required including: Current deed(s), mortgage(s), deed(s) of easement, adverse(s), lot or subdivision plan(s), judgment(s), lien(s), tax assessment information, all tax and lien certification(s), tax map(s), current taxes including paid, unpaid, or delinquent status, bankruptcy verification, unity of use analysis and other related documents and available in a digital format, or paper copy if requested.

2 Right-of-Way Services. In accordance with the Pennsylvania Eminent Domain Code; Publication 378; the Federal Uniform Act and WBS Code 2.10.7 for Right-of-Way Acquisition Services: Submit written acquisition and relocation procedures on a parcel-by-parcel basis to the District Right-of-Way Administrator for approval before commencing right-of-way activities. These procedures should contain a prioritized appraisal, acquisition and relocation strategy (including time frames for the activities as provided for in the schedule) as well as milestones for Department approval, such as approval of just compensation, replacement housing payment calculations and payments, moving cost claims, appraisals, and administrative and stipulated settlement amounts and dates.

Establish a tracking system and quality control system approved by and in concurrence with the District Right-of-Way Administrator. This system must show the status of litigation, property management, appraisal, acquisition and relocation status of all parcels. The quality control system may be administered by a consultant with the necessary expertise in appraisal, acquisition and relocation policies and procedures, and who will make monthly reviews and submit reports directly to the Contractor and the Department.

Execute a certification and include in the submission that the Contractor has received a copy of the Publication 378 and will comply with the procedures. The written relocation plan must provide reasonable time frames for the orderly relocation of residents and businesses on the projects defined in Section II(e)5 of this Special Provision as provided by 49 CFR 24.205 of the Federal Uniform Act. It should be understood that these time

frames will be based on the best estimates of the time it will take to acquire the right-of-way and relocate families in accordance with certain legal requirements and time frames which may not be violated. Accordingly, the time frames estimated for right-of-way acquisition will not be compressed in the event other necessary actions preceding right-of-way acquisition miss their assigned due dates.

No property may be entered upon for the purpose of performing work in connection with the construction of any project until all temporary and permanent right-of-way is acquired by the Department in accordance with 23 CFR Part 710, and 49 CFR Part 24 and a Final Right-of-Way Clearance is issued for the projects as described in Section II(e)5 of this Special Provision.

If determined that additional right-of-way is required to perform construction work outside of the current legal right-of-way, no construction may begin on any particular parcel until a Final Right-of-Way Clearance for the project is issued by the Department in writing.

All required right-of-way and temporary easements for construction will be acquired by the in accordance with the Federal Uniform Act and Publication 378. The Department will issue a Final Right-of-Way Clearance Certification when all parcels have been acquired and all eligible occupants have been relocated from the project area.

Throughout the right-of-way acquisition activities, information will need to be entered by the Contractor's Right-of-Way consultant into the Department's Right-of-Way Office system.

3. Appraisals. All right-of-way appraisal activities will follow the appraisal procedures as provided in the Pennsylvania Eminent Domain Code, the Federal Uniform Act, and Publication 378. All appraisals performed by the fee appraiser will be submitted to the Department's Chief Appraiser for review. All documents associated with the right-of-way appraisal requiring signatures will be signed and approved by the Department. Appraisal review will be completed by the Department staff review appraisers or contracted appraisal reviews will be completed by the firm pre-qualified by the Department to perform this work under RFP Contract Number 358R08 - Appraisal Review Services.

4. Authorizations to Enter - may only be procured by District Right-of-Way Staff or a pre-qualified Right-of-Way Consultant after approval for their use is granted by the District Right-of-Way Administrator.

For any Federal-Aid contract or any contract not involving a bridge, Authorizations to Enter for construction purposes before making payment available to an owner are only to be used in exceptional circumstances, with the prior approval of the owner. It is intended that authorizations to enter for construction purposes be obtained only in the exceptional case, such as an emergency project, when there is no time to make an appraisal and purchase offer and the property owner is agreeable to the process.

For design/build bridge projects with 100% State funding in all phases, the use of Authorizations to Enter for construction purposes is permitted per Section 3.03.F.3 of Publication 378. While certain projects can be constructed using authorizations to enter, timely creation of a Right-of-Way Plan and formal acquisition of the necessary right-of-way must be completed in accordance with Publication 378.

Entrance onto private property outside of legal right-of-way may be done only for the purpose of Preliminary Design Studies such as survey work, core borings, etc., and only after proper notification has been given to the property owner in accordance with Section 309 of the Eminent Domain Code. All private property must be restored to its prior condition. Notification to private property owners must be in the form of the standard Department Intent to Enter Letter. All Intent to Enter Letters must be signed by the Department. If the Department has negotiated an Authorization to Enter, this additional notification using an Intent to Enter Letter is not necessary.

Do not impair the safety or in any way be coercive with respect to unacquired or occupied properties on the same or adjacent segments of project right-of-way.

Provide access to all occupied properties to ensure emergency and personal vehicle access.

Maintain utility services to all occupied properties at all times before and until relocations are completed.

5. Final Right-of-Way Clearances

The following Final Right-of-Way Clearances have been obtained by the Department:

-MPMS #_____ *(Describe limits of each project, including SR, segments included (or range), and any limitations to construction activities included. If no ROW have been obtained by the Department indicate "None")*

Obtain the following Final Right-of-Way Clearance(s):

- MPMS #_____ *(Describe limits of each project, including SR, segments included (or range), and any limitations to construction activities included)*

(f) Submissions

Right-of-Way Plan. Submit 3 full size sets of plans with plots and current deed and title certifications in accordance with Publication 14M, Design Manual Part 3 and documentation of any utility's compensable interest where a Required Substitute Utility Right-of-Way is required as per Publication 16M, Design Manual Part 5, Utility Right-of-Way Chapter. Make all necessary changes as directed and resubmit for review and approval. The Right-of-Way Plan must be approved before any negotiations can begin.

(g) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD

III. MEASUREMENT AND PAYMENT – Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- **Final Right-of-Way Plan Approval** - will be paid after the final Right-of-Way Plan is received and signed by the District Executive.
- **All Appraisals Approved** - will be paid upon the approval of all appraisals.
- **Final Right-of-Way Clearance** - will be paid upon the issuance of all Final Right-of-Way Clearance Certificates as specified in Section II(e)5.
- **Right-of-Way Plan Revisions** - will be paid when the contract work is complete and all Right-of-Way Plan revisions have been made and recorded. Revisions include updates to all affected parcels including appraisal updates and reports for Eminent Domain requirements and litigation purposes. If there are no revisions, the percentage indicated on the Schedule of Values will be paid upon completion of the project.

No additional compensation will be made for additional Right-of-Way Plan revisions or Right-of-Way Services that are a result of design omissions or designs that are not accepted.

Project Specific Details:

Special Provision: **D29908A - c29908 ITEM 9694-0001 - DESIGN OF CONCRETE CURB RAMPS [by QUADRANT]**

Item(s) Associated:

Header:

ITEM 9694-0001 - DESIGN OF CONCRETE CURB RAMPS [by QUADRANT]

Provision Body:

I. DESCRIPTION

This work is the design and preparation of drawings for the construction of ADA compliant curb ramps as required to provide pedestrian access.

II. DESIGN

(a) General

Prepare and submit Design Drawings for each quadrant detailing the proposed curb ramp(s) for that quadrant in accordance with the Department's specifications.

A quadrant is defined as all of the curb ramps and ADA features associated with a particular corner, median crossing, island, commercial driveway or mid-block crossing. Each corner, median crossing, island, commercial driveway (both sides) and mid-block crossing (both sides) will be considered one quadrant. A "T" intersection will constitute a maximum of three quadrants.

Detectable Warning Surfaces must be provided at the junction between the Pedestrian Access Route (PAR) and commercial driveways provided with traffic control devices or driveways that are otherwise allowed to operate like public streets.

Contractor will provide a Design Activity Schedule.

The pedestrian studies for the entire State Route must be completed and approved before quadrant design drawings can be submitted for approval.

(b) Additional Designer Qualifications

For this Design Activity, résumés must demonstrate experience and expertise, during the last 5 years, with Americans with Disabilities Act (ADA) requirements as contained in Code of Federal Regulations; 28 CFR Part 36 and other applicable design criteria, standards, guidelines and construction specifications.

(List any additional qualifications necessary for the particular project over and above those listed above and in the Special Provision titled SPECIAL BIDDING – DESIGN BUILD)

(c) Design Specifications

Provide a Design Drawing as specified in Section 105.02(c) and in accordance with Part II (f) Design Requirements of this Special Provision.

Design the ramp construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN BUILD, Section VIII – General Design Requirements, Design Specifications. ***(List any additional publications, and identify the publications they supersede)***

(d) Utilities

Design the curb ramps to accommodate the existing utility facilities within the project. Minor utility adjustments such as, but not limited to, minor vertical adjustments of manholes, junction boxes, and valve

boxes, etc. may be required. See the Special Provision titled UTILITY RELOCATION INFORMATION FOR DESIGN-BUILD PROJECTS.

(e) Signalized Intersections

Revise the existing traffic signal permit plans including, but not limited to, stop bar locations, crosswalks, pedestrian push button locations, loop detectors, sensors, clearance intervals and installation/ removal of pedestrian signs as required to accommodate the new ramps and comply the Design Requirements in subsection (f) below. Coordinate with the appropriate municipalities for the revisions to the traffic signal permit plans and obtain concurrences in writing. Contact the District Traffic Engineer for prints of the existing traffic signal permit plans. Notify the District Traffic Unit if changes to the intersection potentially warrant signal timing adjustments. Submit the revised traffic signal permit plans to the District Traffic Engineer for approval. Upon approval, submit electronic files of the traffic signal permit plans to the District Traffic Engineer. For files not provided to the Contractor in electronic format, revised image files are acceptable.

Ensure that pedestrian visibility is not compromised by the new curb ramp locations. Ensure that distances to the signal head from the stop bar are within the guidelines established in Publication 149 - Traffic Signal Designer Handbook.

(f) Design Requirements

Design all curb ramps in accordance with the Americans with Disabilities Act: Policy and the Design Guidance contained in Publication 13M, Design Manual Part 2 (DM 2).

Refer to the Special Provision titled ENVIRONMENTAL COMPLIANCE AND MITIGATION TRACKING SYSTEM (ECMTS) REPORT to ensure that Curb Ramp Designs comply with the environmental commitments for the project.

Provide access to existing pushbuttons to the maximum extent feasible or install 4 foot pedestal pushbutton poles so as not to create pedestrian obstructions.

Provide 8½ inch x 11 inch Design Drawings at a scale of *(Insert desired scale. Suggested: 1 inch per 5 feet Vertical and 1 inch per 25 feet Horizontal.)*

Provide a title block in the lower right hand corner, including the Project's name, ECMS number, date of submittal, a block for date of re-submittal(s), and the appropriate sheet number(s).

Provide positive drainage for each quadrant.

On the drawings, indicate the:

- direction of magnetic North;
- type of curb ramp proposed and the location of each quadrant (as applicable, submit a “Technical Infeasible Form (TIF)” and submit to the District ADA Coordinator for committee approval – the Assistant District Executive - Design will grant final approval);
- Indicate on drawing that TIF was submitted and its submittal date;
- existing and proposed vertical elevations of the finished grade of roadway at the point where the center of the proposed ramp intersects the edge of roadway (designated to the nearest 0.01 foot);
- existing longitudinal and cross slopes of the roadway directly in front of and at the center of the proposed ramp (designated to the nearest 0.10 %);
- proposed running and cross slope percent of the ramp (designated to the nearest 0.10 %);
- proposed running and cross slope percent of the sidewalk transitions to the ramp and/or landing (designated to the nearest 0.10 %);
- limits of removal of existing sidewalk, curb and curb ramp(s) (designated to the nearest 0.10 foot), terminate limits of work at existing tooled expansion/ contraction joints, curbs may be saw cut;

- proposed length and width of the curb ramp;
- proposed horizontal location and horizontal measurements of the landing area;
- proposed slopes of the landing area (designated to the nearest 0.10 %);
- proposed slopes of flares (designated to the nearest 0.10 %);
- proposed horizontal measurement(s) of flares (designated to the nearest 0.10 foot);
- proposed horizontal placement of Detectable Warning Surface (DWS);
- horizontal and vertical relationships to the pedestrian push buttons (designated to the nearest 0.10 foot);
- horizontal relationship of the crosswalk and stop bars (designated to the nearest 0.10 foot);
- utility features within the curb ramp construction area;
- existing and proposed right-of-way and construction easements (including the administrator of the right-of-way ex. state, municipal or dedicated etc); and
- property lines and property owner of record on drawings where there is insufficient right-of-way for the proposed design.

All minimum and maximum dimensions contained on the Standard Drawings RC-67M are absolute. Construction tolerances do not apply when a dimension is shown as minimum or maximum.

Designs utilizing cheek-walls and vertical drops will require Department approval. Designs must include pedestrian barriers, for approval by the Department, if vertical drops are used. Otherwise grade non-walk areas in accordance with Standard Drawing RC-67M.

All work must be performed within the Legal Right-of-Way unless written permission is obtained from the Department.

Complete the PennDOT form entitled "Technically Infeasible Form" (TIF), when applicable, and submit to the District ADA Coordinator for approval prior to the acceptance of the drawings.

(g) Submittals

Submit at a minimum, two hard copies and one electronic copy of all drawings, forms, and related drawings. Submit one photograph depicting each location. *(delete sentence if photographs are not required)* Each submission package must be sealed by a Professional Engineer licensed in the State.

(h) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN BUILD.

III. MEASUREMENT AND PAYMENT – EACH. One quadrant.

The design for each corner, median crossing, island, commercial driveway (both sides) and mid-block crossing (both sides) will be considered one quadrant. A “T” intersection will constitute a maximum of three quadrants. Payment for construction of Curb Ramps will made in accordance with the appropriate Contract Items.

Project Specific Details:

Special Provision: **D29909A - c29909 ITEM 9694-0002 – DESIGN OF CONCRETE CURB RAMPS [by RAMP]**

Item(s) Associated:

Header:

ITEM 9694-0002 – DESIGN OF CONCRETE CURB RAMPS [by RAMP]

Provision Body:

I. DESCRIPTION

This work is the design and preparation of drawings for the construction of ADA compliant curb ramps as required to provide pedestrian access.

II. DESIGN

(a) General

Prepare and submit Design Drawings for each ramp detailing the proposed curb ramp(s) in accordance with the Department's specifications.

Design will be paid for each ramp designed.

Detectable Warning Surfaces must be provided at the junction between the Pedestrian Access Route (PAR) and commercial driveways provided with traffic control devices or driveways that are otherwise allowed to operate like public streets.

Provide design and drawings in English units.

Contractor will provide a Design Activity Schedule.

(b) Additional Designer Qualifications

For this Design Activity, résumés must demonstrate experience and expertise, during the last 5 years, with Americans with Disabilities Act (ADA) requirements as contained in Code of Federal Regulations; 28 CFR Part 36 and other applicable design criteria, standards, guidelines and construction specifications.

(List any additional qualifications necessary for the particular project over and above those listed above and in the Special Provision titled SPECIAL BIDDING – DESIGN BUILD)

(c) Design Specifications

Provide a Design Drawing as specified in Section 105.02(c) and in accordance with Part II (f) Design Requirements of this Special Provision.

Design the ramp construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN BUILD, Section VIII – General Design Requirements, Design Specifications. ***(List any additional publications, and identify the publications they supersede)***

(d) Utilities

Design the curb ramps to accommodate the existing utility facilities within the project. Minor utility adjustments such as, but not limited to, minor vertical adjustments of manholes, junction boxes, and valve boxes, etc. may be required. See Special Provision titled UTILITY RELOCATION INFORMATION FOR DESIGN-BUILD PROJECTS included in the bid package.

(e) Signalized Intersections

Revise the existing traffic signal permit plans including, but not limited to, stop bar locations, crosswalks, pedestrian push button locations, loop detectors, sensors, clearance intervals and installation/ removal of pedestrian signs as required to accommodate the new ramps and comply with the Design Requirements in subsection (f) below. Coordinate with the appropriate municipalities for the revisions to the traffic signal permit plans and obtain concurrences in writing. Contact the District Traffic Engineer for prints of the existing traffic

signal permit plans. Notify the District Traffic Unit if changes to the intersection potentially warrant signal-timing adjustments. Submit the revised traffic signal permit plans to the District Traffic Engineer for approval. Upon approval, submit electronic files of the traffic signal permit plans to the District Traffic Engineer. For files not provided to the Contractor in electronic format, revised image files are acceptable.

Ensure that pedestrian visibility is not compromised by the new curb ramp locations. Ensure that distances to the signal head from the stop bar are within the guidelines established in Publication 149 - Traffic Signal Designer Handbook.

(f) Design Requirements

Design all curb ramps in accordance with the Americans with Disabilities Act: Policy and the Design Guidance contained in Publication 13M, Design Manual Part 2, Highway Design (DM 2).

Refer to the Special Provision titled ENVIRONMENTAL COMPLIANCE AND MITIGATION TRACKING SYSTEM (ECMTS) REPORT to ensure that Curb Ramp Designs comply with the environmental commitments for the project.

Provide access to existing pushbuttons to the maximum extent feasible or install 4 foot pedestal pushbutton poles so as not to create pedestrian obstructions.

Provide 8½ inch x 11 inch Design Drawings at a scale of *(Insert desired scale. Suggested: 1 inch per 5 feet Vertical and 1 inch per 25 feet Horizontal.)*

Provide a title block in the lower right hand corner, including the Project's name, ECMS number, date of submittal, a block for date of re-submittal(s), and the appropriate sheet number(s).

Provide positive drainage for each ramp.

On the drawings, indicate the:

- direction of magnetic North;
- type of curb ramp proposed and the location of each ramp (as applicable, submit a “Technical Infeasible Form (TIF)” and submit to the District ADA Coordinator for committee approval – the Assistant District Executive - Design will grant final approval);
- Indicate on drawing that TIF was submitted and its submittal date;
- existing and proposed vertical elevations of the finished grade of roadway at the point where the center of the proposed ramp intersects the edge of roadway (designated to the nearest 0.01 foot);
- existing longitudinal and cross slopes of the roadway directly in front of and at the center of the proposed ramp (designated to the nearest 0.10 %);
- proposed running and cross slope percent of the ramp (designated to the nearest 0.10 %);
- proposed running and cross slope percent of the sidewalk transitions to the ramp and/or landing (designated to the nearest 0.10 %);
- limits of removal of existing sidewalk, curb and curb ramp(s) (designated to the nearest 0.10 foot), terminate limits of work at existing tooled expansion/ contraction joints, curbs may be saw cut;
- proposed length and width of the curb ramp;
- proposed horizontal location and horizontal measurements of the landing area;
- proposed slopes of the landing area (designated to the nearest 0.10 %);
- proposed slopes of flares (designated to the nearest 0.10 %);
- proposed horizontal measurement(s) of flares (designated to the nearest 0.10 foot);
- proposed horizontal placement of Detectable Warning Surface (DWS);
- horizontal and vertical relationships to the pedestrian push buttons (designated to the nearest 0.10 foot);
- horizontal relationship of the crosswalk and stop bars (designated to the nearest 0.10 foot);
- utility features within the curb ramp construction area;

- existing and proposed right-of-way and construction easements (including the administrator of the right-of-way ex. state, municipal or dedicated etc); and
- property lines and property owner of record on drawings where there is insufficient right-of-way for the proposed design.

All minimum and maximum dimensions contained on the Standard Drawing RC-67M are absolute. Construction tolerances do not apply when a dimension is shown as minimum or maximum.

Designs utilizing cheek-walls and vertical drops will require Department approval. Designs must include pedestrian barriers, for approval by the Department, if vertical drops are used. Otherwise, grade non-walk areas in accordance with Standard Drawing RC-67M.

All work must be performed within the Legal Right-of-Way unless written permission is obtained from the Department.

Complete the PennDOT forms titled "Technically Infeasible Form" (TIF), when applicable, and submit to the District ADA Coordinator for approval prior to the acceptance of the drawings.

(g) Submittals

Submit at a minimum, two hard copies and one electronic copy of all drawings, forms, and related drawings. Submit one photograph depicting each location. *(delete sentence if photographs are not required)* Each submission package must be sealed by a Professional Engineer licensed in the State.

(h) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN BUILD.

III. MEASUREMENT AND PAYMENT – EACH. One ramp.

Project Specific Details:

Special Provision: **D29910B - c29910 ITEM 9694-0010 – CONSTRUCT CONCRETE CURB RAMPS AND SIDEWALKS**

Item(s) Associated:

Header:

ITEM 9694-0010 – CONSTRUCT CONCRETE CURB RAMPS AND SIDEWALKS

Provision Body:

I. DESCRIPTION

This work is the construction of concrete curb ramps, cement concrete sidewalks, and restoration of the adjacent area as indicated on the approved curb ramp design drawings and applicable standards.

II. MATERIAL

As per Sections 630 and 676 and as indicated and specified on the approved Design Curb Ramp Drawings.

III. CONSTRUCTION

In accordance with the special provisions of the contract and any additional requirements specified herein. Construct curb ramps and sidewalks in accordance with Section 630 and Section 676, and as indicated, except as follows:

Revise Section 630.3 (g) as follows:

Excavate the existing pavement up to a maximum of 2 feet in front of the existing curb to neat (sawcut) lines. Maintain positive drainage.

Backfill the area on the roadway side of the curb up to the depth of the existing pavement structure with No.2A Stone. Backfill in lifts not to exceed 6 inches and compact by means of mechanical tampers or rollers, not to exceed 8 tons. Place asphalt material for the remainder of the excavated area, matching the existing pavement structure. Following placement of asphalt material, seal the paved area with PG 64S-22. If concrete is encountered as part of the pavement structure, use Asphalt Base to replace removed concrete.

Revise Section 676.3 Construction by adding the following:

Construct plain cement concrete curb ramps at the locations indicated on the approved Design Curb Ramp Drawings; as shown on Standard Drawings RC – 67M and RC – 64M; and meeting the requirements of Publication 13M, Design Manual Part 2, Chapter 6. On Standard Drawing RC – 67M, the details depicted are most appropriate for new construction. Alterations to existing facilities must meet the requirements, unless a Technical Infeasibility Form has been approved by the Department for each deficient location.

Do not start work on curb ramps until the drawings for the quadrant or ramp, as applicable, are submitted and approved. ***[A quadrant is defined as all of curb ramps and ADA features associated with a particular corner, median crossing, island, commercial driveway, or mid-block crossing. Each corner, median crossing, island, commercial driveway (both sides) and mid-block crossing (both sides) will be considered to be a separate quadrant. A “T” intersection will constitute a maximum of three quadrants].***

Perform all work within the Legal Right-of-Way.

Minor utility adjustments such as, but not limited to, minor vertical adjustments of manholes, junction boxes, and valve boxes, etc. may be required. Coordinate with all necessary utility facility owners for adjustments to facilities for construction of the curb ramp. Coordinate all utility adjustments as specified in the Special Provision titled UTILITY RELOCATION INFORMATION FOR DESIGN/BUILD PROJECTS.

All minimum and maximum dimensions contained on Standard Drawings RC – 67M and RC-64M are absolute. Construction tolerances do not apply when a dimension is shown as minimum or maximum. Check all slopes with a Digital Display Level as specified in Section 609.2(e)3 for compliance. An acceptance certificate will not be issued if any newly constructed curb ramps do not fully comply with the approved curb ramp design drawings and applicable standards.

All curb ramps will include Sidewalk Detectable Warning Surfaces as specified in Section 695, unless excluded by Publication 13M, Design Manual Part 2, Section 6.5.A.8.

Remove all existing concrete and curb to neat lines.

Notify the applicable municipality and appropriate Engineering District a minimum of 3 calendar days before to any work at signalized intersections that may affect loop detectors. Replace any damaged or removed loop detectors and fully restore their operation for each signalized intersections within 7 calendar days. Adjust video detection systems as required. Comply with the appropriate Traffic Signal Permit for all signalized intersections. Modifications to the existing Traffic Signal Permit will require municipal and appropriate Engineering District Approval.

Eradicate and install pavement markings as required by the Curb Ramp Design Drawings.

Provide access to existing pedestrian controls to the maximum extent feasible or install 4 feet pedestal control poles so as not to create pedestrian obstructions.

Grade areas behind the sidewalk that are within the work area to match the grade of the new sidewalk and existing topography so the area will drain away from the pedestrian facility. Place topsoil as necessary and seed the area with Seeding and Soil Supplements, Formula B as specified in Section 804.2.

If a new curb ramp is being placed at a quadrant of an intersection where there is an existing curb ramp, but not at the same location of the placement of the proposed ramp, remove the existing depressed curb and replace with necessary curb to tie into the new curb cut ramp. Remove the existing curb ramp and replace with the appropriate sidewalk or topsoil at a grade to meet the new curb ramp facility.

Any temporary construction activities required for alterations that affect existing Pedestrian Access Routes (PAR) will require the provision of a safe, alternate, and accessible pedestrian route around the construction activities. Provide alternate access in accordance with Publication 13M, Design Manual Part 2, Section 6.14 Temporary Alternate Circulation Paths at Construction Sites to the maximum extent feasible so that the usability of the alternate PAR is maintained. Maintain the alternate PAR through the duration of the construction activity.

Following construction of each curb ramp, the Representative will utilize Department form CS-4401 to evaluate all constructed curb ramps for compliance with the referenced Department standards. Reconstruct curb ramps that are found to be non-compliant as a result of the evaluation at the no cost to the Department, unless the curb ramp detail in question had been authorized to be constructed through the use of an approved Technically Infeasible Form.

An acceptance certificate will not be issued if any newly constructed curb ramp does not fully comply with the Standard Drawings RC - 67M and ADAAG requirements.

IV. MEASUREMENT AND PAYMENT- Square Meter (Square Yard)

Project Specific Details:

Special Provision: **I30021B - c80021 ITEM 8____ - ____ - BRIDGE STRUCTURE**

Item(s) Associated:

Header:

ITEM 8____ - ____ - BRIDGE STRUCTURE

Provision Body:

I. DESCRIPTION - This work is the construction of a bridge structure of the design indicated.

II. MATERIALS - As indicated and as specified in the applicable sections of the Specifications, Publication 408, Supplements thereto, and/or the Special Provisions for each respective item included in the construction of the structure.

III. CONSTRUCTION - In accordance with the applicable sections of the Specifications, Publication 408, Supplements thereto, and/or the Special Provisions for each respective item.

IV. MEASUREMENT AND PAYMENT - Lump Sum

Reinforcement Bars and Epoxy Coated Reinforcement Bars will be measured and paid for separately.

Placing concrete on the deck of the bridge in excess of the quantity shown on the drawings will not be considered a change from the design. Full compensation for all the deck concrete is included in the lump sum price for the structure.

Submit the "Component Item Schedule", included with the Proposal, as specified in Section 103.01(a).

Make the "Total" at the end of the "Component Item Schedule" equal the amount of the lump sum shown for the structure.

Project Specific Details:

Special Provision: **I80041A - c80041 ITEM 8____-____ - ALTERNATE BRIDGE STRUCTURE**

Item(s) Associated:

Header:

ITEM 8____-____ - ALTERNATE BRIDGE STRUCTURE

Provision Body:

PART A

I. DESCRIPTION - This work is either construction of the bridge structure as designed or designing and constructing an equivalent bridge structure of an alternate design in place of the "as-designed" bridge structure.

II. DESIGN -

(a) General. If an alternate design bridge structure is bid, furnish, to the Department, preliminary conceptual design calculations and drawings for the alternate bridge structure. Provide an alternate design equivalent to the original design and meeting applicable design criteria for strength and serviceability. Submit the alternate design to the District Executive for acceptance. Refer to PennDOT Design Manual Part 4, PP 1.10, Bridge Submissions-Construction Phase, for details on procedures for contractor submissions. If the equivalency of an alternate design cannot be clearly established, the Chief Bridge Engineer will be arbiter and the Chief Bridge Engineer's decision will be final. Furnish, with the preliminary conceptual design submission, a tabulation identifying the differences between the "as-designed" bridge structure and the alternate design bridge structure.

Any delay in submission and acceptance of a proposed alternate design or a revision, and/or approval of required permits, will not extend the contract time.

If an alternate design bridge structure is bid, and an acceptable preliminary conceptual design is not approved within 30 calendar days from the award date (6 days for the submission and 24 days for Department review), construct the "as-designed" bridge structure at no additional cost to the Department.

Alternate designs, which take advantage of any errors and/or omissions in the plans for the "as-designed" bridge structure or discrepancies between the "as-designed" bridge structure plans and the special provisions covering alternate designs, will not be accepted. In the event any such error, omission, or discrepancy is discovered, immediately notify the Department. Failure to notify the Department will constitute a waiver of all claims for misunderstandings, ambiguities, or other situations resulting from the error, omission, or discrepancy.

Experimental or demonstration-type design concepts; or products, structures, or elements not preapproved by the Department for general usage, will not be allowed in the alternate design.

Only eligible types of bridge structures, as shown in the Project Items and Quantities, bid documents, or special provisions, are allowed as contractor-designed alternates.

Value Engineering will not be allowed for elements changed by an approved alternate design.

Use the same type foundation for an alternate design as that indicated for the "as-designed" bridge structure. Contractor-designed alternate foundation types will not be allowed, but Value Engineering of the as-designed foundation will be allowed.

Have the alternate design completed by a Professional Engineer registered in the Commonwealth of Pennsylvania. All engineering firms must have a current Annual Qualification Package on file with the Bureau of Project Delivery's Consultant Agreement Unit and be registered business partners in ECMS.

Submit an affidavit, before or along with the preliminary conceptual design submission, stating that the designer is familiar with AASHTO, PennDOT, and other applicable design criteria, standards, and construction specifications. Also, submit a list of similar bridges designed for the Department within the past 5 years.

In identifying alternate design bridge structures, retain the "as-designed" bridge structure number, but suffix the numbers with the letters A, B, etc.

Show, on first sheet of the alternate design, the seal of a Professional Engineer registered in the Commonwealth of Pennsylvania, a valid signature in ink, the date signed, a business name, a business address, and the note "These drawings (S-XXXXXA) supersede drawings (S-XXXXX) approved (insert appropriate date)".

The Department will furnish CADD files and design computations for the "as-designed" bridge structure to the successful bidder upon request. Prepare alternate design plans using Department drafting standards.

(b) Design Computations and Design Specifications. On the first sheet of the computations for the alternate design show the seal of a Professional Engineer registered in the Commonwealth of Pennsylvania, a valid signature in ink, and the date signed.

Provide a complete set of computations for the alternate design of the superstructure and/or substructure, including foundation. Reproduce and insert computations from the "as-designed" bridge structure, as needed. Provide additional calculations, as requested by the District Bridge Engineer to justify the design, throughout the life of the contract.

Designs copied directly from approved Department Standards need not be documented through independent computations. List such designs on the submission by referencing the drawing number of the applicable standard, and the sheet number, table, or graph.

Use PennDOT Design Manual Part 4 for design policy procedures and criteria. All design related Strike-off Letters listed in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS", are applicable to the alternate design.

In the event that certain design parameters, stresses, or specifications are in conflict, the following order of predominance governs:

- Design requirements listed herein, in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS" and addenda (addendum) to the proposal.
- Design related Strike-off Letters in effect on the date of project advertisement.
- PennDOT Design Manual Part 4, "Structures", including revisions, (Publication 15M).
- PennDOT Bridge Design and Bridge Construction Standards (Publications 218M and 219M).
- AASHTO LRFD Bridge Design Specifications, as indicated for the "as-designed" bridge structure.

In the event that a clear order of predominance cannot be established, or a difference in the interpretation of the design criteria, standards, specifications, or methodology cannot be resolved, the Chief Bridge Engineer will be arbiter and the Chief Bridge Engineer's decision will be final.

Submit shop drawings to the District Executive as specified in Section 105.02 for review and acceptance. The Department is not responsible for work done without approved shop drawings.

If any provisions in PART B conflict with those in PART A, the provisions in PART B are to govern.

Within 60 calendar days after completion of the bridge structure, revise the structure drawings to show "as-built" conditions and submit them to the Representative. If caissons or piles are utilized, show, on the bridge elevation view, the maximum and minimum tip elevation and the average length for each substructure unit. For pile foundations, ensure that the table shown in PennDOT Design Manual Part 4, PP1.7.5.2 is included on the drawings and properly completed.

(c) Design Requirements. In the design of an alternate bridge structure, comply with PennDOT Design Manual Part 4, "Structures", and other design criteria as specified for the "as-designed" bridge structure, subject to the exceptions and/or additions in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Provide clear span distances between faces of substructure units and underclearances of not less than the minimum values indicated for the "as-designed" bridge structure, except as noted in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

The minimum underclearance for stream or river crossings is defined as the high water elevation for the design flood plus the specified debris clearance or as indicated for the "as-designed" bridge structure, whichever is less.

The minimum clearance for overpass structures is defined as the minimum required underclearance plus 3 inches or the minimum underclearance indicated for the "as-designed" bridge structure, whichever is less. Provide additional underclearance to compensate for foundation settlement if applicable to the alternate design.

Provide equivalent inspection and maintenance accessibility for the alternate bridge structure as for the "as-designed" bridge structure. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be final.

Do not change the indicated horizontal and vertical alignments, except as noted in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

For an alternate bridge structure, design the substructure to be within the limits of factored foundation bearing resistance, factored pile resistance, and factored drilled shaft resistance as indicated for the "as-designed" bridge structure.

Provide structure and end structure drainage as indicated for the "as-designed" bridge structure.

Comply with all requirements of the approved permit(s). Obtain approved/amended waterway permit(s) for alternate structures if necessary.

Be responsible for the cost and delay of any additional utility relocation that results from changes in the Contractor's plans or construction sequences made subsequent to (1) acceptance of the utility's relocation plans and (2) where the utility has physically moved its facilities based upon those relocation plans.

1. Deck Joints. Provide the same number of expansion joints or less if design allows for an alternate bridge structure as specified for the "as-designed" bridge structure. Provide joint type in accordance with PennDOT Design Manual Part 4.

2. Bearings. Provide bearings meeting requirements of PennDOT Design Manual Part 4.

Provide an expansion dam support system as indicated for the "as-designed" bridge structure unless otherwise specified in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

3. Superstructure. If the as-designed bridge superstructure consists of curved girders, as shown on the structure drawings, the alternate design bridge superstructure is also to consist of curved girders unless otherwise specified in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Provide slab designs conforming to the requirements of Standard Drawing BD-601M. Use composite design only, unless the "as-designed" bridge structure utilized noncomposite design.

4. Super Load Bridge Beams. Do not use super load bridge beams (beams over 160 feet in length or total load over 201,000 pounds gross weight) unless included in the "as-designed" bridge structure or allowed in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS". Verify that an oversize and/or overweight permit can be issued for superloads, before incorporating them into the alternate design.

If super load bridge beams are used, for transportation of these beams conform to the requirements of PennDOT Design Manual Part 4, PP1.13.2, and the following:

- Requests for waiver of any provisions of Chapter 179 of Title 67 will not be approved, except as noted herein.

5. Alternate Prestressed Concrete Bridge Structure. Use the Department's prestressed concrete girder computer program to design precast prestressed concrete beams. Use the version of the program in effect at the time of project advertising.

5.a Prestressed Concrete Beams. Prestressed concrete beam sections, differing significantly from the standards specified herein, will be considered special sections and subject to the requirements of Section 1107.03(a)4. Do not deviate from the minimum flange and web thicknesses or section properties shown in the Bridge Design Standards.

Use of lightweight concrete for prestressed beams is not allowed.

5.b Deck Slab. If the effective slab span is less than 3 1/2 feet, a minimum slab thickness of 7 1/2 inches, using all No. 4 reinforcement bars, is allowed.

5.c Prestressed Concrete Segmental Box Girders. Use either single or multiple cell box girders, trapezoidal in shape (inclined webs) or rectangular in shape (vertical webs). Provide for future deck removal and replacement in the design and details. Conform to design criteria specified for the "as-designed" bridge structure and as follows:

- Cast-in-place joints may be used to join precast segments, in place of match cast joints sealed with epoxy. If cast-in-place joints are used, shear keys may be omitted. However, if shear keys are omitted, striate and/or heavy score the surfaces to be joined to a minimum depth of 1/4 inch. Use the same concrete mix for cast-in-place joints as for the precast segments, and ensure that strength development is the same.
- Maintain a joint width as needed for coupling conduits, lapping reinforcement, and placement of concrete, but in no case allow a joint width of less than 4 inches at the closest point. Keep adjacent concrete surfaces thoroughly wet or apply an approved bonding agent before placing concrete in the joint.
- Identify anchor piers. Provide box girder diaphragms having sufficient openings to allow for continuous inspection of the inside of the box girder. Provide steel access doors with master locks, at each abutment, for each box. Provide

diaphragms that are substantially solid at piers and abutments, except for access and utility holes.

Design adjacent prestressed box beam as a composite beam.

6. Alternate Steel Bridge Structure. Use the Department's steel girder and steel splice design computer programs to design steel girders or beams. Use the version of the program in effect at the time of project advertising.

Do not use unpainted weathering steel unless allowed in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Do not include longitudinal stiffeners in computing steel section properties.

7. Nonstandard Designs. Do not submit an alternate design bridge structure, either prestressed concrete or steel, which is not covered by the aforementioned Standards, or under PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

8. Pile-Supported Foundation. Base pile design for the alternate bridge structure on the same type, size, length, tip reinforcement, maximum design load, and driving criteria specified for piles for the "as-designed" bridge structure. Piles will be measured and paid for as specified herein.

Include test piles in the lump sum price bid for the bridge structure. Provide the same number of test piles per substructure unit for alternate design as specified per substructure unit for the "as-designed" bridge structure.

Load test piles, when specified for the "as-designed" bridge structure, will be measured and paid for separately, as specified. Provide the same number of load test piles per bridge structure for an alternate design as specified for the "as-designed" bridge structure, located at a substructure unit as close as possible to the "as-designed" location unless otherwise specified in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Bearing piles, additional test piles, test pile extensions, load test pile extensions, and pile tip reinforcement will be measured and paid for separately as specified in Section 1005.4. Determine test pile extensions and load test pile extensions relative to the pile lengths indicated in the estimated quantities for the "as-designed" bridge structure or approved alternate bridge structure.

Record the bid quantities for bearing piles and pile tip reinforcement in the spaces provided in the Project Items and Quantities for the alternate design.

Base the estimated quantity for bearing piles used in an alternate design on maximum utilization of the factored resistance indicated for piles used in the "as-designed" bridge structure.

Calculate the lengths of bearing piles used in an alternate design as follows:

- Determine the bearing pile length for each as-designed substructure unit, to the next longer foot, by dividing the quantity of bearing piles by the number of bearing piles for that unit, using the estimated quantities indicated for the "as-designed" bridge structure.
- For alternate designs involving the relocation of substructure units, determine bearing pile lengths by straight line interpolation, to the next foot, using as-designed pile lengths and the average distance between as-designed substructure units in back and ahead of the relocated unit. Base the average distance between as-designed substructure units on measurements between the centerlines of piers (or centerline of bearing at abutments) along the centerlines of exterior girders or beams. If the alternate design bridge structure is longer than the "as-designed" bridge structure, provide bearing piles for the relocated abutment of the same length as the bearing piles for the as-designed abutment.

- If one of the as-designed substructure units in back or ahead of a relocated unit is wholly supported on a spread foundation, determine the bearing pile length for the relocated unit, to the next foot, by a straight line interpolation, using the bearing pile length of the as-designed, pile supported unit and zero length at the spread foundation supported unit. However, do not use lengths of less than 10 feet for determining the bid quantity.
- For relocated substructure units, test pile lengths, which are included in the lump sum price for the alternate design bridge structure, are to be the average lengths determined using the procedures specified above. The load test pile length at a relocated substructure unit is to be the same as the bearing pile length at that unit.
- For the purpose of determining pile lengths at relocated substructure units, consider a unit relocated if the average distance from the closest, as-designed unit is 20 feet or more. Determine the average distance as specified above.

Show the estimated quantities of as-designed load test piles, test piles, bearing piles, and pile tip reinforcement used in an alternate design on the alternate design plans when submitted for approval. Show test pile lengths, included in the lump sum price bid for the alternate bridge structure, and load test pile length, included in the lump sum price bid for load test piles, in the estimated quantities. Tabulate piling quantities using a format similar to that used for the "as-designed" bridge structure. Show alternate design bid quantities for load test piles, bearing piles, and pile tip reinforcement for comparison with approved, as-designed, estimated quantities.

Value Engineering of as-designed piles used in an approved alternate design bridge structure is allowed.

If as-designed piles for a relocated substructure unit in an alternate design cannot be driven, thereby necessitating a redesign of the substructure unit, furnish the revised design and complete construction drawings as part of the lump sum price bid for the alternate bridge structure.

If the as-designed pile layout can not be used in an alternate design involving a relocated substructure unit, alternate design piles will be measured and paid for as part of the lump sum price bid for the alternate bridge structure. Exclude from the bid all pile load tests specified for as-designed piles which are replaced by alternate design piles.

Compute the pay quantity for as-designed bearing piles incorporated into an alternate design as follows:

Case 1: If D and E are less than or equal to B, the Pay Quantity = D

Case 2: If D and E are greater than B, the Pay Quantity = D - (E-B)

Case 3: If E is greater than B but D is equal to or less than B, the Pay

Quantity = D

For all other cases, use D as the Pay Quantity.

where:

D = Actual acceptable driven quantity per structure

B = Bid quantity per structure entered in the Project Items and Quantities.

E = Estimated quantity per structure shown on the approved alternate drawings.

III. MATERIAL - As indicated and as specified for each respective item included in the "as-designed" bridge structure.

IV. CONSTRUCTION - In accordance with Publication 408, Special Provisions for each respective item, and any additional requirements specified herein. Submit construction procedures for an alternate design, for

acceptance, if other than those specified herein.

Erection methods are open, but submit the proposed method to the District Bridge Engineer for approval.

If utility relocations are required to accommodate the proposed locations of substructure units in an alternate design, be responsible for the cost of the utility relocations and any related delay claim costs.

V. MEASUREMENT AND PAYMENT - Lump Sum

For the type of alternate design bridge structure selected, subject to a reduction equal to the amount of the Contractor's share of the Department's engineering costs to be determined as follows:

- For each alternate bridge structure with lump sum bid item amount less than \$2,000,000 = 2% of the lump sum bid amount for structure
- For each alternate bridge structure with lump sum bid item amount over \$2,000,000 = \$40,000 plus 0.25% of the lump sum bid amount over \$2,000,000, total amount not to exceed \$85,000

The Contractor's share of the Department's engineering costs will be recovered by processing a contract adjustment (Alternate Design Review) to reduce the contract lump sum price by an amount equal to the Contractor's share.

A utility company's share of fabricated structural steel and/or installation of sleeves, inserts, casings, hanger assemblies, ducts, etc. for utilities is to be a separate item. Do not include the utility company's share in the bid price for the alternate design bridge structure unless otherwise specified.

For an alternate design bridge structure, all items of work are to be included in and will be paid for as part of the contract lump sum price; except, bearing piles; pile tip reinforcement; pile load tests; dynamic pile testing; Class C cement concrete under footings; Class 3 excavation, reinforcement bars, and Class A cement concrete for pedestals; and caissons.

Placing deck concrete in excess of the indicated quantity will not be considered a change from the design. The contract lump sum price for each alternate bridge structure includes full compensation for all deck concrete.

(a) Bridge Structure As Designed. If the "as-designed" bridge structure is bid, submit the "Component Item Schedule", included with the Proposal, as specified in Section 103.01(a).

Make the "Total" at the end of the "Component Item Schedule" equal the amount of the lump sum bid for Bridge Structure as Designed.

(b) Alternate Bridge Structure. If an alternate design bridge structure is bid, the apparent low bidder is required to submit a "Component Item Schedule for Alternate Design" as specified in Section 103.01(a). No adjustments will be made to the contract lump sum price bid for alternate design bridge structure for any field adjustments necessary to complete the structure.

Make the "Total" at the end of the "Component Item Schedule for Alternate Design" equal the amount of the lump sum bid for Alternate Bridge Structure.

(c) Alternate Structure Design Costs. The apparent low bidder is to include a component item for Alternate Design Costs in the Component Item Schedule when an alternate design is bid. Include the cost of this item in the total of the lump sum bid price. Payment of 25% of the total design costs will be made upon approval of the preliminary conceptual design. The remaining amount will be paid for in a proportionate manner, designated by the Department, on the basis of approval of the final design.

Project Specific Details:

**I80081A - c80081 ITEM 8 ____ - ____ - ALTERNATE
SUPERSTRUCTURE**

Special Provision:

Item(s) Associated:

Header:

ITEM 8 ____ - ____ - ALTERNATE SUPERSTRUCTURE

Provision Body:

PART A

I. DESCRIPTION - This work is either construction of the bridge superstructure as designed or designing and constructing an equivalent bridge superstructure of an alternate design in place of the "as-designed" bridge superstructure.

II. DESIGN -

(a) General. If an alternate design bridge superstructure is bid, furnish, to the Department, preliminary conceptual design calculations and drawings for the alternate bridge superstructure. Provide an alternate design equivalent to the original design and meeting applicable design criteria for strength and serviceability. Submit the alternate design to the District Executive for acceptance. Refer to PennDOT Design Manual Part 4, PP 1.10, Bridge Submissions-Construction Phase, for details on procedures for contractor submissions. If the equivalency of an alternate design cannot be clearly established, the Chief Bridge Engineer will arbitrate and the Chief Bridge Engineer's decision will be final. Furnish, with the preliminary conceptual design submission, a tabulation identifying the differences between the "as-designed" bridge superstructure and the alternate design bridge superstructure.

Any delay in submission and acceptance of a proposed alternate design or a revision, and/or approval of required permits, will not extend the contract time.

If an alternate design bridge superstructure is bid, and an acceptable preliminary conceptual design is not approved within 30 calendar days from the award date (6 days for the submission and 24 days for Department review), construct the "as-designed" bridge superstructure at no additional cost to the Department.

Alternate designs, which take advantage of any errors and/or omissions in the plans for the "as-designed" bridge superstructure or discrepancies between the "as-designed" bridge superstructure plans and the special provisions covering alternate designs, will not be accepted. In the event any such error, omission, or discrepancy is discovered, immediately notify the Department. Failure to notify the Department will constitute a waiver of all claims for misunderstandings, ambiguities, or other situations resulting from the error, omission, or discrepancy.

Experimental or demonstration-type design concepts; or products, structures, or elements not preapproved by the Department for general usage, will not be allowed in the alternate design.

Only eligible types of bridge superstructures, as shown in the Project Items and Quantities, bid documents, or special provisions, are allowed as contractor-designed alternates.

Value Engineering will not be allowed for elements changed by an approved alternate design.

Have the alternate design completed by a Professional Engineer registered in the Commonwealth of Pennsylvania. All engineering firms must have a current Annual Qualification Package on file with the Bureau of Project Delivery's Consultant Agreement Unit and be registered business partners in ECMS.

Submit an affidavit, before or along with the preliminary conceptual design submission, stating that the designer is familiar with AASHTO, PennDOT, and other applicable design criteria, standards, and construction specifications. Also, submit a list of similar bridges designed for the Department within the past 5 years.

In identifying alternate design bridge superstructures, retain the "as-designed" bridge superstructure number, but suffix the number with the letters A, B, etc.

Show, on first sheet of the alternate design, the seal of a Professional Engineer registered in the Commonwealth of Pennsylvania, a valid signature in ink, the date signed, a business name, a business address, and the note "These drawings (S-XXXXXA) supersede drawings (S-XXXXX) approved (insert appropriate date)".

The Department will furnish CADD files and design computations for the "as-designed" bridge superstructure to the successful bidder upon request.

Prepare alternate design plans using Department drafting standards.

(b) Design Computations and Design Specifications. On the first sheet of the computations for the alternate design, show the seal of a Professional Engineer registered in the Commonwealth of Pennsylvania, a valid signature in ink, and the date signed.

Provide a complete set of computations for the alternate design bridge superstructure. Reproduce and insert computations from the "as-designed" bridge superstructure, as needed. Provide additional calculations, as requested by the District Bridge Engineer to justify the design, throughout the life of the contract.

Designs copied directly from approved Department Standards need not be documented through independent computations. List such designs on the submission by referencing the drawing number of the applicable standard, and the sheet number, table, or graph.

Use PennDOT Design Manual Part 4 for design policy procedures and criteria. All design related Strike-off Letters listed in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS", are applicable to the alternate design.

In the event that certain design parameters, stresses, or specifications are in conflict, the following order of predominance governs:

- Design requirements listed herein, in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS" and addenda (addendum) to the proposal.
- Design related Strike-off Letters in effect on the date of project advertisement.
- PennDOT Design Manual Part 4, "Structures" including revisions (Publication 15M)
- PennDOT Bridge Design and Bridge Construction Standards (Publications 218M and 219M)
- AASHTO LRFD Bridge Design Specifications, as indicated for the "as-designed" bridge superstructure.

In the event that a clear order of predominance cannot be established, or a difference in the interpretation of the design criteria, standards, specifications, or methodology cannot be resolved, the Chief Bridge Engineer will be arbiter and the Chief Bridge Engineer's decision will be final.

Submit shop drawings to the District Executive as specified in Section 105.02 for review and acceptance. The Department is not responsible for work done without approved shop drawings.

If any provisions in PART B conflict with those in PART A, the provisions in PART B are to govern.

Within 60 calendar days after completion of the bridge superstructure, revise the structure drawings to show "as-built" conditions and submit them to the Representative.

(c) Design Requirements. In the design of an alternate bridge superstructure, comply with PennDOT Design Manual Part 4, "Structures", and other design criteria as specified for the "as-designed" bridge superstructure,

subject to the exceptions and/or additions in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Provide clear span distances between faces of substructure units and underclearances of not less than the minimum values indicated for the "as-designed" bridge superstructure, except as noted in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

The minimum underclearance for stream or river crossings is defined as the high water elevation for the design flood plus the specified debris clearance or as indicated for the "as-designed" bridge superstructure, whichever is less.

The minimum clearance for overpass structures is defined as the minimum required underclearance plus 3 inches or the minimum underclearance indicated for the "as-designed" bridge superstructure, whichever is less. Provide additional underclearance to compensate for foundation settlement if applicable to the alternate design.

Provide equivalent inspection and maintenance accessibility for the alternate bridge superstructure as for the "as-designed" bridge superstructure. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be final.

Do not change the indicated horizontal and vertical alignments, except as noted in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Design an alternate bridge superstructure to be within the limits of factored foundation bearing resistance, factored pile resistance, and factored drilled shaft resistance of the existing substructure, as indicated for the "as-designed" bridge superstructure.

Provide structure and end structure drainage as indicated for the "as-designed" bridge superstructure.

Comply with all requirements of the approved permit(s). Obtain approved/amended waterway permit(s) for alternate structures if necessary.

Be responsible for the cost and delay of any additional utility relocation that results from changes in the Contractor's plans or construction sequences made subsequent to (1) acceptance of the utility's relocation plans and (2) where the utility has physically moved its facilities based upon those relocation plans.

1. Deck Joints. Provide the same type and number of expansion joints or less if design allows for an alternate bridge superstructure as specified for the "as-designed" bridge superstructure.

2. Bearings. Provide the same type bearings for an alternate bridge superstructure as specified for the "as-designed" bridge superstructure unless specified in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Provide an expansion dam support system as indicated for the "as-designed" bridge superstructure unless otherwise specified in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

3. Superstructure. If the "as-designed" bridge superstructure consists of curved girders, as shown on the structure drawings, the alternate design bridge superstructure is also to consist of curved girders unless otherwise specified in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Provide slab designs conforming to the requirements of Standard Drawing BD-601M. Use composite design only, unless the "as-designed" bridge superstructure utilized noncomposite design.

4. Super Load Bridge Beams. Do not use super load bridge beams (beams over 160 feet in length or total load over 201,000 pounds gross weight) unless included in the "as-designed" bridge superstructure or allowed in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS". Verify that an oversize and/or overweight permit can be issued for superloads, before incorporating them into the alternate design.

If super load bridge beams are used, for transportation of these beams conform to the requirements of PennDOT Design Manual Part 4, PP1.13.2, and the following:

- Requests for waiver of any provisions of Chapter 179 of Title 67 will not be approved, except as noted herein.

5. Alternate Prestressed Concrete Bridge Superstructure. Use the Department's prestressed concrete girder computer program to design precast prestressed concrete beams. Use the version of the program in effect at the time of project advertising.

5.a Prestressed Concrete Beams. Prestressed concrete beam sections, differing significantly from the standards specified herein, will be considered special sections and subject to the requirements of Section 1107.03(a)4. Do not deviate from the minimum flange and web thicknesses or section properties shown in the Bridge Design Standards.

Use of lightweight concrete for prestressed beams is not allowed.

5.b Deck Slab. If the effective slab span is less than 3 1/2 feet, a minimum slab thickness of 7 1/2 inches, using all No. 4 reinforcement bars, is allowed.

5.c Prestressed Concrete Segmental Box Girders. Use either single or multiple cell box girders, trapezoidal in shape (inclined webs) or rectangular in shape (vertical webs). Provide for future deck removal and replacement in the design and details. Conform to design criteria specified for the "as-designed" bridge superstructure and as follows:

- Cast-in-place joints may be used to join precast segments, in place of match cast joints sealed with epoxy. If cast-in-place joints are used, shear keys may be omitted. However, if shear keys are omitted, striate and/or heavy score the surfaces to be joined to a minimum depth of 1/4 inch. Use the same concrete mix for cast-in-place joints as for the precast segments, and ensure that strength development is the same.
- Maintain a joint width as needed for coupling conduits, lapping reinforcement, and placement of concrete, but in no case allow a joint width of less than 4 inches at the closest point. Keep adjacent concrete surfaces thoroughly wet or apply an approved bonding agent before placing concrete in the joint.
- Identify anchor piers. Provide box girder diaphragms having sufficient openings to allow for continuous inspection of the inside of the box girder. Provide steel access doors with master locks, at each abutment, for each box. Provide diaphragms that are substantially solid at piers and abutments, except for access and utility holes.

Design adjacent prestressed box beam as a composite beam.

6. Alternate Steel Bridge Superstructure. Use the Department's steel girder and steel splice computer programs to design steel beams or girders. Use the version of the program in effect at the time of project advertising.

Do not use unpainted weathering steel unless allowed in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Do not include longitudinal stiffeners in computing steel section properties.

7. Nonstandard Designs. Do not submit an alternate design bridge superstructure, either prestressed concrete or steel, which is not covered by the aforementioned Standards, or under PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

III. MATERIAL - As indicated and as specified for each respective item included in the "as-designed" bridge superstructure.

IV. CONSTRUCTION - In accordance with Publication 408, Special Provisions for each respective item, and any additional requirements specified herein. Submit construction procedures for an alternate design, for acceptance, if other than those specified herein.

Erection methods are open, but submit the proposed method to the District Bridge Engineer for approval.

If utility relocations are required as part of an alternate design, be responsible for the cost of the utility relocations and any related delay claim costs.

V. MEASUREMENT AND PAYMENT - Lump Sum

For the type of alternate design bridge superstructure selected, subject to a reduction equal to the amount of the Contractor's share of the Department's engineering costs to be determined as follows:

- For each alternate bridge superstructure with lump sum bid item amount less than \$2,000,000 = 2% of the lump sum bid amount for structure
- For each alternate bridge superstructure with lump sum bid item amount over \$2,000,000 = \$40,000 plus 0.25% of the lump sum bid amount over \$2,000,000 total amount not to exceed \$85,000

The Contractor's share of the Department's engineering costs will be recovered by processing a contract adjustment (Alternate Design Review) to reduce the contract lump sum price by an amount equal to the Contractor's share.

A utility company's share of fabricated structural steel and/or installation of sleeves, inserts, casings, hanger assemblies, ducts, etc. for utilities is to be a separate item. Do not include the utility company's share in the bid price for the alternate design bridge superstructure unless otherwise specified.

For an alternate design bridge superstructure, all items of work are to be included in and will be paid for as part of the contract lump sum price.

Placing deck concrete in excess of the indicated quantity will not be considered a change from the design. The contract lump sum price for each alternate bridge superstructure includes full compensation for all deck concrete.

(a) Bridge Superstructure As Designed. If the "as-designed" bridge superstructure is bid, submit the "Component Item Schedule", included with the Proposal, as specified in Section 103.01(a).

Make the "Total" at the end of the "Component Item Schedule" equal the amount of the lump sum bid for Bridge Superstructure As Designed.

(b) Alternate Bridge Superstructure. If an alternate design bridge superstructure is bid, the apparent low bidder is required to submit a "Component Item Schedule for Alternate Design" as specified in Section 103.01(a). No adjustments will be made to the contract lump sum price bid for alternate design bridge superstructure for any field adjustments necessary to complete the superstructure.

Make the "Total" at the end of the "Component Item Schedule for Alternate Design" equal the amount of the lump sum bid for Alternate Bridge Superstructure.

(c) Alternate Structure Design Costs. The apparent low bidder is to include a component item for Alternate Design Costs in the Component Item Schedule when an alternate design is bid. Include the cost of this item in the total of the lump sum bid price. Payment of 25% of the total design costs will be made upon approval of the preliminary conceptual design. The remaining amount will be paid for in a proportionate manner, designated by the Department, on the basis of approval of the final design.

Project Specific Details:

Special Provision: **I80101A - c80101 ITEM 8____ - ____ - ALTERNATE WALLS (USED WHEN "AS DESIGNED")**

Item(s) Associated:

Header:

ITEM 8____ - ____ - ALTERNATE WALLS (USED WHEN "AS DESIGNED")

Provision Body:

PART A

I. DESCRIPTION - This work is either construction of retaining walls and/or wingwalls as designed or designing and constructing equivalent retaining walls and/or wingwalls of an alternate design in place of the "as-designed" retaining walls and/or wingwalls.

II. DESIGN -

(a) General. If alternate design retaining walls and/or wing-walls are bid, furnish, to the Department, preliminary conceptual design calculations and drawings for the alternate retaining walls and/or wingwalls. Provide an alternate design equivalent to the original design and meeting applicable design criteria for strength and serviceability. Submit the alternate design to the District Executive for acceptance. Refer to PennDOT Design Manual Part 4, PP 1.10, Bridge Submissions-Construction Phase, for details on procedures for contractor submissions. If the equivalency of an alternate design cannot be clearly established, the Chief Bridge Engineer will be arbiter and the Chief Bridge Engineer's decision will be final. Furnish, with the preliminary conceptual design submission, a tabulation identifying the differences between the "as designed" retaining walls and/or wingwalls and the alternate design retaining walls and/or wingwalls.

On the alternate design plans include the type of wall, location, length, top elevation(s), proposed bottom of footing/leveling pad elevation(s), cross-sections including backfill material type and limits, and quantities. Also show, as required, details for concrete bridge barriers and/or railings, copings, conduit, or other attachments to precast wall panels/units. Show complete layout plans and fabrication details for precast wall panels/units and footings/leveling pads including reinforcement and attachments, and step-by-step erection instructions. Include details for strip or wire mesh reinforcement and attachments, for anchoring panels into the soil. Any fabrication done before acceptance of the plans will be at the Contractor's risk.

Any delay in submission and acceptance of a proposed alternate design or a revision, and/or approval of required permits, will not extend the contract time.

If alternate design retaining walls and/or wingwalls are bid, and an acceptable preliminary conceptual design is not approved within 30 calendar days from the award date (6 days for the submission and 24 days for Department review), construct the "as-designed" retaining walls and/or wingwalls at no additional cost to the Department.

Alternate designs which take advantage of any errors and/or omissions in the plans for the "as-designed" wall or discrepancies between the "as-designed" wall plans and the special provisions covering alternate designs, will not be accepted. In the event any such error, omission, or discrepancy is discovered, immediately notify the Department. Failure to notify the Department will constitute a waiver of all claims for misunderstandings, ambiguities, or other situations resulting from the error, omission, or discrepancy.

Experimental or demonstration-type design concepts; or products, structures, or elements not preapproved by the Department for general usage, will not be allowed in the alternate design.

Value Engineering may be applied to the "as-designed" retaining walls and/or wingwalls, but do not Value Engineer alternate design retaining walls and/or wingwalls.

Have the alternate design completed by a Professional Engineer registered in the Commonwealth of Pennsylvania. All engineering firms must have a current Annual Qualification Package on file with the Bureau of Project Delivery's Consultant Agreement Unit and be registered business partners in ECMS.

Submit an affidavit, before or along with the preliminary conceptual design submission, stating that the designer is familiar with AASHTO, PennDOT, and other applicable design criteria, standards, and construction specifications. Also, submit a list of similar retaining walls and/or wingwalls/bridges designed for the Department within the past 5 years.

In identifying alternate design retaining walls and/or wingwalls, retain the "as designed" retaining wall and/or wingwall number, but suffix the number with the letters A, B, etc. Proprietary walls shall have a P suffix as detailed in Design Manual Part 4 PP3.3.4.7(k).

Show, on first sheet of the alternate design, the seal of a Professional Engineer registered in the Commonwealth of Pennsylvania, a valid signature in ink, the date signed, a business name, a business address, and the note "These drawings (S-XXXXXA) supersede drawings (S-XXXXX) approved (insert appropriate date)". Also include a statement "All assumptions made in the design are validated either by details or notes on these drawings."

The Department will furnish CADD files for the "as-designed" retaining walls and/or wingwalls upon request.

Prepare alternate design plans using Department drafting standards.

(b) Design Computations and Design Specifications. On the first sheet of the computations for the alternate design, show the seal of a Professional Engineer registered in the Commonwealth of Pennsylvania, a valid signature in ink, and the date signed.

Provide a complete set of computations for the alternate design of the retaining walls and/or wingwalls. Reproduce and insert computations from the "as-designed" walls, as needed. Provide additional calculations, as requested by the District Bridge Engineer to justify the design, throughout the life of the contract.

Designs copied directly from approved Department Standards need not be documented through independent computations. List such designs on the submission by referencing the drawing number of the applicable standard, and the sheet number, table, or graph.

Use PennDOT Design Manual Part 4 for design policy procedures and criteria. All design related Strike-off Letters listed in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS", are applicable to the alternate design.

In the event that certain design parameters, stresses, or specifications are in conflict, the following order of predominance governs:

- Design requirements listed herein, in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS" and addenda (addendum) to the proposal.
- Design related Strike-off Letters in effect on the date of project advertisement.
- PennDOT Design Manual Part 4, "Structures" including revisions (Publication 15M).
- PennDOT Bridge Design and Bridge Construction Standards (Publications 218M and 219M).
- AASHTO LRFD Bridge Design Specifications as indicated for the "as-designed" walls.

In the event that a clear order of predominance cannot be established, or a difference in the interpretation of the design criteria, standards, specifications, or methodology cannot be resolved, the Chief Bridge Engineer will be arbiter and the Chief Bridge Engineer's decision will be final.

Submit shop drawings to the District Executive as specified in Section 105.02 for review and acceptance. The Department is not responsible for work done without approved shop drawings.

If any provisions in PART B conflict with those in PART A, the provisions in PART B are to govern.

Within 60 calendar days after completion of the walls, revise the original drawings to show "as-built" conditions and submit them to the Representative.

(c) Design Requirements. In the design of alternate retaining walls and/or wingwalls, comply with PennDOT Design Manual Part 4, "Structures", Section 11, and other design criteria as specified for the "as-designed" retaining walls and/or wingwalls, subject to the exceptions and/or additions in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Provide equivalent inspection and maintenance accessibility for the alternate retaining wall and/or wingwall as for the "as-designed" retaining wall and/or wingwall. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be final.

Do not change the indicated horizontal and vertical alignment of retaining walls and/or wingwalls, except as noted in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Design alternate retaining walls and/or wingwalls to be within the indicated limits of factored foundation bearing resistance and factored pile resistance as indicated for the "as designed" walls.

Provide clear span(s) and/or distances from wall faces of not less than the minimum values indicated for the "as-designed" retaining walls and/or wingwalls, except as noted in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Comply with all requirements of the approved permit(s). Obtain approved/amended waterway permit(s) for alternate structures if necessary.

Be responsible for the cost and delay of any additional utility relocation that results from changes in the Contractor's plans or construction sequences made subsequent to (1) acceptance of the utility's relocation plans and (2) where the utility has physically moved its facilities based upon those relocation plans.

III. MATERIAL - As indicated and as specified for each respective item included in the "as-designed" retaining walls and/or wingwalls.

Use the same materials throughout any individual wall, or at both ends of any individual structure, unless otherwise specified or indicated.

IV. CONSTRUCTION - In accordance with Publication 408, Special Provisions for each respective item, and any additional requirements specified herein. Submit construction procedures for an alternate design for acceptance, if other than those specified herein.

If utility relocations are required as part of an alternate design, be responsible for the cost of the utility relocations and any related delay claim costs.

V. MEASUREMENT AND PAYMENT - Lump Sum

For the type of alternate design wall selected; subject to a reduction equal to the amount of the Contractor's share of the Department's engineering costs as follows:

- For each alternate wall \$100,000 or less.....\$1,000
- For each alternate wall over \$100,000 but less than \$500,000.....\$2,000
- For each alternate wall over \$500,000 but less than \$1,000,000.....\$3,500
- For each alternate wall \$1,000,000 or more.....\$5,000

The Contractor's share of the Department's engineering costs will be recovered by processing a contract adjustment (Alternate Design Review) to reduce the contract lump sum price by an amount equal to the Contractor's share.

A utility company's share of fabricated structural steel and/or installation of sleeves, inserts, casings, hanger assemblies, ducts, etc. for utilities is to be a separate item. Do not include the utility company's share in the bid price for the alternate design walls unless otherwise specified.

All items of work are to be included in and will be paid for as part of the contract lump sum price; except, bearing piles; pile tip reinforcement; pile load tests; dynamic pile testing; Class C cement concrete under footings; Class 3 excavation, reinforcement bars, and Class A cement concrete for pedestals; and caissons.

(a) Retaining Walls and/or Wingwalls As Designed. If the "as-designed" retaining walls and/or wingwalls are bid, submit the "Component Item Schedule", included with the Proposal, as specified in Section 103.01(a).

Make the "Total" at the end of the "Component Item Schedule" equal the amount of the lump sum bid for Retaining Walls and/or Wingwalls As Designed.

(b) Alternate Retaining Walls and/or Wingwalls. If an alternate design retaining wall and/or wingwall is bid, the apparent low bidder is required to submit a "Component Item Schedule for Alternate Design" as specified in Section 103.01(a). Tabulate the quantities, unit prices, and bid prices for excavation, select granular material, precast wall panels/units, and footings/leveling pads. Furnish a similar tabulation for any miscellaneous items such as concrete bridge barriers, copings, conduit, junction boxes, lighting pole anchorages, and lighting poles. No adjustments will be made to the contract lump sum price bid for alternate design retaining walls and/or wingwalls for any field adjustments necessary to complete the structures.

Make the "Total" at the end of the "Component Item Schedule for Alternate Design" equal the amount of the lump sum bid for Alternate Retaining Walls and/or Wingwalls.

(c) Alternate Structure Design Costs. The apparent low bidder is to include a component item for Alternate Design Costs in the Component Item Schedule when an alternate design is bid. Include the cost of this item in the total of the lump sum bid price. Payment of 25% of the total design costs will be made upon approval of the preliminary conceptual design. The remaining amount will be paid for in a proportionate manner, designated by the Department, on the basis of approval of the final design.

Project Specific Details:

Special Provision: **I80141A - c80141 ITEM 8___-___ - ALTERNATE CULVERT**

Item(s) Associated:

Header:

ITEM 8___-___ - ALTERNATE CULVERT

Provision Body:

PART A

I. DESCRIPTION - This work is either construction of the culvert as designed or designing and constructing an equivalent culvert of an alternate design in place of the "as-designed" culvert.

II. DESIGN -

(a) General. If an alternate design culvert is bid, furnish, to the Department, preliminary conceptual design calculations and drawings for the alternate culvert. Provide an alternate design equivalent to the original design and meeting applicable design criteria for strength and serviceability. Submit the alternate design to the District Executive for acceptance. Refer to PennDOT Design Manual Part 4, PP 1.10, Bridge Submissions-Construction Phase, for details on procedures for contractor submissions. If the equivalency of an alternate design cannot be clearly established, the Chief Bridge Engineer will be arbiter and the Chief Bridge Engineer's decision will be final. Furnish, with the preliminary conceptual design submission, a tabulation identifying the differences between the "as designed" culvert and the alternate design culvert.

Any delay in submission and acceptance of a proposed alternate design or a revision, and/or approval of required permits, will not extend the contract time.

If an alternate design culvert is bid, and an acceptable preliminary conceptual design is not approved within 30 calendar days from the award date (6 days for the submission and 24 days for Department review), construct the "as-designed" culvert at no additional cost to the Department.

Alternate designs, which take advantage of any errors and/or omissions in the plans for the "as-designed" culvert or discrepancies between the "as-designed" culvert plans and the special provisions covering alternate designs, will not be accepted. In the event any such error, omission, or discrepancy is discovered, immediately notify the Department. Failure to notify the Department will constitute a waiver of all claims for misunderstandings, ambiguities, or other situations resulting from the error, omission, or discrepancy.

Experimental or demonstration-type design concepts; or products, structures, or elements not preapproved by the Department for general usage, will not be allowed in the alternate design.

Value Engineering may be applied to the "as-designed" culvert, but do not Value Engineer an alternate design culvert.

Have the alternate design completed by a Professional Engineer registered in the Commonwealth of Pennsylvania. All engineering firms must have a current Annual Qualification Package on file with the Bureau of Project Delivery's Consultant Agreement Unit and be registered business partners in ECMS.

Submit an affidavit, before or along with the preliminary conceptual design submission, stating that the designer is familiar with AASHTO, PennDOT, and other applicable design criteria, standards, and construction specifications. Also, submit a list of similar culverts designed for the Department within the past 5 years.

In identifying alternate design culverts, retain the "as designed" culvert number, but suffix the number with the letters A, B, etc.

Show, on the first sheet of the alternate design, the seal of a Professional Engineer registered in the Commonwealth of Pennsylvania, a valid signature in ink, the date signed, a business name, a business address, and the note "These drawings (S-XXXXXA) supersede drawings (S-XXXXX) approved (insert appropriate date)".

The Department will furnish CADD files and design computations for the "as-designed" culvert upon request. Prepare alternate design plans using Department drafting standards.

(b) Design Computations and Design Specifications. On the first sheet of the computations for the alternate design, show the seal of a Professional Engineer registered in the Commonwealth of Pennsylvania, a valid signature in ink, and the date signed.

Provide a complete set of computations for the alternate design culvert. Reproduce and insert computations from the "as-designed" culvert, as needed. Provide additional calculations, as requested by the District Bridge Engineer to justify the design, throughout the life of the contract.

Designs copied directly from approved Department Standards need not be documented through independent computations. List such designs on the submission by referencing the drawing number of the applicable standard, and the sheet number, table, or graph.

Use PennDOT Design Manual Part 4 for design policy procedures and criteria. All design related Strike-off Letters listed in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS", are applicable to the alternate design.

In the event that certain design parameters, stresses, or specifications are in conflict, the following order of predominance governs:

- Design requirements listed herein, in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS" and addenda (addendum) to the proposal.
- Design related Strike-off Letters in effect on the date of project advertisement.
- PennDOT Design Manual Part 4, "Structures" including revisions (Publication 15M).
- PennDOT Bridge Design and Bridge Construction Standards (Publications 218M and 219M).
- AASHTO LRFD Bridge Design Specifications, as indicated for the "as-designed" culvert.

In the event that a clear order of predominance cannot be established, or a difference in the interpretation of the design criteria, standards, specifications, or methodology cannot be resolved, the Chief Bridge Engineer will be arbiter and the Chief Bridge Engineer's decision will be final.

Submit shop drawings to the District Executive as specified in Section 105.02 for review and acceptance. The Department is not responsible for work done without approved shop drawings.

If any provisions in PART B conflict with those in PART A, the provisions in PART B are to govern.

Within 60 calendar days after completion of the culvert, revise the original drawings to show "as-built" conditions and submit them to the Representative.

(c) Design Requirements. In the design of an alternate culvert, comply with PennDOT Design Manual Part 4, "Structures", and other design criteria as specified for the "as-designed" culvert, subject to the exceptions and/or additions in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Provide equivalent inspection and maintenance accessibility for the alternate culvert as for the "as-designed" culvert. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be final.

Do not change the indicated horizontal and vertical alignments or the waterway opening of the culvert, except as noted in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Design the alternate culvert to be within the limits of factored foundation bearing resistance as indicated for the "as-designed" culvert. Do not change the bottom of footing elevation, unless approved by the District Bridge Engineer or District Geotechnical Engineer.

Do not change from the culvert protective system(s) indicated or specified for the "as-designed" culvert.

Comply with all requirements of the approved permit(s). Obtain approved/amended waterway permit(s) for alternate structures if necessary.

Be responsible for the cost and delay of any additional utility relocation that results from changes in the Contractor's plans or construction sequences made subsequent to (1) acceptance of the utility's relocation plans and (2) where the utility has physically moved its facilities based upon those relocation plans.

III. MATERIAL - As indicated and as specified for each respective item included in the "as-designed" culvert. Provide Class A Cement Concrete for cast-in-place walls and footings.

IV. CONSTRUCTION - In accordance with Publication 408, the Special Provisions for each respective item, and any additional requirements specified herein. Submit construction procedures for an alternate design for acceptance, if other than those specified herein.

If utility relocations are required as part of an alternate design, be responsible for the cost of the utility relocations and any related delay claim costs.

If unsuitable foundation material or rock is encountered, construct footings as specified in Section 1085.3(g)1. Excavation beyond the limits indicated or specified and backfill material required to replace unsuitable material will be paid for as specified in Section 110.03(c).

Install precast concrete culvert segments starting from the outlet end; taking special care to place segments to the correct line and grade.

Seal all joints between precast concrete culvert segments with membrane waterproofing as shown on the Standard Drawings.

V. MEASUREMENT AND PAYMENT - Lump Sum

For the type of alternate design culvert selected; subject to a reduction equal to the amount of the Contractor's share of the Department's engineering costs to be determined as follows:

- For each alternate type culvert \$5,000.

The Contractor's share of the Department's engineering costs will be recovered by processing a contract adjustment (Alternate Design Review) to reduce the lump sum price by an amount equal to the Contractor's share.

A utility company's share of fabricated structural steel and/or installation of sleeves, inserts, casings, hanger assemblies, ducts, etc. for utilities is to be a separate item. Do not include the utility company's share in the bid price for the alternate design culvert unless otherwise specified.

(a) Culvert As Designed. If the "as-designed" culvert is bid, submit the "Component Item Schedule", included with the Proposal, as specified in Section 103.01(a).

Make the "Total" at the end of the "Component Item Schedule" equal the amount of the lump sum bid for Culvert As Designed.

(b) Alternate Culvert. If an alternate design culvert is bid, the apparent low bidder is required to submit a "Component Item Schedule for Alternate Design" as specified in Section 103.01(a). No adjustments will be made to the contract lump sum price bid for alternate design culvert for any field adjustments necessary to complete the structure.

Make the "Total" at the end of the "Component Item Schedule for Alternate Design" equal the amount of the lump sum bid for Alternate Culvert.

(c) Alternate Structure Design Costs. The apparent low bidder is to include a component item for Alternate Design Costs in the Component Item Schedule when an alternate design is bid. Include the cost of this item in the total of the lump sum bid price. Payment of 25% of the total design costs will be made upon approval of the preliminary conceptual design. The remaining amount will be paid for in a proportionate manner, designated by the Department, on the basis of approval of the final design.

Project Specific Details:

Special Provision: **I30161B - c80161 ITEM 85__ - __ - _____ CULVERT**

Item(s) Associated:

Header:

ITEM 85__ - __ - _____ CULVERT

Provision Body:

I. DESCRIPTION - This work is the construction of a culvert of the design indicated.

II. MATERIALS - As indicated and as specified in the applicable sections of the Specifications, Publication 408, Supplements thereto, and/or the Special Provisions for each respective item included in the construction of the structure.

III. CONSTRUCTION - In accordance with the applicable sections of the Specifications, Publication 408, Supplements thereto, and/or the Special Provisions for each respective item.

IV. MEASUREMENT AND PAYMENT - Lump Sum

Reinforcement Bars and Epoxy Coated Reinforcement Bars will be measured and paid for separately.

Submit the "Component Item Schedule", included with the Proposal, as specified in Section 103.01(a).

Make the "Total" at the end of the "Component Item Schedule" equal the amount of the lump sum shown for the structure.

Project Specific Details:

Special Provision: **I80181A - c80181 ITEM 8__ - __ - ALTERNATE SOUND BARRIER WALL**

Item(s) Associated:

Header:

ITEM 8__ - __ - ALTERNATE SOUND BARRIER WALL

Provision Body:

PART A

I. DESCRIPTION - This work is either construction of the sound barrier wall as designed or designing and constructing an equivalent sound barrier wall of a pre-approved alternate design (refer to Bulletin 15 for the list of pre-approved sound walls) in place of the "as-designed" sound barrier wall.

II. DESIGN-

(a) General. If an alternate design sound barrier wall is bid, furnish, to the Department, preliminary conceptual design calculations and drawings for the alternate sound barrier wall. Provide an alternate design equivalent to the original design and meeting applicable geometry, design loads, aesthetics, sound abatement characteristics (the specifications for the sound abatement characteristics must be accompanied by a report from an acoustical laboratory verifying the sound abatement characteristics that are claimed), design criteria for strength and serviceability. Submit the alternate design to the District Executive for acceptance. Refer to PennDOT Design Manual Part 4, PP 1.10, Bridge Submission-Construction Phase, for details on procedures for contractor submissions. If the equivalency of an alternate design cannot be clearly established, the Chief Bridge Engineer will be arbiter, and the Chief Bridge Engineer's decision will be final. Furnish, with the preliminary conceptual design submission, a tabulation identifying the differences between the "as-designed" sound barrier wall and the alternate design sound barrier wall.

Any delay in submission and acceptance of the proposed alternate design or a revision, and/or approval of required permits, will not extend the contract time.

If an alternate design sound barrier wall is bid, and an acceptable preliminary conceptual design is not approved within 45 calendar days from the award date (15 days for the submission and 30 days for Department review), construct the "as-designed" sound barrier wall at no additional cost to the Department.

Alternate designs which take advantage of any errors and/or omissions in the plans for the "as-designed" sound barrier wall or discrepancies between the "as-designed" sound barrier wall plans and the special provisions covering alternate designs, will not be accepted. In the event any such error, omission, or discrepancy is discovered, immediately notify the Department. Failure to notify the Department will constitute a waiver of all claims for misunderstandings, ambiguities, or other situations resulting from the error, omission, or discrepancy.

Experimental or demonstration-type design concepts; or products, structures, or elements not preapproved by the Department for general usage, will not be allowed in the alternate design.

Value Engineering will be allowed for the "as-designed" sound barrier wall, but do not Value Engineer the alternate sound barrier wall. Value Engineering will not be allowed for elements changed by an approved alternate design.

Under no circumstances may the acoustical factors or aesthetics of the sound barrier be altered by the Value Engineering process.

Use the same type foundation for an alternate design as that indicated for the "as-designed" sound barrier wall. Contractor-designed alternate foundation types will not be allowed, but Value Engineering of the "as-designed" foundation will be allowed.

Have the alternate design completed by a Professional Engineer registered in the Commonwealth of Pennsylvania. All engineering firms must have a current Annual Qualification Package on file with the Bureau of Project Delivery's Consultant Agreement Unit and be registered business partners in ECMS.

Submit an affidavit, before or along with the preliminary conceptual design submission, stating that the designer is familiar with applicable AASHTO and PennDOT design and acoustical criteria, standards, and construction specifications. Also, submit a list of similar sound barrier walls designed for the Department within the past 5 years.

In identifying alternate design sound barrier walls, retain the "as-designed" sound barrier wall S-XXXXX number, but suffix the number with the letters A, B, etc.

Show on first sheet of the alternate design, the seal of a Professional Engineer registered in the Commonwealth of Pennsylvania, a valid signature in ink, the date signed, a business name, a business address, and the note "These drawings (S-XXXXXA) supersede drawings (S-XXXXX) approved (insert appropriate date)". Also,

include a statement "All assumptions made in the design are validated either by details or notes on these drawings".

The Department will furnish CADD files and design computations for the "as-designed" sound barrier wall to the successful bidder upon request. Prepare alternate design plans using Department drafting standards.

(b) Design Computations and Design Specifications. On the first sheet of the computations for the alternate design, show the seal of a Professional Engineer registered in the Commonwealth of Pennsylvania, a valid signature in ink, and the date signed.

Provide a complete set of computations for the alternate design of the posts, panels, connections and other hardware. Reproduce and insert computations from the "as-designed" sound barrier wall, as needed. Provide additional calculations, as requested by the District Bridge Engineer to justify the design, throughout the life of the contract.

Design copied directly from approved Department Standards need not be documented through independent computations. List such designs on the submission by referencing the drawing number of the applicable standard, and the sheet number, table or graph.

Use PennDOT Design Manual Part 4 for design policy procedures and criteria. All design related Strike-off Letters listed in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS", are applicable to the alternate design.

In the event that certain design parameters, stresses, or specifications are in conflict, the following order of predominance governs:

- Design requirements listed herein, in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS" and addenda (addendum) to the proposal.
- Design related Strike-off Letters in effect on the date of project advertisement.
- PennDOT Design Manual Part 4, "Structures" including revisions (Publication 15M).
- PennDOT Bridge Design and Bridge Construction Standards (Publications 218M and 219M).
- AASHTO LRFD Bridge Design Specifications, as indicated for the "as-designed" sound barrier wall.

In the event that a clear order or predominance cannot be established, or a difference in the interpretation of the design criteria, standards, specifications, or methodology cannot be resolved, the Chief Bridge Engineer will be arbiter and the Chief Bridge Engineer's decision will be final.

Submit shop drawings to the District Executive as specified in Section 105.02 for review and acceptance. The Department is not responsible for work done without approved shop drawings.

If any provisions in PART B conflict with those in PART A, the provisions in PART B are to govern.

Within 60 calendar days after completion of the sound barrier wall, revise the original drawings to show "as-built" conditions and submit them to the Representative.

For bridge mounted sound barrier wall alternate, check structural adequacy and modify all affected bridge components to ensure that service life of the bridge or the wall is not jeopardized. These components include concrete bridge barrier, slab, sidewalk (where applicable), beams, diaphragms and bracings, and bearings. Verify structural adequacy of both bridge and wall. Substructure units need not be checked unless they are an integral part of the superstructure.

Account for bridge deflection magnification at the top of the posts to ensure that panels are adequately restrained within the flange space of the posts at the top of the posts under full live load plus impact of the bridge. Conversely, the posts and panels should not be impacting each other thereby causing any damage or

future maintenance problems. Connecting panels or posts directly to the concrete bridge barrier using bolts through the concrete bridge barrier is not allowed.

(c) Design Requirements. Use Working Stress Method Design. In the design of an alternate sound barrier wall, comply with PennDOT Design Manual Part 4, "Structures", and other design criteria as specified for the "as-designed" sound barrier wall, subject to the exceptions and/or additions in Part B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Provide pipe underdrains and structure backfill as specified and at locations indicated for the "as-designed" sound barrier wall.

Provide equivalent inspection and maintenance accessibility for the alternate sound barrier wall as for the "as-designed" sound barrier wall. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be final.

Provide the same architectural finish, sound abatement characteristics, (the sound abatement characteristics will have to be proven), heights and lengths to the same limits as indicated for the "as-designed" sound barrier wall.

Do not change the indicated horizontal and vertical alignments, except as noted in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Provide drainage as indicated for the "as-designed" sound barrier wall.

No gaps (which allows light to pass through) in any joint or seam will be allowed.

Be responsible for the cost and delay of any additional utility relocation that results from changes in the Contractor's plans or construction sequences made subsequent to (1) acceptance of the utility's relocation plans and (2) where the utility has physically moved its facilities based upon those relocation plans.

III. MATERIAL - As indicated and as specified for each respective item included in the "as-designed" sound barrier wall.

IV. CONSTRUCTION - In accordance with Publication 408, Special Provisions for each respective item, and any additional requirements specified herein. Submit construction procedures for an alternate design, for acceptance, if other than those specified herein.

Submit the proposed erection method to the District Bridge Engineer for approval.

V. MEASUREMENT AND PAYMENT - Lump Sum

For the type of sound barrier wall selected, subject to a reduction equal to the amount of the Contractor's share of the Department's engineering costs to be determined as follows:

- For each alternate type sound barrier wall \$1,000.

The Contractor's share of the Department's engineering costs will be recovered by processing a contract adjustment (Alternate Design Review) to reduce the contract lump sum price by an amount equal to the Contractor's share.

(a) Sound Barrier Wall As Designed. If the "as-designed" sound barrier wall is bid, submit the "Component Item Schedule", included with the Proposal, as specified in Section 103.01(a).

Make the "Total" at the end of the "Component Item Schedule" equal the amount of the lump sum bid for Sound Barrier Wall as Designed.

(b) Alternate Sound Barrier Wall. If an alternate sound barrier wall is bid, the apparent low bidder is required to submit a "Component Item Schedule for Alternate Design" as specified in Section 103.01(a). No adjustments will be made to the contract lump sum price bid for alternate design sound barrier wall for any field adjustments necessary to complete the structure.

Make the "Total" at the end of the "Component Item Schedule for Alternate Design" equal the amount of the lump sum bid for Alternate Sound Barrier Wall.

(c) Alternate Structure Design Costs. The apparent low bidder is to include a component item for Alternate Design Costs in the Component Item Schedule when an alternate design is bid. Include the cost of this item in the total of the lump sum bid price. Payment of 25% of the total design costs will be made upon approval of the preliminary conceptual design. The remaining amount will be paid for in a proportionate manner, designated by the Department, on the basis of approval of the final design.

Project Specific Details:

Special Provision: **I30201G - c80201 ITEM 8621- ____ MECHANICALLY
STABILIZED RETAINING WALL SYSTEMS (AS DESIGNED)**

Item(s) Associated:

Header:

ITEM 8621- ____ MECHANICALLY STABILIZED RETAINING WALL SYSTEMS (AS DESIGNED)

Provision Body:

I. DESCRIPTION - This work is the designing, furnishing, and erecting of approved mechanically stabilized systems used as retaining walls. These systems, some of which are proprietary, employ either strip or grid type metallic reinforcements in the soil mass and a discrete modular precast facing.

II. DESIGN - Submit to the District Bridge Engineer, for review and for approval, 4 sets of plans and design calculations for mechanically stabilized earth retaining walls, prepared in accordance with PENNDOT Design Manual Part 4. Allow a maximum of 30 calendar days from the day final plans are received by the District Bridge Engineer for review and approval. Perform fabrication of standard panels in accordance with the approved plans using pre-approved standard shop drawings. Do not perform any construction before approval of design and completed plans. Use mylar furnished by the Department.

Have a Professional Engineer (P.E.), registered in the Commonwealth of Pennsylvania, sign and date the first sheet of the computations.

Include the following statement on the first sheet of the drawings above the P.E. seal:

"I hereby certify that all design assumptions have been validated either through construction details or notes on these drawings, or through the contract plans and provisions."

In the event certain design parameters, stresses, or specifications are in conflict, the following order of predominance will govern:

- Design requirements listed herein and in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS", of the special provisions.

- Design related Strike-off Letters in effect on the date of project advertisement. Refer to the list in PART B.
- PENNDOT Design Manual Part 4, "Structures"
- PENNDOT Bridge Design and Bridge Construction Standards
- AASHTO Standard Specifications for Highway Bridges (date as indicated) and interim specifications

In the event that a clear order of predominance cannot be established, or a difference in the interpretation of the design cannot be resolved, the Chief Bridge Engineer will arbitrate and such decision will be final.

If weep holes are not indicated, and no other provision for subsurface drainage has been incorporated into the design but is required to validate design assumptions of lateral earth pressure from dry backfill, provide a weep hole in every other precast face panel exposed at ground elevation. Locate weep holes a minimum of 300 mm (1 foot) above finished ground elevation.

Provide cast-in-place or preapproved, precast concrete bridge barriers as shown on plans.

Provide cast-in-place or precast copings.

III. MATERIAL -

(a) Precast Concrete Face Panels. Furnish precast face panels as specified in Section 714, except provide concrete having a 28-day minimum compressive strength of 28 MPa (4,000 pounds per square inch) when tested in accordance with PTM No. 604.

Provide panels having a minimum structural thickness of 140 mm (5 1/2 inches).

Place tie strips, reinforcement bars, connecting rods (where required), PVC pipe for weep holes when indicated, PVC tubes (where required), and handling devices, to the dimensions and tolerances indicated or as approved by the Representative, before casting.

1. Testing and Inspection. Acceptability of the precast panels will be determined on the basis of slump and entrained air content testing of the concrete mixture, compressive strength testing, and visual inspection. Furnish facilities for the Department to perform all necessary sampling and testing in an expeditious and satisfactory manner. Acceptance will be as specified herein.

Acceptance of precast concrete panels with respect to compressive strength will be based on the results of production lot testing. A production lot is defined as the panels represented by 1-day's production or 40 panels whichever is less. Acceptance will be based on compliance with the requirements of Sections 714.4(b) and 714.7(a), except the lot compressive strength will be determined as the average of the compressive strength testing of two cylinders and no individual test result may be below 25 MPa (3,600 pounds per square inch).

Acceptance with respect to visual inspection will be based on compliance with the requirements of Section 713.2(d). In addition, precast units may be rejected for color variations on the front.

Completed precast units will be inspected before shipment, and cracked, damaged, or otherwise unsatisfactory units will be rejected. Properly patch all excessive voids and other defects on exterior surfaces in accordance with the approved QC Plan.

Repairs and repair procedures beyond the limits of repair defined in Publication 145 require the approval of the Representative. Mark rejected panels with the words "Rejected for Department Use" using waterproof paint.

2. Forms. Construct forms of steel in a manner that assures the production of uniform units, and leave forms in place until they can be removed without damage to the unit.

Replace damaged forms or forms having a deteriorated surface on the finished face.

3. Mixing and Placing Concrete. Mix and deliver concrete as specified in Section 704. For transporting, placement, and consolidation of concrete, use methods that will prevent segregation of concrete materials and displacement of steel reinforcement from its proper position in the form. Do not place concrete in forms or casting beds when ambient temperatures are below 4 °C (40F) or above 38 °C (100F). Do not use admixtures containing chlorides.

4. Casting. Cast the panels on a flat area, front face down. Set connection guides into the rear face. Do not attach the panel reinforcing steel to or allow contact with embedded loops, tie strips, reinforcing steel, or other devices. Hold attachment devices in place during concrete placement to ensure that proper alignment is maintained. Place concrete in each unit without interruption and consolidate by use of a vibrator, supplemented by such hand tamping as may be necessary to force concrete into the corners of the form and prevent formation of honeycomb segregation, cracking, or cleavage planes. Use clear form oil throughout the casting operation.

5. Concrete Finish. Provide a conventional surface finish for the front face, unless otherwise indicated or specified, and, for the rear face, a floated surface finish. Screed to eliminate open pockets of aggregate and surface distortions in excess of 6 mm (1/4 inch) on the rear face of the panel.

When a special or decorative surface finish is required, display for approval a typical sample of the face panels, showing the color, texture, and finish intended to be used, before standard production of panels. Acceptability of the production units with respect to their architectural surface treatment will be made at a distance of 9000 mm (30 feet), in natural daylight, when compared to the approved sample(s).

6. Curing. Cure units in accordance with the approved QC plan until the concrete obtains 80% of the specified minimum 28-day compressive strength.

7. Tolerances. Manufacture all units within the following tolerances:

- Do not exceed an angular distortion with regard to height of 5 mm (0.02 inch) in 1525 mm (5 feet).
- Panel Dimensions. Position of panel connection devices within 25 mm (1 inch). All other dimensions within 5 mm (3/16 inch).
- Panel Squareness. Not to exceed 13 mm (1/2 inch), as determined by the difference between two diagonals.
- Panel Surface Finish. Surface defects on smooth formed surfaces, measured over a length of 1525 mm (5 feet), not to exceed 3 mm (1/8 inch) and on texture finished surfaces not to exceed 8 mm (5/16 inch).

For panels using welded wire fabric as grid reinforcement, fabricate panels in a manner that ensures compliance with the wire mesh to panel connection requirements indicated in BC-799M.

8. Marking. Clearly scribe or paint with waterproof paint, on the rear face of each panel, the date of manufacture, lot production number and piece mark.

9. Handling, Storing, and Shipping. Handle, store, and ship all units in such a manner as to eliminate the danger of chipping, cracking, fracture, and excessive bending stress, or damage to connection hardware. Support the panels in storage, on firm blocking located immediately adjacent to the tie strips, to avoid bending tie strips. Care should be taken to not bend or damage tie strips when handling with a forklift. Use dunnage or blocking which will not stain the face of the precast unit.

Do not ship units until the 28-day minimum compressive strength is attained. Provide 24-hour advance notice of loading and shipping schedule.

Repair or replace any unit damaged during handling, transporting, erecting, or backfilling, or any unit that cannot be placed satisfactorily in the wall, in accordance with the approved QC Plan.

(b) Reinforcement.

1. Reinforcing Strips and Tie Strips. Fabricate tie strips of hot rolled steel conforming to the requirements of ASTM A1011/A1011M, Structural Steel (SS) Grade 340 (Grade 50) or ASTM A1011/A1011M, High-Strength Low-Allow Steel (HSLAS), Grade 340 (Grade 50), Class 1 including all trace elements. Hot roll reinforcing strips from bars conforming to ASTM-A36/A36M or ASTM-A572/A572M (AASHTO-M223/223M), Grade 450, or equivalent, to the required shape and dimensions. Hot dip galvanize reinforcing strips and tie strips, after fabrication, as specified in Section 1105.02(s) and in accordance with ASTM-A123. Cut to length within the tolerances indicated on approved shop drawings. Punch holes for bolts, in the location shown, before galvanizing. Carefully inspect all reinforcing and tie strips to ensure they are true to size and free from defects that may impair their strength and durability. Cutting of reinforcing strips at pile locations, vertical obstacles, or utilities is not acceptable.

Care must be taken to avoid bending or damage to the galvanized coating on reinforcing and tie strips during handling, storing, and shipping.

2. Steel Mesh Reinforcement. Conform to the requirements of ASTM-A82 for cold drawn wire. Shop fabricate and weld the finished mesh fabric in accordance with ASTM-A185. In addition, comply with the following:

- Fabricate, transport, store, and place steel mesh in a manner that ensures compliance with the wire mesh to panel connection requirements as indicated in BC-799M.
- Fabricate wire mesh in a manner that produces a flat mesh with straight longitudinal and transverse wires meeting the following tolerances:

Flatness:

Length of Wire Mesh:	3000 mm (10') or less	3300 mm (11') to 6000 mm (20')	6300 mm (21') to 9000 mm (30')	9300 mm (31') or greater
Permissible Variation	50 mm (2")	70 mm (2 2/3")	90 mm (3 1/2")	100 mm (4")

Straightness of Longitudinal Wires:

Length of Wire Mesh:	3000 mm (10') or less	3300 mm (11') to 6000 mm (20')	6300 mm (21') to 9000 mm (30')	9300 mm (31') or greater
Permissible Variation:	50 mm (2")	70 mm (2 3/4")	90 mm (3 1/2")	100 mm (4")

Maintain flatness and straightness of the wire mesh during transportation and assembly. Wire mesh not meeting the flatness and straightness tolerances may be realigned using a method that does not damage the galvanizing, damage or weaken the weld at intersection points of the longitudinal and transverse wires, or weaken the strength of the wires. Submit the realignment procedure to the Representative for approval.

Galvanize mesh panels as specified in Section 1105.02(s) and in accordance with ASTM-A641, after fabrication. Provide wire size and mesh configuration as indicated. Carefully inspect all mesh reinforcement and attachment devices to ensure they are true to size and free from any defects that may impair their strength and durability. Cutting of steel mesh or grids at pile locations, vertical obstacles, or utilities is not acceptable.

Care must be taken to avoid bending or damage to the galvanized coating on reinforcing mesh or grids during handling, storing, and shipping.

3. Reinforcement Bars. Grade 420 (Grade 60), Section 709.1(a)1. Provide epoxy coated reinforcement bars, as specified in Section 709.1(c), or galvanized reinforcement bars, as specified in Section 709.1(e), for cast-in-

place or precast concrete bridge barrier, moment slab (cast-in-place) curb, and copings and precast panels.

(c) Fasteners and Attachment Devices.

- Provide galvanized, high strength hexagonal bolts and nuts as specified in Section 1105.02(d) for reinforcement in Section III(b)1.
- Provide embedded loops fabricated from cold drawn steel wire conforming to ASTM-A82 and welded in accordance with ASTM-A185. Galvanize loops as specified in Section 1105.02(s) and in accordance with ASTM-A641 for reinforcement in Section III(b)2.
- Provide connector bar fabricated from cold drawn steel wire conforming to ASTM-A82 and galvanized as specified in Section 1105.02(s) and in accordance with ASTM-A641 for reinforcement in Section III(b)2.
- Fabricate connector rod (where required) from PVC conforming to material as recommended by the manufacturer or steel conforming to ASTM-A36/A36M and galvanize as specified in Section 1105.02(s) and in accordance with ASTM-A123. Fabricate to required diameters and lengths as indicated.

(d) Bearing Pads

- For horizontal joints between panels, provide preformed EPDM rubber pads conforming to ASTM-D2000 2AA 812 A13 C12 F17, neoprene elastomeric pads having a Durometer Hardness of 80 ± 5 , or preformed high density polyethylene panel pads conforming to ASTM-D1505 and having a minimum density of 0.946 g/cm^3 .

(e) Granular Fill Material. Provide crushed or natural sand, crushed or uncrushed gravel, blasted limestone, blasted sandstone, or any standard size coarse aggregate meeting the following gradation as determined in accordance with PTM 616:

Sieve Size Percent Passing

75 mm (3 inches) 100

19 mm (3/4 inch) 20 - 100

425 μm (No. 40) 0 - 60

75 μm (No. 200) 0 - 10*

*Determination of the fines content (minus 75 μm (No. 200) sieve material) for MSE wall reinforced backfill must be determined by wash test according to PTM No. 100, Amount of Material Finer Than 75 μm (No. 200) sieve in Aggregate. This is in addition to PTM No. 616, Sieve Analysis of Coarse and Fine Aggregate.

Have the backfill conform to all of the following additional requirements:

1. Furnish materials meeting the quality requirements of Type C coarse aggregate or better as specified in Section 703.2(a), Table B except furnish materials free of clay lumps, friable particles, coal and coke. Do not use metallurgical slag or cinders.
2. Furnish materials with a maximum plasticity index (PI) of 3 as determined in accordance with AASHTO T89 and T90.
3. Furnish material exhibiting an angle of internal friction of not less than 34 degrees as determined, in accordance with AASHTO-T236, on the portion finer than the 2.0 mm (No. 10) sieve compacted to 95% of PTM No. 106, Method B, at optimum moisture content, except for coarse aggregate as specified in Section 703.2.

Direct shear testing may be performed on samples containing material larger than the 2.0 mm (No. 10) sieve, if the shear device conforms with AASHTO-T236, Sections 5.4 and 5.5.

4. Provide materials meeting the following electrochemical criteria:

Test	Criterion
pH, AASHTO T289	6.0 - 10.0
Resistivity, AASHTO T288	<ul style="list-style-type: none">• >5000 ohm-centimeters - No chloride or sulfate testing is required.• 2000 - 5000 ohm-centimeters -Perform the specified chloride and sulfate tests.
Chlorides, AASHTO T291, Method B	< 100 parts per million (ppm)
Sulfates, AASHTO T290, Method B	< 200 parts per million (ppm)

Provide randomly selected backfill samples for testing 30 calendar days before use, as directed by the Representative. Obtain approval for backfill material, before use. Each sample submitted is to consist of the following:

- Three bags of approximately 20 kg (40 pounds) containing a normal specimen representing the complete gradation.
- One bag containing approximately 5 kg (10 pounds) of material passing the 2.36 mm (No. 8) sieve.

During the backfilling operation, under the direction and supervision of the Representative, obtain verification samples (n=3) as specified in Section 703.5(b), Table F. The Representative will select sample locations according to PTM No. 1

If the material sampled fails to meet the specified requirements, immediately discontinue its use, and remove and replace all material placed since the last passing acceptance or verification sample was obtained. Do not continue backfilling until new backfill material has been sampled and approved.

(f) Pipe Underdrain. Section 610.2(a)

(g) Polyvinyl Chloride (PVC) Pipe. Section 610.2(a)4.

(h) Cast-in-Place Concrete. Section 704. Provide Class A Cement Concrete for footings and leveling pads and Class AA Cement Concrete for curbs, concrete bridge barriers or traffic barriers, moment slabs, and backwalls above bridge seats.

(i) Geomembrane. Section 736.

- Dimensional Stability (ASTM-D1204) + 2%

(j) Geotextiles. Class 4, Type A, Section 735

(k) Certification. Certify as specified in Section 106.03(b)3. Furnish a copy of the results of all tests performed which are necessary to assure compliance with the specifications. Furnish a copy of Form CS-4171 with each shipment of precast products.

(l) Nonshrink Grout. Section 1080.2(c)

IV. CONSTRUCTION -

(a) Shop Drawings. Before fabrication, submit and obtain approval for shop drawings. Show complete fabrication details and dimensions, as well as handling, transportation, and construction procedures for all wall elements.

(b) Excavation and Foundations. Grade the structure foundation level, or to the indicated slope, for a width equal to or exceeding the length of the reinforcing strips or mesh, or as indicated. Before wall construction, except where constructed in rock, compact the foundation with a smooth wheel vibratory roller. Remove any foundation soils found to be unsuitable and replace with granular material. Excavate, as specified in Section 204, to the limits and construction stages indicated.

Do not begin wall erection until the foundation has been accepted.

Construct cast-in-place footings and leveling pads as specified in the applicable portions of Section 1001.3, to the dimensions and details indicated and within the right of way, before placement of precast wall units.

Place bottom of footing and/or leveling pad at a minimum depth equal to prevailing frost depth but not less than 900 mm (3 feet) below finished ground elevation unless otherwise indicated.

(c) Stub Abutment on Piles. If stub abutment supported on piles is indicated, construct stub abutment support system, during placement of MSE wall backfill, as follows:

- Drive all piles before MSE wall installation.
- Encase each pile in a Smooth Wall or Corrugated Galvanized Steel (SWCGS) pipe of sufficient thickness to prevent buckling or distortion during placement and compaction of wall backfill.
- Place spacers between the pile and the SWCGS pipe to prevent the pipe from coming in contact with the pile during backfilling of the wall.
- Extend SWCGS pipe from the bottom of MSE wall backfill to the bottom of the bridge stub abutment footer.
- After positioning, seal the top of the SWCGS pipe to prevent debris accumulation during placement of wall backfill, and keep the pipe sealed until filled with Type A fine aggregate.
- Fill the SWCGS pipe loosely with Type A fine aggregate either before or after completion of MSE wall construction and as directed and approved by the Representative.

(d) Wall Erection. Align precast concrete panels, vertically, using inserts cast into the top edge of the panels. Place panels in successive horizontal lifts, in the sequence indicated or shown on the approved shop drawings, as backfill placement proceeds. As the specified granular fill material is placed behind a panel, maintain the panel in a vertical position by means of clamps placed at the junction of adjacent panels and temporary wooden wedges placed in the horizontal joint at the junction of the two adjacent panels on the external side of the wall. Provide external bracing, if required, for the initial lift.

Install drainage system behind the wall as indicated or as shown on the approved shop drawings.

At least two, but no more than three, rows of panel wedges are to remain in place at all times during construction. Carefully remove wooden wedges, as panel erection progresses, so as to prevent chipping or cracking of concrete panels. Properly repair any damage to erected concrete panels as directed. Remove all wedges when the wall is completed.

Install joint filler as indicated or as shown on the approved shop drawings.

Cover all joints between panels, on the back side of the wall, with geotextile fabric. Apply adhesive to panels only. Do not apply adhesive to geotextile fabric or within 50 mm (2 inches) of a joint. Provide geotextile fabric having a minimum width of 300 mm (12 inches), and overlap fabric a minimum of 100 mm (4 inches).

(e) Backfilling. Have backfill placement closely follow the erection of each lift of panels. Roughly level the backfill at each reinforcing element location before placing and bolting.

As indicated, place reinforcing elements normal to the face of the wall. Do not exceed 200 mm (8 inches) (loose) for the maximum lift thickness and closely follow panel erection. Decrease lift thickness if necessary, to obtain the specified density.

Place backfill in such a manner as to avoid any damage or disturbance to wall materials or misalignment of facing panels. Remove and replace any wall materials which become damaged during backfill placement. Correct any misalignment or distortion of wall facing panels due to placement of backfill. Place backfill to the level of the connection and in such a manner as to assure that no voids exist directly beneath reinforcing elements.

Under fill conditions, place specified backfill material to the dimensions as indicated.

At the end of each day, slope the last level of backfill away from the wall in order to rapidly direct runoff away from the wall face. In addition, do not allow surface runoff from adjacent areas to enter the wall construction site. Place and compact the backfill as specified in Section 1001.3(q)2.b; except, the 7 day waiting period for backfilling is not required. Place backfill material at a moisture content less than or equal to the optimum moisture content. Compact backfill without causing disturbance to or distortion of reinforcing members and panels. Achieve compaction within 900 mm (3 feet) of the wall by making at least three passes with light mechanical tampers, rollers, or vibratory systems.

For applications where stub abutments are to be used to support bridge or other structural loads, compact the top 1525 mm (5 feet) below footing elevation to 100% of the determined dry mass (weight) density.

Do not exceed 20 mm (3/4 inch) for vertical tolerances and horizontal alignment tolerances when measured along a 3 m (10-foot) straightedge. The maximum allowable offset in any panel joint is 20 mm (3/4 inch). Do not exceed an overall vertical tolerance for the wall (top to bottom) of 12 mm per 3 m (1/2 inch per 10 feet) of wall height. Provide uniform vertical and horizontal joint openings between panels.

Check the top row of panels with a level and 3 m (10-foot) straightedge, after each layer of backfill material is placed and compacted. Satisfactorily correct panels not within specified tolerances, before placing additional backfill material.

For structures at stream crossings, provide a blanket of No. 57 coarse aggregate behind the wall panels, to a width of 460 mm (18 inches), for the full length and to the height indicated (minimum 100-year flood level).

Provide Class 2, Type A geotextile fabric, with a minimum overlap of 100 mm (4 inches), at the interface of the coarse aggregate blanket and the granular fill material.

Place geomembrane as indicated. Overlap seams a minimum of 457 mm (18 inches) or seam joints by use of extrusion welding methods with a maximum overlap of 100 mm (4 inches).

Perform site-specific field or laboratory pullout tests, for fully saturated conditions, as indicated or directed and in the presence of the Representative.

(f) Pipe Underdrain. Place, as required, as specified in Section 610.3 and as indicated.

(g) Dewatering. Furnish, install, operate, and maintain satisfactory dewatering systems as required to maintain the site in a dry and workable condition. Include all equipment and materials, and continue as long as necessary.

(h) Technical Assistance. Arrange for a company representative to be present at the project site to assist the fabricator, Contractor, and Representative until they are familiar and confident in casting, installation, and erection procedures. Arrange for monthly visits to the project site by a company representative/engineer during

wall construction. Provide a technical representative to assist in the event unusual problems or special circumstances arise.

V. MEASUREMENT AND PAYMENT - Lump Sum

The apparent low bidder is required to submit a "Component Item Schedule" as specified in Section 103.01(a). Tabulate quantities, unit prices, and extensions for excavation, select granular material, precast wall panels/units, footing/leveling pads, and any miscellaneous items such as concrete bridge barriers or traffic barriers, moment slabs, copings, conduit, junction boxes, lighting pole anchorages, and lighting poles. No adjustment will be made to the contract lump sum price bid for as-designed retaining walls and/or wingwalls for field adjustments necessary to complete the structures.

Project Specific Details:

Special Provision: **I30221A - c80221 ITEM 8622-0003 PRECAST MODULAR
RETAINING WALL SYSTEMS (AS DESIGNED)**

Item(s) Associated:

Header:

ITEM 8622-0003 PRECAST MODULAR RETAINING WALL SYSTEMS (AS DESIGNED)

Provision Body:

I. DESCRIPTION - This work is the designing, furnishing, and erecting of precast modular systems used as retaining walls. These systems, some of which are proprietary, consist of modular precast concrete units erected to form a gravity retaining wall.

II. DESIGN - Submit to the Engineer, for review and for approval, 4 sets of plans and design calculations for precast modular retaining walls, prepared in accordance with PennDOT Design Manual Part 4M (Design Manual Part 4). Allow a maximum of 30 calendar days from the day final plans are received by the Engineer for review and approval. Do not begin fabrication or perform any construction prior to approval of design and completed plans. Use mylar furnished by the Department.

Have a Professional Engineer, registered in the Commonwealth of Pennsylvania, sign and date the first sheet of the computations.

Include the following statement on the first sheet of the drawings above the P.E. seal:

"I hereby certify that all design assumptions have been validated either through construction details or notes on these drawings, or through the contract plans and provisions."

In the event certain design parameters, stresses, or specifications are in conflict, the following order of predominance will govern:

- Design requirements listed herein and in PART B, SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS", of the special provisions.
- Design related Strike-off letters in effect on the date of project advertisement. Refer to the list in PART B.
- PennDOT Design Manual Part 4M (Design Manual Part 4), "Structures"

- PennDOT Design Standards
- AASHTO Standard Specifications for Highway Bridges (date as indicated), and interim specifications

In the event that a clear order of predominance cannot be established, or a difference in the interpretation of the design cannot be resolved, the Chief Bridge Engineer will be arbiter and such decision will be final. If weep holes are not indicated, and no other provision for subsurface drainage has been incorporated into the design but is required to validate design assumptions of lateral earth pressure from dry backfill, provide a weep hole in every other precast module exposed at ground elevation. Locate weep holes a minimum of 300 mm (1 foot) above finished ground elevation.

Provide cast-in-place or preapproved, precast parapets and barriers.

III. MATERIAL -

(a) Precast Concrete Modules (Units). Furnish precast modules in accordance with the requirements of Section 714, except provide concrete for precast modular units, filler panels, and end panels having a 28-day minimum compressive strength of 35 MPa (5,000 psi) when tested in accordance with PTM No. 604.

Place reinforcement bars, PVC pipe for weep holes, and handling devices, to the dimensions and tolerances indicated or as approved by the Engineer, prior to casting.

1. Testing and Inspection. Acceptability of the precast modules will be determined on the basis of slump and entrained air content testing of the concrete mixture, compressive strength testing, and visual inspection. Furnish facilities for the Department to perform all necessary sampling and testing in an expeditious and satisfactory manner. Acceptance will be as herein specified.

Acceptance of precast concrete modules with respect to compressive strength will be based on the results of production lot testing. A production lot is defined as the modules represented by one day's production. Four cylinders per lot will be selected in accordance with PTM No. 1 and PTM No. 601. Cylinder specimens will be cured with the product and tested in accordance with PTM No. 611. Acceptance will be based on compliance with the requirements of Sections 714.4(b) and 714.7(a), except the lot compressive strength will be determined as the average of the compressive strength testing of 2 cylinders and no individual test result may be below 31 MPa (4500 psi).

Acceptance with respect to visual inspection will be based on compliance with the requirements of Section 713.2(d). In addition, precast modules may be rejected for color or texture variations on the front face due to excess form oil or other causes.

Completed precast units will be inspected before shipment, and cracked, damaged, or otherwise unsatisfactory units will be rejected. Properly patch all excessive voids and other defects on exterior surfaces in accordance with the approved Quality Control Plan.

Repairs and repair procedures require the approval of the Engineer. Mark rejected precast units with the words "Rejected for Department Use" using waterproof paint.

2. Forms. Construct forms of steel in a manner that assures the production of uniform units, and leave forms in place until they can be removed without damage to the unit.

Replace damaged forms or forms having a deteriorated surface.

3. Mixing and Placing Concrete. Mix and deliver concrete as specified in Section 704. For transporting, placement, and consolidation of concrete, use methods that will prevent segregation of concrete materials and displacement of steel reinforcement from its proper position in the form. Do not place concrete when ambient temperatures are below 4 C (40F) or above 38 C (100F). Do not use admixtures containing chlorides.

4. Casting. Carefully place concrete in the forms and vibrate sufficiently to produce a surface free from imperfections such as honeycombing, segregation, or cracking. Use clear form oil throughout the casting operation.

5. Finish. Provide a conventional surface finish unless otherwise indicated. When a special or decorative surface finish is required, display for approval a typical sample of the modular unit, showing the color, texture, and finish intended to be used, prior to standard production of units.

6. Curing. Cure units in accordance with Section 1001.3(p) for the period of time required for the concrete to obtain the specified minimum compressive strength. Control curing until a compressive strength of 21 MPa (3000 psi) is achieved.

7. Tolerances. Manufacture all units within the following tolerances:

- Face of Module. Length or height, +/- 5 mm (+/- 3/16-inch).
- Deviation From Square. Not to exceed 13 mm (1/2-inch), as determined by the difference between two diagonals.
- Thickness. - 6 mm (1/4-inch), + 13 mm (1/2-inch)
- Location of Reinforcement Steel. Cover: - 6 mm (1/4-inch), + 13 mm (1/2-inch); otherwise within + 13 mm (1/2 inch).
- Surface Finish. Surface defects, measured over a length of 1500 mm (5 feet), not to exceed 3 mm (1/8-inch) on smooth formed surfaces and, on texture finished surfaces, not to exceed 8 mm (5/16-inch).
- Bearing Surfaces. Finish to within 3 mm (1/8-inch) when tested with an 2450 mm (8-foot) straightedge.

8. Marking. Clearly scribe or paint with waterproof paint, on the interior surface of each unit, the date of manufacture, lot production number, piece mark, and inspection date and stamp.

9. Handling, Storing and Shipping. Handle, store, and ship all units in such a manner as to eliminate the danger of chipping, cracking, fracture, and excessive handling stress.

Do not ship units until the 28-day minimum compressive strength is attained.

Provide 24-hour advance notice of loading and shipping schedule.

Repair or replace any unit damaged during handling, transporting, erecting, or backfilling, or any unit that cannot be placed satisfactorily in the wall, in accordance with the approved Quality Control Plan.

(b) Reinforcement Bars. Grade 400 (60), Section 709.1(a)1., except No. 10 (No. 3) stirrup bars may be Grade 300 (40). Provide epoxy coated reinforcement bars, as specified in Section 709.1(d), for cast-in-place or precast parapets, barrier, curbs, and copings and precast modules, if indicated or specified.

(c) Cast-in-Place Concrete. Section 704. Provide Class A Cement Concrete for footings and leveling pads and Class AA Cement Concrete for curbs, parapets, and backwalls above bridge seats.

(d) Joint Filler.

- For vertical joints, joint filler is not required.

- For horizontal joints, provide Type II preformed cork conforming to AASHTO-M153 and a premium grade, closed cell, polyethylene foam backer rod as detailed on the approved shop drawings.
- Provide rubber pads having a Durometer Hardness of 75 +/- 5 between modules that are not placed in quick set mortar. If specified, use quick set mortar meeting the requirements of Section 1001.2(d) for setting precast units.

(e) Granular Fill Material for Precast Modules. Provide crushed or natural sand, crushed or uncrushed gravel, blasted limestone, blasted sandstone, and/or Type C coarse aggregate meeting the following gradation as determined in accordance with AASHTO-T27:

Sieve Size Percent Passing

75mm (3 inches) 100

19 mm (3/4 inch) 20 - 100

450 um (# 40) 0 - 60

75 um (# 200) 0 - 10

Furnish Type C coarse aggregate meeting the requirements of Section 703.2, except having a maximum of 2% deleterious shale and an allowable total of deleterious shale, clay lumps, friable particles, and coal or coke of 2%, maximum.

Have all granular fill material conform to the following additional requirements:

- Furnish material having a minimum dry weight density of 1921 kg per cubic meter (120 lb per cubic foot) when compacted to 95% of AASHTO-T99 at optimum moisture content.
- Do not use metallurgical slag or cinders.
- Furnish material exhibiting an angle of internal friction consistent with that used in design but not less than 34 degrees as determined, in accordance with AASHTO-T236, on the portion finer than the 2 mm (#10) sieve compacted to 95% of AASHTO-T99, Method C or D (with oversize correction as outlined), at optimum moisture content, except for coarse aggregate meeting the requirements of Section 703.2.

Direct shear testing may be performed on samples containing material larger than the #10 sieve, if the shear device conforms with AASHTO-T236, Sections 5.4 and 5.5.

(f) Polyvinyl Chloride (PVC) Pipe. Section 610.2(a)4.

(g) Geotextiles. Class 1, Section 735

(h) Certification. Certify as specified in Section 106.03(b)3. Furnish a copy of Form CS-4171 with each shipment of precast products.

IV. CONSTRUCTION -

(a) Shop Drawings. Prior to fabrication, submit and obtain approval for shop drawings. Show complete fabrication details and dimensions, as well as handling, transportation, and construction procedures for all wall elements.

(b) Excavation and Foundations. Grade the structure foundation level, or to the indicated slope, for the width required or as indicated. Prior to wall construction, except where constructed in rock, compact the foundation

with a smooth wheel vibratory roller. Remove any foundation soils found to be unsuitable and replace with granular material. Excavate, in accordance with Section 204, to the limits and construction stages indicated.

Do not begin wall erection until the foundation has been approved.

Construct cast-in-place footings and leveling pads as specified in the applicable portions of Section 1001.3, to the dimensions and details indicated and within the right of way, prior to placement of precast wall units. Provide a wood float finish and cure in accordance with Section 1001.3(p). Construct in conformance with the grades and cross slopes indicated. Do not allow grades and cross slopes to vary by more than 3 mm in 3000 mm (1/8-inch in 10 feet) when tested with a 3000 mm (10-foot) straightedge.

Place bottom of footing and/or leveling pad at a minimum depth equal to prevailing frost depth but not less than 900 mm (3 feet) below finished ground elevation, unless otherwise indicated.

(c) Wall Erection. Install precast modular units as shown on the approved shop drawings. Take special care to set the bottom course of modules to true line and grade.

Install drainage system behind the wall as indicated or as shown on the approved shop drawings.

Interlock all modular units from course to courses. Stagger vertical joints with each successive course, as indicated. Do not exceed 19 mm (3/4-inch) for the vertical joint openings on the front face of the wall. Install joint filler in the horizontal joints on the front face of the wall. Close joints at corners or angle points in accordance with the manufacturer's recommendations. Cover all vertical joints on the back side of the front face of the wall with geotextile fabric. Provide geotextile fabric having a minimum width of 300 mm (12 inches), and overlap fabric a minimum of 100 mm (4 inches). Place rubber bearing pads under each module, throughout the wall, or set modules in a quick set mortar bed, depending on wall type and manufacturer's recommendations.

Have repairs made, at the job site, by experienced personnel utilizing methods and materials recommended by the manufacturer. Do not patch unless conditions exist which assure that the repaired area will conform to the remainder of the work with respect to appearance, strength, and durability.

(d) Backfilling. Fill the interior of each precast modular unit with the specified granular fill material, as each successive course is set. Fill units in 600 mm (2-foot) maximum lifts and thoroughly compact each lift with a vibratory tamping device. Place specified backfill material behind the wall within the limits shown on the Standard Drawings, as indicated or directed, in accordance with the requirements of Section 1001.3(t), except the 10-day waiting period is not required.

Where modules are open and tiered in construction and plant growth is planned, topsoil may be placed at the outer front edge of each tier to a maximum depth of 150 mm (6 inches).

When erecting a battered wall, place backfill behind the wall to closely follow the erection of successive courses of precast units.

At the end of each day, slope the last level of backfill away from the wall in order to rapidly direct runoff away from the wall face. In addition do not allow surface runoff from adjacent areas to enter the wall construction site.

At no time allow the difference in elevation between the backfill and the top of the last erected course to exceed 1800 mm (6 feet).

(e) Dewatering. Furnish, install, operate, and maintain satisfactory dewatering systems as required to maintain the site in a dry and workable condition. Include all equipment and materials, and continue as long as necessary.

(f) Technical Assistance. Arrange for a company representative to be present at the project site to assist the fabricator, Contractor, and Engineer until they are familiar and confident in casting, installation, and erection

procedures. Arrange for monthly visits to the project site by a company representative/engineer during wall construction. Provide a technical representative to assist in the event unusual problems or special circumstances arise.

V. MEASUREMENT AND PAYMENT - Lump Sum

The apparent low bidder is required to submit a "Component Item Schedule" as specified in Section 103.01(a). Tabulate quantities, unit prices, and extensions for excavation, select granular material, precast wall panels/units, footing/leveling pads, and any miscellaneous items such as parapets, copings, conduit, junction boxes, lighting pole anchorages and lighting poles. No adjustment will be made to the contract lump sum price bid for as-designed retaining walls and/or wingwalls for field adjustments necessary to complete the structures.

Project Specific Details:

Special Provision: **I30231A - c80231 ITEM 8623-00__ EVERGREEN PRECAST CONCRETE RETAINING WALL SYSTEM**

Item(s) Associated:

Header:

ITEM 8623-00__ EVERGREEN PRECAST CONCRETE RETAINING WALL SYSTEM

Provision Body:

I DESCRIPTION -

This work is the design, manufacture, storage, delivery, installation, and assembly of Evergreen Precast Concrete Retaining Wall System along with the construction of footing as indicated and specified on the approved PADOT Drawing No. 92-047 PE (1) (Dated 6/26/03).

II MATERIAL -

Evergreen Precast Concrete Retaining Wall System. PADOT Drawing No. 92-047 PE (1) (Dated 06/26/03), including design and fabrication requirements is available upon request from District Bridge Engineer office. Obtain Evergreen Precast Concrete Retaining Wall System units from a fabricator listed in Bulletin 15, certify in accordance with Section 106.03(b)3.

III CONSTRUCTION -

(a) Design. Provide design in accordance with PADOT Drawing No. 92-047 PE (1) (Dated 6/26/03).

(b) Shop Drawings. Provide approved shop drawings before fabricating Evergreen Precast Concrete Retaining Wall System units.

Provide shop drawings meeting the general requirements of Section 105.02(d).

(c) Installation. Install in accordance with PADOT Drawing No. 92-047 PE (1) (Dated 6/26/03).

IV MEASUREMENT AND PAYMENT - Square Meter (Square Foot)

Project Specific Details:

**D82100B - c82100 ITEM 8210-YYYY DESIGN OF BRIDGE
STRUCTURE (AS-DESIGNED FOUNDATION PROVIDED), S-
XXXXX**

Special Provision:

Item(s) Associated:

Header:

ITEM 8210-YYYY Design of Bridge Structure (As-Designed Foundation Provided), S-xxxxxx

Provision Body:

I. DESCRIPTION - This work is the design and preparation of construction plans for a bridge structure of the type indicated on the Department's Conceptual Type, Size, and Location (TS&L) Plans or an alternate type structure. Preparation of a Final TS&L Submission for the proposed structure type is also required.

II. DESIGN

(a) General

(Select (A) when a full Conceptual TS&L is provided, (B) when a final Approved TS&L is provided, or (C) when the minimum Conceptual TS&L consisting of plan view, cross-section, and elevation with minimum widths, vertical clearance, and required waterway opening is provided. Delete the option not selected.)

(A) The Department's Conceptual TS&L Plans represent a bridge structure type and layout that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. A structure type and configuration as that shown on the Conceptual TS&L Plans or an alternate type structure subject to the requirements specified herein may be designed and constructed. Prepare and submit Final TS&L submission for the proposed bridge structure for review and approval.

(B) The Department's Approved TS&L Plans represent a bridge structure type and layout that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. A structure subject to the requirements shown on the Approved TS&L Plans and as specified herein may be designed and constructed. Prepare and submit a Final TS&L submission for the proposed bridge structure for review and approval when proposing changes to the Approved TS&L Plans.

(C) Design and construct a structure meeting the configuration and requirements as shown on the Conceptual TS&L Plans. Prepare and submit Final TS&L submission for the proposed bridge structure for review and approval.

Foundation type(s) along with geotechnical design parameters are provided for the structure foundation. Use the foundation type(s) and design parameters (hereinafter referred to as "as-designed") to design the substructure units or develop an alternate foundation type and design parameters subject to the limitations specified.

Provide design and drawings in the units of measurement shown on the Conceptual TS&L Plans.

Provide a complete set of computations for superstructure and substructure, including the foundation. Provide additional calculations, as requested by the Department's District Bridge Engineer or Chief Bridge Engineer, to evaluate any details throughout the life of the contract.

Verify that an oversize and/or overweight permit can be issued for superloads before incorporating them into a design. Submit verification documentation with the Final TS&L submission.

Structure types, concepts, construction sequencing, or other details that are not covered in the design and construction specifications or standards, or practice not commonly used in Pennsylvania are allowed only when specifically indicated herein. Where design or construction that deviates from standard Department practice is proposed, submit a conceptual design before the Final TS&L for review and approval. Include in the submittal conceptual plans and a list of items that deviate from standard design and construction, including but not limited to design methodology, the computer program that will be used in the design, construction sequencing, and any specialized construction techniques. No extensions of contract time will be granted for pursuits of alternates or non-standard designs.

(b) Additional Designer Qualifications

(List any additional qualifications necessary for the particular project over and above those listed in Special Provision titled SPECIAL BIDDING - DESIGN-BUILD or indicate "None")

(c) Additional Information/Data Made Available to the Contractor by the Department

The following information/data will be made available to the Contractor during the advertisement period: *(List the following, as applicable)*

- Test Boring Core Boxes: Test boring core boxes are available for inspection at *(specify location)*. Contact *(specify name and telephone number of person)* to arrange for a date and time to inspect the core boxes.
- *(List any other information/data that will be furnished)*

(d) Design Specifications

Develop the Final TS&L and prepare the structure construction plan in accordance with the Special Provision titled SPECIAL BIDDING-DESIGN-BUILD, Section VIII -General Design Requirements, Design Specifications.

(List any additional publications not listed in the Special Provision titled SPECIAL BIDDING-DESIGN-BUILD, and identify the publications they supersede)

(e) Design Requirements

1. General

(List general requirements. Include the following, as applicable)

- Slip-formed barriers *(are/are not)* allowed.
- Segmental concrete construction *(is/is not)* allowed.
- Lightweight concrete *(is/is not)* allowed.
- Do not use the BLC Standard Drawings.
- Do not use precast bridge barriers
- Barrier type differing from that shown on the Conceptual TS&L *(is/is not)* allowed. *(Specify acceptable alternate barrier type(s) if applicable)*
- *(specify other)*

2. Geometry

Design the structure according to the geometrics shown on the Conceptual TS&L Plans, except changes will be allowed as follows:

- Horizontal Alignment: *(Specify allowable changes or indicate "No Change Allowed")*
- Vertical Alignment: *(Specify allowable changes or indicate "No Change Allowed")*
- Substructure Unit Locations: *(Specify allowable changes or indicate "No Change Allowed")*
- Bridge Length: *(Specify allowable changes or indicate "No Change Allowed")*
- Lane, Shoulder, and Sidewalk Widths: *(Specify allowable changes or indicate "No Changes Allowed")*
- Staged Construction Requirements: *(Specify allowable changes / criteria such as those given below, or indicate "No Changes Allowed")*
 - o Allow for staged construction while maintaining *(specify number)* lanes of vehicular traffic during all stages of construction.
 - o Minimum temporary lane widths of *(specify value)* are required.
 - o Provide a maximum of *(specify number)* longitudinal construction joint(s) in the deck slab. The longitudinal construction joint must be positioned within the *(Specify criteria. For example "middle 1/3", or "middle 1/2")* width of the top flange of a beam.
 - o *(Specify other)*

3. Seismic

Site Class *(specify "is" or "is not")* Class E.

Design the connection force effect in the restrained directions between the superstructure and substructure as 0.25 times the vertical reaction due to the tributary permanent load.

4. Superstructure

Incorporate the following requirements into the superstructure design: *(Specify requirements and limitations. Include the following as applicable)*

- Do not use less than *(specify number)* girders in the superstructure. Use more girders if required for future redecking.
- Deck Expansion Joints: *(Specify number and locations of allowable deck expansion joints)*.
- Approach Slabs: *(Specify type, length, width, and/or other requirements for the approach slabs)*.
- Steel box girders *(are/are not)* allowed.
- Precast panel forms for placing the concrete deck slab in lieu of metal stay-in-place forms *(are/are not)* allowed.
- Provide live load ratings with *(and without)* future wearing surface.
- For steel girder designs, do not include longitudinal stiffeners in computing the steel section properties.
- For prestressed concrete beam designs, prestressed concrete beam sections differing significantly from the standards specified herein will be considered as nonstandard sections subject to the requirements of Publication 408, Section 1107.03(a)4. Do not deviate from the minimum flange and web thickness or section properties shown in the Bridge Design Standard Drawings.
- Provide provisions for future jacking of superstructure for bearing repair or replacement. *(Delete if not needed)*
- *(specify other)*

5. Substructure

Incorporate the following requirements into the substructure design: *(Specify requirements and limitations. Include the following, as applicable)*

- MSE abutments or wingwalls *(are/are not)* allowed.
- Precast modular retaining walls *(are/are not)* allowed.
- Integral abutments *(are/are not)* allowed.
- Precast piers *(are/are not)* allowed.
- *(specify other)*

6. Temporary Bridges

(Specify design and construction requirements for temporary bridges or refer to the Special Provision where this information is provided. If temporary bridges are not applicable, indicate "Not Applicable".)

7. Maintenance of Traffic During Construction

(Specify maintenance of traffic requirements related to the bridge design and construction or refer to the Special Provision where this information is provided)

8. Railroad Requirements

(If the bridge is not over or adjacent to a railroad, indicate "Not Applicable")

Design the structure to meet the following railroad requirements:

- Minimum Horizontal Clearance: *(specify value or indicate "Not Applicable")*
- Minimum Vertical Clearance: *(specify value or indicate "Not Applicable")*
- Temporary Support for Railroad Tracks: *(specify requirements, refer to the Special Provision where this information is provided, or indicate "Not Applicable")*
- Other *(specify other requirements, as applicable, such as catenary involvement, shielding, temporary clearances, etc.)*

9. Future Widening Requirements

In addition to Publication 15M, Design Manual Part 4 (DM-4) requirements, incorporate the following future widening provisions into the design: *(Specify geometric, design, and construction requirements or indicate "None")*

10. Future Redecking Requirements

In addition to the requirements in DM-4, incorporate the following future redecking provisions into the design: *(Specify requirements or indicate "None". Include the following, as applicable)*

- Allow for redecking in staged construction while maintaining *(specify number)* lanes of vehicular traffic during all stages of construction.
- Minimum lane widths of *(specify value)* are required.
- Design beams to carry standard design live loads at all stages of redecking.
- Allow for a maximum of *(specify number)* longitudinal construction joint(s) in the deck slab. The longitudinal construction joint must be positioned within the width of the top flange of a beam.
- Maintenance of pedestrian traffic *(is/is not)* required during future redecking. *(If pedestrian traffic is to be maintained, specify minimum travelway width and barrier protection requirements)*
- The superstructure and substructure must be designed to meet all Strength and Service Limit States for the specified future staging shown on the Conceptual TS&L *(as applicable)*.

11. Inspection and Maintenance Accessibility

Provide inspection and maintenance accessibility equivalent to that provided in the Conceptual TS&L Plans, or alternate means acceptable to the Department. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be binding.

12. On-Bridge Lighting

(Specify on-bridge lighting requirements. Indicate whether lighting locations shown on the Conceptual TS&L Plans may or may not be changed. If there is no on-bridge lighting, indicate "None".)

13. Waterway Requirements

(If the bridge is not over a waterway, indicate "Not Applicable")

Incorporate the following waterway requirements into the bridge design and construction:

13.a. Structure Shown on the Conceptual TS&L:

(For contracts which provide an approved waterway permit for the Conceptual TS&L structure, include the following three bullets; otherwise delete the following three bullets:)

- An approved waterway permit for the Conceptual TS&L structure is provided – see *(refer to the specific permit here)*. Comply with all requirements of the approved permit(s) or obtain approval for permit modifications from the appropriate DEP office. Additional time will not be provided for permit modifications. Do not start construction work until approval for waterway permit modifications, if applicable, is obtained.
- *(Specify waterway-related design and construction requirements for the structure in which a waterway permit was obtained. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans.)*
- If the waterway permit obtained by the Department includes a causeway permit, be responsible for obtaining any causeway permit amendments necessary due to change of causeway design during final design and/or construction.

(For contracts where waterway permit acquisition is a Design-Build activity, include the following bullet(s) and 13.a.1 through 13.a.5; otherwise delete through 13.a.5:)

- Obtain approved waterway permit(s) for the project. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permits are obtained.
- *(Specify waterway-related design and construction requirements for which the waterway permit materials will be prepared. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans, such as temporary pipes, causeway, etc.)*

13.a.1. Hydraulic Analysis:

(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other.)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure have been approved by the Department. Prepare and submit for approval the appropriate waterway permit(s) using the provided H&H documents and in accordance with the conditions of the permit.

(or)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure prepared by the Department are preliminary and for information purposes only. Prepare, submit, and obtain approval on the final Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10. Prepare and submit for approval the appropriate waterway permit(s) using the final H&H documents and in accordance with the conditions of the permit.

13.a.2. Scour Analysis: *(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other)*

- Included in the provided H&H documents.

(or)

- Scour Analysis is preliminary and for information purposes only, Prepare Scour Analysis in conjunction with final H&H documents.

13.a.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.a.4. Permits: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.a.5. Other *(List any other requirements)*

13.b. Alternate Structure

(Specify waterway-related design and construction requirements for alternate structures. If the bridge is not over a waterway, indicate "Not Applicable".)

- Obtain approved/amended waterway permit(s) for alternate structures. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permits are obtained.
- Alternate Structures with low chord elevations less than the Conceptual TS&L structure may be used, dependent upon approved hydraulic analyses, and provided that the water surface elevations are less than the Conceptual TS&L.
- Do not increase the water surface elevations for the *(INSERT APPLICABLE FLOOD YEAR(S))* year storms above those given for the Conceptual TS&L.
- If the Conceptual TS&L structure impacts wetlands, no additional wetland impacts will be allowed for alternate structure types.

13.b.1. Hydraulic Analysis

(Specify hydraulic analysis requirements for alternate structures. Address requirements for the completed bridge and construction conditions such as temporary pipes, causeway, etc.)

- Hydrologic and Hydraulic Report. Prepare, submit, and obtain approval on a revised Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10.

13.b.2. Scour Analysis *(Specify additional project specific scour requirements)*

13.b.3. FEMA and NEPA Coordination – In accordance with the special provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.b.4. Permits – In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.b.5. Other *(List any other requirements)*

14. Environmental

Refer to the Special Provision titled ENVIRONMENTAL COMMITMENT AND MITIGATION TRACKING SYSTEM (ECMTS) REPORT.

15. Utilities

Refer to the Conceptual TS&L Plans for general utility details and a listing of required on-bridge utility materials, and material acquisition and installation responsibilities.

Design the bridge structure to accommodate the following utility facilities on, under, or above the bridge:

(List the utility name and type of facility. Specify whether the utility facility is on, under, above or near the bridge. Also, specify any geometric or design restrictions - vertical clearance, clearance to footing, etc. - or refer to the Special Provision that contains this information. If there are no utilities that affect the bridge design and construction, indicate "None".)

If utility relocations are required as part of an alternate structure, obtain approvals from the affected utility companies.

16. Other

(List any other design requirements not covered in Section II(e)1 through Section II(e)15. If none, indicate "None")

(f) Foundations

1. General - Design the substructure units using as-designed geotechnical design parameters and requirements or an alternate foundation type as allowed herein.

2. As-Designed Foundation - Use the following in conjunction with the foundation type(s) shown on the Conceptual TS&L Plans:

2.a. Geotechnical Design Parameters *(list applicable type(s) as follows)*

2.a.1. Spread Footings on Soil: *(List for each substructure unit, as applicable)*

Resistance Factor for Bearing, ϕ_b : *(specify value)*

Resistance Factor for Sliding, ϕ_t : *(specify value)*

Number of Soil Layers: *(specify number)*

(Specify data for each layer in applicable units of measurement)

Layer Number *(specify number)*

Soil Type *(specify type)*

Soil Layer Thickness: *(specify value)*

Layer Limits: From Elevation *(specify value)*

To Elevation *(specify value)*

Moist Unit Weight/Density: *(specify value)*

Saturated Mass Unit Weight/Density: *(specify value)*

Cohesion, c : *(specify value)*

Elastic Modulus: *(specify value)*

Poisson's Ratio: *(specify value)*

Effective Internal Friction Angle, ϕ_f : *(specify value)*

N_{cq} : *(specify value or indicate "Not Applicable")*

$N_{\gamma q}$: *(specify value or indicate "Not Applicable")*

Maximum Allowable Settlement: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

2.a.2. Spread Footing on Rock: *(List for each substructure unit, as applicable)*

Ultimate Bearing Capacity, q_{ult} : *(specify value)*

Allowable Settlement: *(specify value)*

Resistance Factor for Bearing, ϕ_b : *(specify value)*

Resistance Factor for Sliding, ϕ_τ : *(specify value)*

Rock Quality Designation, RQD: (specify value)

Uniaxial Compressive Strength, C_0 : *(specify value)*

Concrete /Rock Friction Angle: (specify value)

Elastic Modulus, E: *(specify value)*

Poisson's Ratio: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

2.a.3. Pile Supported Footings: *(List for each substructure unit, as applicable)*

Pile Size: *(specify pile type and size)*

Pile Tip Reinforcement: *(specify "Required" or "Not Required")*

Service Axial Capacity: (specify value)

Strength Axial Capacity: *(specify value)*

Extreme Event Axial Capacity: *(specify value)*

Service Lateral Capacity: Weak Axis (specify value)

Strong Axis (*specify value*)

Strength Lateral Capacity: Weak Axis *(specify value)*

Strong Axis *(specify value)*

Extreme Event Lateral Capacity: Weak Axis *(specify value)*

Strong Axis *(specify value)*

Strength Allowable Uplift: *(specify value)*

Extreme Event Allowable Uplift: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

Estimated Pile Tip Elevation: Refer to the Conceptual TS&L Plans

2.a.4. Drilled Caisson Supported Footings: *(List for each substructure unit, as applicable)*

Shaft Diameter: *(specify value)*

Rock Socket Diameter: *(specify value)*

Service Axial Capacity: *(specify value)*

Strength Axial Capacity: *(specify value)*

Extreme Event Axial Capacity: *(specify value)*

Service Lateral Capacity: *(specify value)*

Strength Lateral Capacity: *(specify value)*

Extreme Event Lateral Capacity: *(specify value)*

Strength Allowable Uplift: *(specify value)*

Extreme Event Allowable Uplift: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

Estimated Length of Shaft in Soil: Refer to the Conceptual TS&L Plans

Estimated Length of Shaft in Rock: Refer to the Conceptual TS&L Plans

Estimated Length of Rock Socket: Refer to the Conceptual TS&L Plans

2.b. Foundation Design Information

(Specify foundation design information that would be important for the Lead Design Engineer's use in designing the substructure units)

2.c. Construction Requirements

2.c.1. Test Piles

- Provide a minimum of *(specify number or indicate "Not Applicable")* test piles at each abutment
- Provide a minimum of *(specify number or indicate "Not Applicable")* test piles at each pier.

2.c.2. Subgrade Preparation - Perform *(specify required special subgrade preparation operations or indicate "Not Applicable")* according to the Special Provision *(list the applicable Special Provision)*.

2.c.3. Pile Dynamic Analysis - Perform pile dynamic analysis on the test piles at *(list locations or indicate "Not Applicable")* according to the Special Provision *"(specify the applicable Special Provision or indicate "Not Applicable")"*.

2.c.4. Load Tests - Perform *(specify the number and locations, or indicate "Not Applicable")* pile load test according to the Special Provision *"(specify the applicable Special Provision or indicate "Not Applicable")"*.

2.c.5. Settlement Monitoring - Perform settlement monitoring at *(specify locations or indicate "Not Applicable")* according to the Special Provision "*(specify the applicable Special Provision or indicate "Not Applicable")*".

2.c.6. Other *(specify other construction requirements, if any)*

3. Relocated Substructure Units Using the As-Designed Foundation

The as-designed foundation(s) may be used for substructure units at locations other than those shown on the Conceptual TS&L Plans subject to the following:

- If as-designed piles for a relocated substructure unit cannot be driven, thereby necessitating a redesign of the substructure unit, furnish the revised design and complete construction drawings as part of the lump sum price bid for this item.
- *(Specify additional design and construction requirements)*
- *(Specify the extent of additional test borings that are required)*

(Sample: Drill supplementary test borings to provide at least two borings within the footprint of the footing. Drill the borings to establish the top of rock elevation and confirm the type and competency of rock. The borings may be advanced through the soil zone without sampling. Borings must core a minimum of 3 feet into intact bedrock. Borings already taken may be used to fulfill this requirement. Boring operations should be performed according to Publication 222, Sections 100, 202, 204, 210, 214, and 215. A proposed boring layout must be included in the Final TS&L submission. The borings may be taken during construction of the individual substructure units provided that boring results and recommendations are submitted to the Department at least 1 week before commencement of driving test piles at the subject substructure units. Include the estimated pile tip elevation(s) with the recommendation. Boring logs prepared according to DM-4 and BC-795M should be prepared and included with the final structure plans.)

4. Alternate Foundations

Alternate foundations are allowed as follows:

4.a. Allowable Foundation Types

(Specify allowable alternate foundation types - e.g., piles, spread footing on rock micro piles, etc. - along with geotechnical design parameter limitations for each type)

4.a.1. Geotechnical Design Parameter Limitations

Determine the applicable resistances to be used to design the substructures, limited to the maximum Ultimate Capacities given below. Designs utilizing Ultimate Capacities exceeding the maximum values indicated below will not be accepted.

4.a.2. Spread Footings on Soil

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

4.a.3. Spread Footings on Rock

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

4.a.4. Pile Supported Foundations

Point Bearing Piles

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

End Bearing Piles:

(Provide the capacity based on the applicable controlling mechanism, i.e. structural or geotechnical, respectively, as shown below. Select one of the following)

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

Or

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

Friction Piles:

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

4.a.5. Drilled Caisson Supported Foundations

The Ultimate (Geotechnical) Unit Side Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

The Ultimate (Geotechnical) Unit Tip Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

4.b. Required Geotechnical Exploration

Provide and utilize the following number of borings for the foundation design at a minimum:

- Abutments - *(specify number)*
- Piers -*(specify number)*

Previously obtained borings as shown on the Conceptual TS&L Plans may be used as a required boring where the boring lies within the footprint of the footing of the substructure unit.

Perform the geotechnical exploration for the bridge structure as described herein and according to the Special Provision titled SPECIAL BIDDING - DESIGN-BUILD, Section VIII - General Design Requirements, Design Specifications. *(list any additional publications, and identify the publications they supersede):*

4.c. Foundation Submission

Prepare and submit a foundation report in accordance with the requirements of DM-4) Policies and Procedures (PP), Section 1.9.4.3. Cost comparisons in accordance with Section 1.9.4.3.1, item (c) are not required.

4.d. Construction Requirements

4.d.1. Test Piles

(Specify minimum number of test piles or indicate "Not Applicable")

4.d.2. Subgrade Preparation

(Specify required subgrade preparation or indicate "Not Applicable")

4.d.3. Pile Dynamic Analysis

(Specify locations of required pile dynamic analysis or indicate "Not Applicable")

4.d.4. Load Tests

(Specify locations of required load tests or indicate "Not Applicable")

4.d.5. Settlement Monitoring

(Specify locations of required settlement monitoring or indicate "Not Applicable")

4.d.6. Other

(Specify other construction requirements or indicate "Not Applicable")

(g) Submittals

1. Final TS&L Submission

Include the following information in the TS&L submission:

1. Final TS&L submission letter: In accordance with DM-4, PP Section 1.9.3.3.1, item (a).
2. Final TS&L plans: In accordance with DM-4, PP Section 1.9.3.3.1, item (b).
3. Supply the following additional information:
 - (a) Route and section number, index map and segment/offset of limits
 - (b) Name of Lead Design Engineer
 - (c) Design traffic data including current and projected ADTT and class of highways on relevant roads

(d) Date of line and grade approval and design speed (if changes are made to the as-designed vertical and horizontal alignments)

(e) Copy of the H&H analysis submitted to the Department of Environmental Protection if the Contractor obtains the waterway permit(s) or if an amendment to the waterway permit is necessary.

4. Completed applicable Q/A Forms D-501, D-502, D-503, and/or D-504 (refer to DM-4 Appendix A).

Approval of the Final TS&L is contingent upon approval of the waterway permit from the Department of Environmental Protection, as applicable.

2. Waterway (As Applicable)

In accordance with Section II(e)13 of this Special Provision.

3. Foundation Submission (As Applicable)

In accordance with DM-4, Section 1.9.4.3.1 and Section II(f) of this Special Provision for submittal requirements.

4. Final Structure Plans and Computations

In accordance with DM-4. Include in the Final Structure Plans the Core Boring Logs as provided in the Conceptual Drawings in unmodified form; with the exception of superimposition of sheet numbering consistent with the Final Structure Plans and prominent designation of each sheet as "Information Provided by Others." Sign and seal each plan sheet in accordance with DM-4, PP Section 1.6.3.1, with the exception of the aforementioned Core Boring Logs. Upon completion of Quality Assurance Review, or Owner's Perspective Review, as applicable, and receipt of drawings stamped "Released for Construction," provide the Department with one (*Specify: "paper", "linen", drafting film", "vellum", or "electronic"*) copy for signature by the District Bridge Engineer.

5. Revisions During Construction and "As-Built" Drawings

In accordance with DM-4, PP Section 1.10.6, except that the Contractor is responsible for making changes to the contract drawings, and making and distributing necessary copies of the revised plans to all affected parties. The following shall replace DM-4, PP Section 1.10.5: "If a design error occurs, the Contractor is fully responsible for the costs associated with providing additional design analysis and construction modifications, acceptable to the Department, to correct the problem. The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item via work order."

Maintain and submit “As-Built” drawings in accordance with Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures, Section 5.7, As-Built Plans, except include major quantity changes (such as foundation pile length changes, etc.).

“As-Built” drawings are the sole responsibility of the Contractor and must be submitted to the District within 3 months of final inspection acceptance as defined in Publication 408 Section 110.08(a).

(h) Submittal Review, Approval, and Distribution

Make all submissions in accordance with Special Provisions titled SPECIAL BIDDING – DESIGN-BUILD, except as follows

- Partial Plans Submissions: *(Specify partial plans submission review procedure, or indicate “None”)*
- Utilities: Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

III. MEASUREMENT AND PAYMENT-Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Final TS&L Approval
- Final Plan Approval – Substructure
- Final Plan Approval – Superstructure
- Final Plan – for signature
- As-Built Drawings

Project Specific Details:

Special Provision: **D82110B - c82110 ITEM 8211-YYYY DESIGN OF BRIDGE
STRUCTURE (NO AS-DESIGNED FOUNDATION PROVIDED), S-
XXXXX**

Item(s) Associated:

Header:

ITEM 8211-YYYY DESIGN OF BRIDGE STRUCTURE (NO AS-DESIGNED FOUNDATION PROVIDED),
S-xxxxxx

Provision Body:

I. DESCRIPTION - This work is the design and preparation of construction plans for a bridge structure of the type indicated on the Department's Conceptual Type, Size, and Location (TS&L) Plans or an alternate type structure. Preparation of a Final TS&L Submission and a Foundation Submission for the proposed structure type is also required.

II. DESIGN

(a) General

(Select (A) when a full Conceptual TS&L is provided, (B) when a final Approved TS&L is provided, or (C) when the minimum Conceptual TS&L consisting of plan view, cross-section, and elevation with minimum widths, vertical clearance, and required waterway opening is provided. Delete the option not selected.)

(A) The Department's Conceptual TS&L Plans represent a bridge structure type and layout that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. A structure type and configuration as that shown on the Conceptual TS&L Plans or an alternate type structure subject to the requirements specified herein may be designed and constructed. Prepare and submit a Final TS&L submission for the proposed bridge structure for review and approval.

(B) The Department's Approved TS&L Plans represent a bridge structure type and layout that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. A structure subject to the requirements shown on the Approved TS&L Plans and as specified herein may be designed and constructed. Prepare and submit a Final TS&L submission for the proposed bridge structure for review and approval when proposing changes to the Approved TS&L Plans.

(C) Design and construct a structure meeting the configuration and requirements as shown on the Conceptual TS&L Plans. Prepare and submit Final TS&L submission for the proposed bridge structure for review and approval.

Allowable foundation type(s) along with geotechnical design parameter limitations are provided for the structure foundation. Use this information to prepare the foundation submission for the structure.

Provide design and drawings in the units of measurement shown on the Conceptual TS&L Plans.

Provide a complete set of computations for superstructure and substructure, including the foundation. Provide additional calculations, as requested by the Department's District Bridge Engineer or Chief Bridge Engineer, to evaluate any details throughout the life of the contract.

Verify that an oversize and/or overweight permit can be issued for superloads before incorporating them into a design. Submit verification documentation with the Final TS&L submission.

Structure types, concepts, construction sequencing, or other details that are not covered in the design and construction specifications or standards, or practice not commonly used in Pennsylvania are allowed only when specifically indicated herein. Where design or construction that deviates from standard Department practice is proposed, submit a conceptual design before the Final TS&L for review and approval. Include in the submittal conceptual plans and a list of items that deviate from standard design and construction, including but not limited to design methodology, the computer program that will be used in the design, construction sequencing, and any specialized construction techniques. No extensions of contract time will be granted for pursuits of alternates or non-standard designs.

(b) Additional Designer Qualifications

(List any additional qualifications necessary for the particular project over and above those listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD or indicate “None”)

(c) Additional Information/Data Made Available to the Contractor by the Department

The following information/data will be made available to the Contractor during the advertisement period: *(List the following, as applicable)*

- Test Boring Core Boxes: Test boring core boxes are available for inspection at *(specify location)*. Contact *(specify name and telephone number of person)* to arrange for a date and time to inspect the core boxes.
- *(List any other information/data that will be furnished)*

(d) Design Specifications

Develop the Final TS&L and prepare the structure construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications not listed in the Special Provision titled SPECIAL BIDDING-DESIGN-BUILD, and identify the publications they supersede)*

(e) Design Requirements

1. General

(List general requirements. Include the following, as applicable)

- Slip-formed barriers *(are/are not)* allowed.
- Segmental concrete construction *(is/is not)* allowed.
- Lightweight concrete *(is/is not)* allowed.
- Do not use the BLC Standard Drawings.
- Do not use precast concrete bridge barriers.

- Barrier type differing from that shown on the Conceptual TS&L (*is/is not*) allowed. (*Specify acceptable alternate barrier type(s) if applicable*)
- (*specify other*)

2. Geometry

Design the structure according to the geometrics shown on the Conceptual TS&L Plans, except changes will be allowed as follows:

- Horizontal Alignment: (*Specify allowable changes or indicate "No Change Allowed"*)
- Vertical Alignment: (*Specify allowable changes or indicate "No Change Allowed"*)
- Substructure Unit Locations: (*Specify allowable changes or indicate "No Change Allowed"*)
- Bridge Length: (*Specify allowable changes or indicate "No Change Allowed"*)
- Lane, Shoulder, and Sidewalk Widths: (*Specify allowable changes or indicate "No Changes Allowed"*)
- Staged Construction Requirements: (*Specify allowable changes / criteria such as those given below, or indicate "No Changes Allowed"*)
 - o Allow for staged construction while maintaining (*specify number*) lanes of vehicular traffic during all stages of construction.
 - o Minimum temporary lane widths of (*specify value*) are required.
 - o Provide a maximum of (*specify number*) longitudinal construction joint(s) in the deck slab. The longitudinal construction joint must be positioned within the (*Specify criteria. For example "middle 1/3", or "middle 1/2"*) width of the top flange of a beam.
 - o (*Specify other*)

3. Seismic

Site Class (*specify "is" or "is not"*) Class E.

Design the connection force effect in the restrained directions between the superstructure and substructure as 0.25 times the vertical reaction due to the tributary permanent load.

4. Superstructure

Incorporate the following requirements into the superstructure design: (*Specify requirements and limitations. Include the following as applicable*)

- Do not use less than (*specify number*) girders in the superstructure. Use more girders if required for future redecking.
- Deck Expansion Joints: (*Specify number and locations of allowable deck expansion joints*)
- Approach Slabs: (*Specify type, length, width, and/or other requirements for the approach slabs*).
- Steel box girders (*are/are not*) allowed.
- Precast panel forms for placing the concrete deck slab in lieu of metal stay-in-place forms (*are/are not*) allowed.
- Provide live load ratings with (*and without*) future wearing surface
- For steel girder designs, do not include longitudinal stiffeners in computing the steel section properties.

- For prestressed concrete beam designs, prestressed concrete beam sections differing significantly from the standards specified herein will be considered as nonstandard sections subject to the requirements of Publication 408, Section 1107.03(a) 4. Do not deviate from the minimum flange and web thickness or section properties shown in the Bridge Design Standard Drawings.
- Provide provisions for future jacking of superstructure for bearing repair or replacement. *(Delete if not needed)*
- *(specify other)*

5. Substructure

Incorporate the following requirements into the substructure design: *(Specify requirements and limitations. Include the following, as applicable)*

- MSE abutments or wingwalls *(are/are not)* allowed.
- Precast modular retaining walls *(are/are not)* allowed.
- Integral abutments *(are/are not)* allowed.
- Precast piers *(are/are not)* allowed.
- *(specify other)*

6. Temporary Bridges

(Specify design and construction requirements for temporary bridges or refer to the Special Provision where this information is provided. If temporary bridges are not applicable, indicate "Not Applicable".)

7. Maintenance of Traffic During Construction

(Specify maintenance of traffic requirements related to the bridge design and construction or refer to the Special Provision where this information is provided)

8. Railroad Requirements

(If the bridge is not over or adjacent to a railroad, indicate "Not Applicable")

Design the structure to meet the following railroad requirements:

- Minimum Horizontal Clearance: *(specify value or indicate "Not Applicable")*
- Minimum Vertical Clearance: *(specify value or indicate "Not Applicable")*
- Temporary Support for Railroad Tracks: *(specify requirements, refer to the Special Provision where this information is provided, or indicate "Not Applicable")*
- Other *(specify other requirements, as applicable, such as catenary involvement, shielding, temporary clearances, etc.)*

9. Future Widening Requirements

In addition to Publication 15M, Design Manual Part 4 (DM-4) requirements, incorporate the following future widening provisions into the design: *(Specify geometric, design, and construction requirements or indicate "None")*

10. Future Redecking Requirements

In addition to the requirements in DM-4, incorporate the following future redecking provisions into the design: *(Specify requirements or indicate "None". Include the following, as applicable)*

- Allow for redecking in staged construction while maintaining *(specify number)* lanes of vehicular traffic during all stages of construction.
- Minimum lane widths of *(specify value)* are required.
- Design beams to carry standard design live loads at all stages of redecking.
- Allow for a maximum of *(specify number)* longitudinal construction joint(s) in the deck slab. The longitudinal construction joint must be positioned within the width of the top flange of a beam.
- Maintenance of pedestrian traffic *(is/is not)* required during future redecking. *(If pedestrian traffic is to be maintained, specify minimum travelway width and barrier protection requirements)*
- The superstructure and substructure must be designed to meet all Strength and Service Limit States for the specified future staging shown on the Conceptual TS&L *(as applicable)*.

11. Inspection and Maintenance Accessibility

Provide inspection and maintenance accessibility equivalent to that provided in the Conceptual TS&L Plans, or alternate means acceptable to the Department. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be binding.

12. On-Bridge Lighting

(Specify on-bridge lighting requirements. Indicate whether lighting locations shown on the Conceptual TS&L Plans may or may not be changed. If there is no on-bridge lighting, indicate "None".)

13. Waterway Requirements

(If the bridge is not over a waterway, indicate "Not Applicable")

Incorporate the following waterway requirements into the bridge design and construction:

13.a. Structure Shown on the Conceptual TS&L:

(For contracts which provide an approved waterway permit for the Conceptual TS&L structure, include the following three bullets; otherwise delete the following three bullets:)

- An approved waterway permit for the Conceptual TS&L structure is provided – see *(refer to the specific permit here)*. Comply with all requirements of the approved permit(s), or obtain approval for permit modifications from the appropriate DEP office. Additional time will not be provided for permit modifications. Do not start construction work until approval for waterway permit modifications, if applicable, is obtained.
- *(Specify waterway-related design and construction requirements for the structure in which a waterway permit was obtained. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans.)*
- If the waterway permit obtained by the Department includes a causeway permit, be responsible for obtaining any causeway permit amendments necessary due to change of causeway design during final design and/or construction.

(For contracts where waterway permit acquisition is a Design-Build activity, include the following bullet(s) and 13.a.1 through 13.a.5; otherwise delete through 13.a.5:)

- Obtain approved waterway permit(s) for the project. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permits are obtained.
- *(Specify waterway-related design and construction requirements for which the waterway permit materials will be prepared. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans, such as temporary pipes, causeway, etc.)*

13.a.1. Hydraulic Analysis:

(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure have been approved by the Department. Prepare and submit for approval the appropriate waterway permit(s) using the provided H&H documents and in accordance with the conditions of the permit.

(or)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure prepared by the Department are preliminary and for information purposes only. Prepare, submit, and obtain approval on the final Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10. Prepare and submit for approval the appropriate waterway permit(s) using the final H&H documents and in accordance with the conditions of the permit.

13.a.2. Scour Analysis: *(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other)*

- Included in the provided H&H documents.

(or)

- Scour Analysis is preliminary and for information purposes only. Prepare Scour Analysis in conjunction with final H&H documents.

13.a.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.a.4 Permits: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.a.5. Other (*List any other requirements*)

13.b. Alternate Structure

(Specify waterway-related design and construction requirements for alternate structures. If the bridge is not over a waterway, indicate "Not Applicable")

- Obtain approved/amended waterway permit(s) for alternate structures. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permits are obtained.
- Alternate Structures with low chord elevations less than the Conceptual TS&L structure may be used, dependent upon approved hydraulic analyses, and provided that the water surface elevations are less than the Conceptual TS&L.
- Do not increase the water surface elevations for the *(INSERT APPLICABLE FLOOD YEAR(S))* year storms above those given for the Conceptual TS&L.
- If the Conceptual TS&L structure impacts wetlands, no additional wetland impacts will be allowed for alternate structure types.

13.b.1. Hydraulic Analysis

(Specify hydraulic analysis requirements for alternate structures. Address requirements for the completed bridge and construction conditions such as temporary pipes, causeway, etc.)

- Hydrologic and Hydraulic Report. Prepare, submit, and obtain approval on a revised Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10.

13.b.2. Scour Analysis (*Specify additional project specific scour requirements*)

13.b.3. FEMA and NEPA Coordination In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.b.4. Permits In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.b.5. Other (List any other requirements)

14. Environmental

Refer to the Special Provision title ENVIRONMENTAL COMMITMENT AND MITIGATION TRACKING SYSTEM (ECMTS) REPORT.

15. Utilities

Refer to the Conceptual TS&L Plans for general utility details and a listing of required on-bridge utility materials, and material acquisition and installation responsibilities.

Design the bridge structure to accommodate the following utility facilities on, under, or above the bridge:

(List the utility name and type of facility. Specify whether the utility facility is on, under, above or near the bridge. Also, specify any geometric or design restrictions - vertical clearance, clearance to footing, etc. - or refer to the Special Provision that contains this information. If there are no utilities that affect the bridge design and construction, indicate "None".)

If utility relocations are required as part of an alternate structure, obtain approvals from the affected utility companies.

16. Other

(List any other design requirements not covered in Section II(e)1 through Section II(e)15. If none, indicate "None")

(f) Foundations

1. General – A (*specify "limited" or "comprehensive"*) subsurface exploration investigation has been performed for this project. The subsurface exploration data, in conjunction with foundation requirements specified herein, should be used to develop the foundation design parameters. A foundation submission is required.

2. Allowable Foundation Types

Foundation types are allowed as follows:

(Specify allowable foundation types - e.g., piles, spread footing on rock, micropiles, etc. - along with geotechnical design parameter limitations for each type)

2.a. Geotechnical Design Parameter Limitations

Determine the applicable resistances to be used to design the substructures, limited to the maximum Ultimate Capacities given below. Designs utilizing Ultimate Capacities exceeding the maximum values indicated below will not be accepted.

2.a.1. Spread Footings on Soil

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

2.a.2. Spread Footings on Rock

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

2.a.3. Pile Supported Foundations

Point Bearing Piles

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

End Bearing Piles:

(Provide the capacity based on the applicable controlling mechanism, i.e. structural or geotechnical, respectively, as shown below. Select one of the following)

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

Or

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

Friction Piles:

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

2.a.4. Drilled Caisson Supported Foundations

The Ultimate (Geotechnical) Unit Side Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

The Ultimate (Geotechnical) Unit Tip Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

3. Required Geotechnical Exploration

Provide and utilize the following number of borings for the foundation design, at a minimum:

- Abutments - *(specify number)*
- Piers - *(specify number)*

Previously obtained borings as shown on the Conceptual TS&L Plans may be used as a required boring where the boring lies within the footprint of the footing of the substructure unit.

Perform the geotechnical exploration for the bridge structure according to the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications, and identify the publications they supersede)*

4. Laboratory Testing

(Specify required laboratory tests)

5. Foundation Submission

Prepare and submit a foundation report in accordance with the requirements of DM-4, Policies and Procedures (PP), Section 1.9.4.3. Cost comparisons in accordance with Section 1.9.4.3.1, item (c) are not required.

6. Construction Requirements

6.a. Test Piles

(Specify minimum number of test piles or indicate "Not Applicable")

6.b. Pile Dynamic Analysis

(Specify required subgrade preparation or indicate "Not Applicable")

6.c. Load Tests

(Specify locations of required load tests or indicate "Not Applicable")

6.d. Subgrade Preparation

(Specify locations of required settlement monitoring or indicate "Not Applicable")

6.e. Settlement Monitoring

(Specify other construction requirements or indicate "Not Applicable")

6.f. Other

(Specify other construction requirements or indicate "Not Applicable")

(g) Submittals

1. Final TS&L Submission

Include the following information in the TS&L submission:

1. Final TS&L submission letter: In accordance with DM-4 PP Section 1.9.3.3.1, item (a).

2. Final TS&L plans: In accordance with DM-4 PP Section 1.9.3.3.1, item (b).

3. Supply the following additional information:

(a) Route and section number, index map and segment/offset of limits

(b) Name of Lead Design Engineer

(c) Design traffic data including current and projected ADTT and class of highways on relevant roads

(d) Date of line and grade approval and design speed (if changes are made to the as-designed vertical and horizontal alignments)

(e) Copy of the H&H analysis submitted to the Department of Environmental Protection) if the Contractor obtains the waterway permit(s) or if an amendment to the waterway permit is necessary

4. Completed applicable Q/A Forms D-501, D-502, D-503 and/or D-504 (refer to DM-4 Appendix A).

Approval of the Final TS&L is contingent upon waterway permit approval from the Department of Environmental Protection, as applicable.

2. Waterway (As Applicable)

In accordance with Section II.(e).13 of this Special Provision.

3. Foundation Submission (As Applicable)

In accordance with DM-4, PP Section 1.9.4.3.1 and Section II(f) of this Special Provision for submittal requirements.

4. Final Structure Plans and Computations

In accordance with DM-4. Include in the Final Structure Plans the Core Boring Logs as provided in the Conceptual Drawings in unmodified form; with the exception of superimposition of sheet numbering consistent with the Final Structure Plans and prominent designation of each sheet as "Information Provided by Others." Sign and seal each plan sheet in accordance with DM-4, PP Section 1.6.3.1, with the exception of the aforementioned Core Boring Logs. Upon completion of Quality Assurance Review, or Owner's Perspective Review, as applicable, and receipt of drawings stamped "Recommended for Construction," provide the Department with one (*Specify: "paper", "linen", "drafting film", "vellum", or "electronic"*) copy for signature by the District Bridge Engineer.

5. Revisions During Construction and "As-Built" Drawings

In accordance with DM-4, PP Section 1.10.6, except that the Contractor is responsible for making changes to the contract drawings, and making and distributing necessary copies of the revised plans to all affected parties. The following shall replace DM-4, PP Section 1.10.5: "If a design error occurs, the Contractor is fully responsible for the costs associated with providing additional design analysis and construction modifications, acceptable to the Department, to correct the problem. The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item via work order."

Maintain and submit "As-Built" drawings in accordance with Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures, Section 5.7, As-Built Plans, except include major quantity changes (such as foundation pile length changes, etc.).

All "As-Built" drawings are the sole responsibility of the Contractor and must be submitted to the District within 3 months of final inspection acceptance as defined in Publication 408, Section 110.08(a).

(h) Submittal Review, Approval, and Distribution

Make all submissions in accordance with Special Provisions titled SPECIAL BIDDING – DESIGN-BUILD, except as follows;

- Partial Plans Submissions: (*Specify partial plans submission review procedure, or indicate "None"*)
- Utilities: Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

III. MEASUREMENT AND PAYMENT-Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Final TS&L Approval
- Foundation Approval
- Final Plan Approval – Substructure
- Final Plan Approval – Superstructure
- Final Plan – for Signature
- As-Built Drawings

Project Specific Details:

Special Provision: **D82120B - c82120 ITEM 8212-YYYY DESIGN OF RETAINING WALL (AS-DESIGNED FOUNDATION PROVIDED),S-xxxxx**

Item(s) Associated:

Header:

ITEM 8212-YYYY Design of Retaining Wall (As-Designed Foundation Provided), S-xxxxx

Provision Body:

I. DESCRIPTION - This work is the design and preparation of construction plans for a retaining wall of the type indicated on the Department's Conceptual Type, Size, and Location (TS&L) Plans or an alternate type retaining wall. Preparation of a Final TS&L Submission for the proposed retaining wall type is also required.

II. DESIGN

(a) General

(Select (A) when a full Conceptual TS&L is provided, (B) when a final Approved TS&L is provided, or (C) when the minimum Conceptual TS&L consisting of plan view, cross-section, and elevation with minimum widths, vertical clearance, and required waterway opening is provided. Delete the option not selected.)

(A) The Department's Conceptual TS&L Plans represent a retaining wall type and layout that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. A retaining wall type and configuration as that shown on the Conceptual TS&L Plans or an alternate type retaining wall subject to the requirements specified herein may be designed and constructed. Prepare and submit a Final TS&L submission for the proposed retaining wall for review and approval.

(B) The Department's Approved TS&L Plans represent a retaining wall type and layout that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. A retaining wall subject to the requirements shown on the

Approved TS&L Plans and as specified herein may be designed and constructed. Prepare and submit a Final TS&L submission for the proposed retaining wall for review and approval when proposing changes to the Approved TS&L Plans.

(C) Design and construct a retaining wall meeting the configuration and requirements as shown on the Conceptual TS&L plans. Prepare and submit Final TS&L submission for the retaining wall.

Foundation type(s) along with geotechnical design parameters are provided for the retaining wall foundation. Use the foundation type(s) and design parameters (hereinafter referred to as "as-designed") to design the retaining wall or develop an alternate foundation type and design parameters subject to the limitations specified.

Provide design and drawings in the units of measurement shown on the Conceptual TS&L Plans.

Provide a complete set of computations for the retaining wall, including the foundation. Provide additional calculations, as requested by the Department's District Bridge Engineer or Chief Bridge Engineer, to evaluate any details throughout the life of the contract.

Verify that an oversize and/or overweight permit can be issued for superloads before incorporating them into a design. Submit verification documentation with the Final TS&L submission.

Structure types, concepts, construction sequencing, or other details that are not covered in the design and construction specifications or standards, or practice not commonly used in Pennsylvania are allowed only when specifically indicated herein. Where design or construction that deviates from standard Department practice is proposed, submit a conceptual design before the Final TS&L for review and approval. Include in the submittal conceptual plans, and a list of items that deviate from standard design and construction, including but not limited to design methodology, the computer program that will be used in the design, construction sequencing, and any specialized construction techniques. No extensions of contract time will be granted for pursuits of alternates or non-standard designs.

(b) Additional Designer Qualifications

(List any additional qualifications necessary for the particular project over and above those listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD or indicate "None")

(c) Additional Information/Data Made Available to the Contractor by the Department

The following information/data will be made available to the Contractor during the advertisement period: *(List the following, as applicable)*

- Test Boring Core Boxes: Test boring core boxes are available for inspection at *(specify location)*. Contact *(specify name and telephone number of person)* to arrange for a date and time to inspect the core boxes.
- *(List any other information/data that will be furnished)*

(d) Design Specifications

Develop the Final TS&L and prepare the structure construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications not listed in the Special Provision titled SPECIAL BIDDING-DESIGN-BUILD, and identify the publications they supersede)*

(e) Design Requirements

1. General

(List general requirements. Include the following, as applicable)

- Slip-formed barriers *(are/are not)* allowed.
- Lightweight concrete *(is/is not)* allowed.
- MSE walls *(are/are not)* allowed.
- Precast modular wall *(are/are not)* allowed.
- Precast barriers *(are/are not)* allowed.
- Barrier type differing from that shown on the Conceptual TS&L *(is/is not)* allowed. *(Specify acceptable alternate barrier type(s) if applicable)*
- Post and Panel type walls *(are/are not)* allowed.
- Permanent anchored walls *(are/are not)* allowed. Provide permanent anchored walls in accordance with the Special Provision titled PERMANENT ANCHORED WALLS. Exposed permanent anchor heads *(are/are not)* allowed.
- Precast concrete wall panels *(are/are not)* allowed.
 - o Driven piles are not permitted for use with precast concrete wall panels.
- Cast-In-Place concrete wall panels *(are/are not)* allowed.
- Shotcrete wall panels or facing is not allowed.
- Timber lagging wall panels are not allowed.
- The base of the wall or wall panel must extend *(specify depth criteria, such as for frost, etc.)* minimum below the proposed ground line.
- Secant walls *(are/are not)* not allowed.
- Reinforced Soil Slopes *(are/are not)* not allowed.
- Soil Nail Walls *(are/are not)* not allowed.
- Design for the presence of water behind the wall as required by site conditions and drainage.
- Limit the horizontal displacement at the top of permanent anchored walls to 1 inch at the Service Limit State.
- *(specify other)*

2. Geometry

Design the retaining wall according to the geometrics shown on the Conceptual TS&L Plans, except changes will be allowed as follows:

- Horizontal Alignment: *(Specify allowable changes or indicate "No Change Allowed")*
- Vertical Alignment: *(Specify allowable changes or indicate "No Change Allowed")*
- Wall Length: *(Specify allowable changes or indicate "No Change Allowed")*

3. Seismic

Site Class *(specify "is" or "is not")* Class E.

4. Maintenance of Traffic During Construction

(Specify maintenance of traffic requirements related to the wall design and construction or refer to the Special Provision where this information is provided)

5. Railroad Requirements

Design the retaining wall to meet the following railroad requirements:

- Minimum Horizontal Clearance: *(specify value or indicate "Not Applicable")*
- Temporary Support for Railroad Tracks: *(specify requirements, refer to the Special Provision where this information is provided, or indicate "Not Applicable")*
- Other *(specify other requirements, as applicable, such as catenary involvement, shielding, temporary clearances, etc.)*

6. Inspection and Maintenance Accessibility

Provide inspection and maintenance accessibility equivalent to that provided in the Conceptual TS&L Plans, or alternate means acceptable to the Department. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be binding.

7. On-Wall Lighting

(Specify on-wall lighting requirements. Indicate whether lighting locations shown on the Conceptual TS&L Plans may or may not be changed. If there is no on-wall lighting, indicate "None".)

8. Waterway Requirements

Incorporate the following waterway requirements into the retaining wall design and construction:

(If the retaining wall is not impacting a waterway, indicate "Not Applicable".)

8.a. Structure Shown on the Conceptual TS&L:

(For contracts which provide an approved waterway permit for the Conceptual TS&L structure, include the following:)

- An approved waterway permit for the Conceptual TS&L structure is provided – see *(refer to the specific permit here)*. Comply with all requirements of the approved permit(s), or obtain approval for permit modifications from the appropriate DEP office. Additional time will not be provided for permit modifications. Do not start construction work until approval for waterway permit modifications, if applicable, is obtained.
- *(Specify waterway-related design and construction requirements for the structure in which a waterway permit was obtained. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans.)*
- If the waterway permit obtained by the Department includes a causeway permit, be responsible for obtaining any causeway permit amendments necessary due to change of causeway design during final design and/or construction.

(For contracts where waterway permit acquisition is a Design-Build activity, include the following bullet(s) and 8.a.1 through 8.a.5; otherwise delete through 8.a.5:)

- Obtain approved waterway permit(s) for the project. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permit(s) are obtained.
- *(Specify waterway-related design and construction requirements for which the waterway permit materials will be prepared. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans, such as temporary pipes, causeway, etc.)*

8.a.1. Hydraulic Analysis:

(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other.)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure have been approved by the Department. Prepare and submit for approval the appropriate waterway permit(s) using the provided H&H documents and in accordance with the conditions of the permit.
- (or)*
- Hydrologic and Hydraulic documents for the Conceptual TS&L structure prepared by the Department are preliminary and for information purposes only. Prepare, submit, and obtain approval on the final Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10. Prepare and submit for approval the appropriate waterway permit(s) using the final H&H documents and in accordance with the conditions of the permit.

8.a.2. Scour Analysis: *(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other)*

- Included in the provided H&H documents.

(or)

- Scour Analysis is preliminary and for information purposes only. Prepare Scour Analysis in conjunction with final H&H documents.

8.a.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

8.a.4. Permits: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

8.a.5. Other *(List any other requirements)*

8.b. Alternate Structure

(Specify waterway-related design and construction requirements for alternate structures. If the wall is not impacting a waterway, indicate "Not Applicable".)

- Obtain approved/amended waterway permit(s) for alternate structures. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permit(s) are obtained.
- Do not increase the water surface elevations for the *(INSERT APPLICABLE FLOOD YEAR(S))* year storms above those given for the Conceptual TS&L.
- If the Conceptual TS&L structure impacts wetlands, no additional wetland impacts will be allowed for alternate structure types.

8.b.1. Hydraulic Analysis

(Specify hydraulic analysis requirements for alternate structures. Address requirements for the completed wall and construction conditions such as temporary pipes, causeway, etc.)

- Hydrologic and Hydraulic Report. Prepare, submit, and obtain approval on a revised Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10.

8.b.2. Scour Analysis *(Specify additional project specific scour requirements)*

8.b.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

8.b.4. Permits: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

8.b.5. Other (*List any other requirements*)

9. Environmental

Refer to the Special Provision titled ENVIRONMENTAL COMMITMENTS AND MITIGATION TRACKING SYSTEM (ECMTS).

10. Utilities

Design the retaining wall to accommodate the following utility facilities at the retaining wall:

(List the utility name and type of facility. Specify any geometric or design restrictions - vertical clearance, clearance to footing, etc. - or refer to the Special Provision that contains this information. If there are no utilities that affect the retaining wall and construction, indicate "None".)

If utility relocations are required as part of an alternate structure, be responsible for securing approvals from the affected utility companies.

11. Other

(List any other design requirements not covered in Section II(e)1 through Section II(e)10. If none, indicate "None")

(f) Foundations

1. General - Design the retaining wall using as-designed geotechnical design parameters and requirements or an alternate foundation type as allowed herein.

2. As-Designed Foundation - Use the following in conjunction with the foundation type(s) shown on the Conceptual TS&L Plans:

2.a. Geotechnical Design Parameters *(list applicable type(s) as follows)*

2.a.1. Spread Footings on Soil: *(List for each substructure unit, as applicable)*

Resistance Factor for Bearing, ϕ_b : *(specify value)*

Resistance Factor for Sliding, ϕ_τ : *(specify value)*

Number of Soil Layers: *(specify number)*

(Specify data for each layer in applicable units of measurement)

Layer Number *(specify number)*

Soil Type *(specify type)*

Soil Layer Thickness: *(specify value)*

Layer Limits: From Elevation *(specify value)*

To Elevation *(specify value)*

Moist Unit Weight/Density: *(specify value)*

Saturated Mass Unit Weight/Density: *(specify value)*

Cohesion, c : *(specify value)*

Elastic Modulus: *(specify value)*

Poisson's Ratio: *(specify value)*

Effective Internal Friction Angle, ϕ_f : *(specify value)*

N_{cq} : *(specify value or indicate "Not Applicable")*

$N_{\gamma q}$: *(specify value or indicate "Not Applicable")*

Maximum Allowable Settlement: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

2.a.2. Spread Footing on Rock:*(List for each substructure unit, as applicable)*

Ultimate Bearing Capacity, q_{ult} : *(specify value)*

Allowable Settlement: *(specify value)*

Resistance Factor for Bearing, ϕ_b : *(specify value)*

Resistance Factor for Sliding, ϕ_r : *(specify value)*

Rock Quality Designation, RQD: *(specify value)*

Uniaxial Compressive Strength, C_o : *(specify value)*

Concrete /Rock Friction Angle: *(specify value)*

Elastic Modulus, E: *(specify value)*

Poisson's Ratio: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

2.a.3. Pile Supported Footings: *(List for each substructure unit, as applicable)*

Pile Size: *(specify pile type and size)*

Pile Tip Reinforcement: *(specify "Required" or "Not Required")*

Service Axial Capacity: *(specify value)*

Strength Axial Capacity: *(specify value)*

Extreme Event Axial Capacity: *(specify value)*

Service Lateral Capacity: Weak Axis *(specify value)*

Strong Axis *(specify value)*

Strength Lateral Capacity: Weak Axis *(specify value)*

Strong Axis *(specify value)*

Extreme Event Lateral Capacity: Weak Axis *(specify value)*

Strong Axis *(specify value)*

Strength Allowable Uplift: *(specify value)*

Extreme Event Allowable Uplift: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

Estimated Pile Tip Elevation: Refer to the Conceptual TS&L Plans

2.a.4. Drilled Caisson Supported Footings: *(List for each substructure unit, as applicable)*

Shaft Diameter: *(specify value)*

Rock Socket Diameter: *(specify value)*

Service Axial Capacity: *(specify value)*

Strength Axial Capacity: *(specify value)*

Extreme Event Axial Capacity: *(specify value)*

Service Lateral Capacity: *(specify value)*

Strength Lateral Capacity: *(specify value)*

Extreme Event Lateral Capacity: *(specify value)*

Strength Allowable Uplift: *(specify value)*

Extreme Event Allowable Uplift: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

Estimated Length of Shaft in Soil: Refer to the Conceptual TS&L Plans

Estimated Length of Shaft in Rock: Refer to the Conceptual TS&L Plans

Estimated Length of Rock Socket: Refer to the Conceptual TS&L Plans

2.a.5. Permanent Anchored Walls: *(List for each substructure unit, as applicable)*

- The Ultimate Resistance for Bond of Rock Anchor is limited to a maximum of *(specify value, xxx)* kips. Anchor must be founded in rock.
- Rock Parameters: *(list type(s): for example, Sandy Shale; Sandstone, slightly weathered)*

Recovery: *(specify value, xx)%*

Rock Quality Designation (RQD): *(specify value, xx-xx)%*

Maximum Uniaxial Compressive Strength: *(specify value, xxxx)* ksf

Refer to soil borings for more detailed information.

Soil Phi Angle: *(specify value, xx)* degrees

- *(Specify others)*

2.a.6. *(Specify others)*

2.b. Foundation Design Information

(Specify foundation design information that would be important for the Contractor's use in designing the retaining wall)

2.c. Construction Requirements

2.c.1. Test Piles

- Provide a minimum of *(specify number or indicate "Not Applicable")* test piles.

2.c.2. Subgrade Preparation - Perform *(specify required special subgrade preparation operations or indicate "Not Applicable")* according to the Special Provision *(list the applicable Special Provision)*.

2.c.3. Pile Dynamic Analysis - Perform pile dynamic analysis on the test piles at *(list locations or indicate "Not Applicable")* according to the Special Provision *(specify the applicable Special Provision or indicate "Not Applicable")*.

2.c.4. Load Tests - Perform *(specify the number and locations, or indicate "Not Applicable")* pile load test according to the Special Provision *(specify the applicable Special Provision or indicate "Not Applicable")*.

2.c.5. Settlement Monitoring - Perform settlement monitoring at *(specify locations or indicate "Not Applicable")* according to the Special Provision *(specify the applicable Special Provision or indicate "Not Applicable")*.

2.c.6. Other *(specify other construction requirements, if any)*

3. Relocated Retaining Wall Using the As-Designed Foundation

The as-designed foundation(s) may be used for a retaining wall relocated from the position specified on the Conceptual TS&L Plans subject to the following:

- If as-designed piles for a relocated retaining wall cannot be driven, thereby necessitating a redesign of the retaining wall, furnish the revised design and complete construction drawings as part of the lump sum price bid for this item.
- *(Specify additional design and construction requirements, as applicable)*
- *(Specify the extent of additional test borings that are required)*

(Sample: Drill supplementary test borings to provide at least two borings within the footprint of the footing. Drill the borings to establish the top of rock elevation and confirm the type and competency of rock. The borings may be advanced through the soil zone without sampling. Borings must core a minimum of 3 feet into intact bedrock. Borings already taken may be used to fulfill this requirement. Boring operations should be performed according to Publication 222, Sections 100, 202, 204, 210, 214, and 215. A proposed boring layout must be included in the Final TS&L submission. The borings may be taken during construction of the individual substructure units provided that boring results and recommendations are submitted to the Department at least 1 week before commencement of driving test piles at the subject substructure units. Include the estimated pile tip elevation(s) with the recommendation. Boring logs prepared according to DM-4 and Publication 222 should be prepared and included with the final structure plans.)

4. Alternate Foundations

Alternate foundations are allowed as follows:

4.a. Allowable Foundation Types

(Specify allowable alternate foundation types - e.g., piles, spread footing on rock, micro piles, etc. - along with geotechnical design parameter limitations for each type)

4.a.1. Geotechnical Design Parameter Limitations

Determine the applicable resistances to be used to design the substructures, limited to the maximum Ultimate Capacities given below. Designs utilizing Ultimate Capacities exceeding the maximum values indicated below will not be accepted.

4.a.2. Spread Footings on Soil

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

4.a.3. Spread Footings on Rock

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

4.a.4. Pile Supported Foundations

Point Bearing Piles

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

End Bearing Piles:

(Provide the capacity based on the applicable controlling mechanism, i.e. structural or geotechnical, respectively, as shown below. Select one of the following)

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

Or

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

Friction Piles:

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

4.a.5. Drilled Caisson Supported Foundations

The Ultimate (Geotechnical) Unit Side Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

The Ultimate (Geotechnical) Unit Tip Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

4.b. Required Geotechnical Exploration

Provide and utilize the following number of borings for the foundation design, at a minimum:

- *(specify number and locations)*

Previously obtained borings as shown on the Conceptual TS&L Plans may be used as a required boring where the boring lies within the footprint of the footing of the retaining wall.

Perform the geotechnical exploration for the bridge structure as described herein and according to the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications, and identify the publications they supersede)*

4.c. Foundation Submission

Prepare and submit a foundation report in accordance with the requirements of Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP), Section 1.9.4.3. Cost comparisons in accordance with Section 1.9.4.3.1, item (c) are not required.

4.d. Construction Requirements

4.d.1. Test Piles

(Specify minimum number of test piles or indicate "Not Applicable")

4.d.2. Subgrade Preparation

(Specify required subgrade preparation or indicate "Not Applicable")

4.d.3. Pile Dynamic Analysis

(Specify locations of required pile dynamic analysis or indicate "Not Applicable")

4.d.4. Load Tests

(Specify locations of required load tests or indicate "Not Applicable")

4.d.5. Settlement Monitoring

(Specify locations of required settlement monitoring or indicate "Not Applicable")

4.d.6. Other

(Specify other construction requirements or indicate "Not Applicable")

(g) Submittals

1. Final TS&L Submission

Include the following information in the TS&L submission:

1. Final TS&L submission letter: In accordance with DM-4, PP Section 1.9.3.3.1, item (a).
2. Final TS&L plans: In accordance with DM-4, PP Section 1.9.3.3.1, item (b).
3. Supply the following additional information:
 - (a) Route and section number, index map and segment/offset of limits

(b) Name of Lead Design Engineer

(c) Design traffic data including current and projected ADTT and class of highways on relevant roads

(d) Date of line and grade approval and design speed (if changes are made to the as-designed vertical and horizontal alignments)

(e) Copy of the H&H analysis submitted to the Department of Environmental Protection if the Contractor obtains the waterway permit(s) or if an amendment to the waterway permit(s) is necessary

4. Completed applicable Q/A Forms D-514, D-516 and/or D-517 (refer to DM-4 Appendix A)

Approval of the Final TS&L is contingent upon approval of the waterway permit(s) by the Department of Environmental Protection, as applicable.

2. Waterway (As Applicable)

In accordance with Section II(e)8 of this Special Provision.

3. Foundation Submission (As Applicable)

In accordance with DM-4, PP Section 1.9.4.3.1 and Section II(f) of this Special Provision for submittal requirements. Complete Q/A Form D-505 (refer to DM 4 Appendix A).

4. Final Structure Plans and Computations

In accordance with applicable sections of DM-4. Include in the Final Structure Plans the Core Boring Logs as provided in the Conceptual Drawings in unmodified form; with the exception of superimposition of sheet numbering consistent with the Final Structure Plans and prominent designation of each sheet as "Information Provided by Others." Sign and seal each plan sheet in accordance with DM-4, PP Section 1.6.3.1, with the exception of the aforementioned Core Boring Logs. Upon completion of Quality Assurance Review, or Owner's Perspective Review, as applicable, and receipt of drawings stamped "Recommended for Construction," provide the Department with one (*Specify: "paper", "linen", "drafting film", "vellum", or "electronic"*) copy for signature by the District Bridge Engineer.

5. Revisions During Construction and As-Built Drawings

In accordance with DM-4, PP Section 1.10.6, except that the Lead Design Engineer is responsible for making changes to the contract drawings, and making and distributing necessary copies of the revised plans to all affected parties. The following shall replace DM-4, PP Section 1.10.5: "If a design error occurs, the Contractor is fully responsible for the costs associated with providing additional design analysis and construction modifications, acceptable to the Department, to correct the problem. The Department will require reimbursement for design errors to cover engineering review costs. This amount shall be deducted from the lump sum cost for the construction of structure item via work order."

Maintain and submit As-Built Drawings in accordance with Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures, Section 5.7, As-Built Plans, except include major quantity changes (such as foundation pile length changes, etc.).

All as-built drawings are the sole responsibility of the Contractor and must be submitted to the District within 3 months of final inspection acceptance as defined in Publication 408, Section 110.08(a).

(h) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as follows;

- Partial Plans Submissions: *(Specify partial plans submission review procedure, or indicate "None")*
- Utilities: Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

III. MEASUREMENT AND PAYMENT-Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Final TS&L Approval
- Final Plan Approval
- Final Plan – for Signature
- As-Built Drawings

Project Specific Details:

Special Provision: **D82130B - c82130 ITEM 8213-YYYY DESIGN OF RETAINING WALL (NO AS-DESIGNED FOUNDATION PROVIDED), S-xxxxx**

Item(s) Associated:

Header:

ITEM 8213-YYYY Design of Retaining Wall (No As-Designed Foundation Provided), S-xxxxx

Provision Body:

I. DESCRIPTION - This work is the design and preparation of construction plans for a retaining wall of the type indicated on the Department's Conceptual Type, Size, and Location (TS&L) Plans or an alternate type retaining wall. Preparation of a Final TS&L Submission and a Foundation Submission for the proposed retaining wall type is also required.

II. DESIGN

(a) General

(Select (A) when a full Conceptual TS&L is provided, (B) when a final Approved TS&L is provided, or (C) when the minimum Conceptual TS&L consisting of plan view, cross-section, and elevation with minimum widths, vertical clearance, and required waterway opening is provided. Delete the option not selected.)

(A) The Department's Conceptual TS&L Plans represent a retaining wall type and layout that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. A retaining wall type and configuration as that shown on the Conceptual TS&L Plans or an alternate type retaining wall subject to the requirements specified herein may be designed and constructed. Prepare and submit a Final TS&L submission for the proposed retaining wall for review and approval.

(B) The Department's Approved TS&L Plans represent a retaining wall type and layout that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. A retaining wall subject to the requirements shown on the Approved TS&L Plans and as specified herein may be designed and constructed. Prepare and submit a Final TS&L submission for the proposed retaining wall for review and approval when proposing changes to the Approved TS&L Plans.

(C) Design and construct a retaining wall meeting the configuration and requirements as shown on the Conceptual TS&L plans. Prepare and submit Final TS&L submission for the retaining wall.

Allowable foundation type(s) along with geotechnical design parameter limitations are provided for the retaining wall foundation. Use this information to prepare the foundation submission for the retaining wall.

Provide design and drawings in the units of measurement shown on the Conceptual TS&L Plans.

Provide a complete set of computations for retaining wall, including the foundation. Provide additional calculations, as requested by the Department's District Bridge Engineer or Chief Bridge Engineer, to evaluate any details throughout the life of the contract.

Verify that an oversize and/or overweight permit can be issued for superloads before incorporating them into a design. Submit verification documentation with the Final TS&L submission.

Structure types, concepts, construction sequencing, or other details that are not covered in the design and construction specifications or standards, or practice not commonly used in Pennsylvania are allowed only when specifically indicated herein. Where design or construction that deviates from Department standard practice is proposed, submit a conceptual design before the Final TS&L for review and approval. Include in the submittal conceptual plans and a list of items that deviate from standard design and construction, including but not limited to design methodology, the computer program that will be used in the design, construction sequencing, and any specialized construction techniques. No extensions of contract time will be granted for pursuits of alternates or non-standard designs.

(b) Additional Designer Qualifications

(List any additional qualifications necessary for the particular project over and above those listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD or indicate “None”)

(c) Additional Information/Data Made Available to the Contractor by the Department

The following information/data will be made available to the Contractor during the advertisement period: *(List the following, as applicable)*

- Test Boring Core Boxes: Test boring core boxes are available for inspection at *(specify location)*. Contact *(specify name and telephone number of person)* to arrange for a date and time to inspect the core boxes.
- *(List any other information/data that will be furnished)*

(d) Design Specifications

Develop the Final TS&L and prepare the structure construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications not listed in the Special Provision titled SPECIAL BIDDING-DESIGN-BUILD, and identify the publications they supersede)*

(e) Design Requirements

1. General

(List general requirements. Include the following, as applicable)

- Slip-formed barriers *(are/are not)* allowed.
- Lightweight concrete *(is/is not)* allowed.
- MSE walls *(are/are not)* allowed.
- Precast modular wall *(are/are not)* allowed.
- Precast barriers *(are/are not)* allowed.
- Barrier type differing from that shown on the Conceptual TS&L *(is/is not)* allowed. *(Specify acceptable alternate barrier type(s) if applicable)*
- Post and Panel type walls *(are/are not)* allowed.
- Permanent anchored walls *(are/are not)* allowed. Provide permanent anchored walls in accordance with the Special Provision titled PERMANENT ANCHORED WALLS. Exposed permanent anchor heads *(are/are not)* allowed.
- Precast concrete wall panels *(are/are not)* allowed.
 - o Driven piles are not permitted for use with precast concrete wall panels.
- Cast-In-Place concrete wall panels *(are/are not)* allowed.
- Shotcrete wall panels or facing is not allowed.
- Timber lagging wall panels are not allowed.
- The base of the wall or wall panel must extend *(specify depth criteria, such as for frost, etc.)* minimum below the proposed ground line.
- Secant walls *(are/are not)* not allowed.
- Reinforced Soil Slopes *(are/are not)* not allowed.
- Soil Nail Walls *(are/are not)* not allowed.
- Design for the presence of water behind the wall as required by site conditions and drainage.
- Limit the horizontal displacement at the top of permanent anchored walls to 1 inch at the Service Limit State.
- *(specify other)*

2. Geometry

Design the retaining wall according to the geometrics shown on the Conceptual TS&L Plans, except changes will be allowed as follows:

- Horizontal Alignment: *(Specify allowable changes or indicate "No Change Allowed")*
- Vertical Alignment: *(Specify allowable changes or indicate "No Change Allowed")*
- Wall Length: *(Specify allowable changes or indicate "No Change Allowed")*

3. Seismic

Site Class *(specify "is" or "is not")* Class E.

4. Maintenance of Traffic During Construction

(Specify maintenance of traffic requirements related to the bridge design and construction or refer to the Special Provision where this information is provided.)

5. Railroad Requirements

Design the retaining wall to meet the following railroad requirements:

- Minimum Horizontal Clearance: *(specify value or indicate "Not Applicable")*
- Temporary Support for Railroad Tracks: *(specify requirements, refer to the Special Provision where this information is provided, or indicate "Not Applicable")*
- Other *(specify other requirements, as applicable, such as catenary involvement, shielding, temporary clearances, etc.)*

6. Inspection and Maintenance Accessibility

Provide inspection and maintenance accessibility equivalent to that provided in the Conceptual TS&L Plans, or alternate means acceptable to the Department. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be binding.

7. On-Wall Lighting

(Specify on-wall lighting requirements. Indicate whether lighting locations shown on the Conceptual TS&L Plans may or may not be changed. If there is no on-wall lighting, indicate "None".)

8. Waterway Requirements

(If the retaining wall is not impacting a waterway, indicate "Not Applicable".)

Incorporate the following waterway requirements into the retaining wall design and construction:

8.a. Structure Shown on the Conceptual TS&L:

(For contracts which provide an approved waterway permit for the Conceptual TS&L structure, include the following:)

- An approved waterway permit for the Conceptual TS&L structure is provided – see *(refer to the specific permit here)*. Comply with all requirements of the approved permit(s), or obtain approval for permit modifications from the appropriate DEP office. Additional time will not be provided for permit modifications. Do not start construction work until approval for waterway permit modifications, if applicable, is obtained.
- *(Specify waterway-related design and construction requirements for the structure in which a waterway permit was obtained. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans.)*
- If the waterway permit obtained by the Department includes a causeway permit, be responsible for obtaining any causeway permit amendments necessary due to change of causeway design during final design and/or construction.

(For contracts where waterway permit acquisition is a Design-Build activity, include the following bullet(s) and 8.a.1 through 8.a.5; otherwise delete through 8.a.5:)

- Obtain approved waterway permit(s) for the project. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permit(s) are obtained.
- *(Specify waterway-related design and construction requirements for which the waterway permit materials shall be prepared. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans, such as temporary pipes, causeway, etc.)*

8.a.1. Hydraulic Analysis:

(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other.)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure have been approved by the Department. Prepare and submit for approval the appropriate waterway permit(s) using the provided H&H documents and in accordance with the conditions of the permit.
- (or)*
- Hydrologic and Hydraulic documents for the Conceptual TS&L structure prepared by the Department are preliminary and for information purposes only. Prepare, submit, and obtain approval on the final Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10. Prepare and submit for approval the appropriate waterway permit(s) using the final H&H documents and in accordance with the conditions of the permit.

8.a.2. Scour Analysis: Included in the provided H&H documents.

8.a.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMIT FOR DESIGN-BUILD PROJECTS.

8.a.4. Permits: In accordance with the Special Provision titled PERMIT FOR DESIGN-BUILD PROJECTS.

8.a. 5. Other *(List any other requirements)*

8.b. Alternate Structure

(Specify waterway-related design and construction requirements for alternate structures. If the wall is not impacting a waterway, indicate "Not Applicable".)

- Obtain approved/amended waterway permit(s) for alternate structures. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. No construction work shall start until approved waterway permit(s) are obtained.
- Do not increase the water surface elevations for the *(INSERT APPLICABLE FLOOD YEAR(S))* year storms above those given for the Conceptual TS&L.
- If the Conceptual TS&L structure impacts wetlands, no additional wetland impacts will be allowed for alternate structure types.

8.b.1. Hydraulic Analysis

(Specify hydraulic analysis requirements for alternate structures. Address requirements for the completed wall and construction conditions such as temporary pipes, causeway, etc.)

- Hydrologic and Hydraulic Report. Prepare, submit, and obtain approval on a revised Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10.

8.b.2. Scour Analysis *(Specify additional project specific scour requirements)*

8.b.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

8.b.4. Permits: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

8.b.5. Other *(List any other requirements)*

9. Environmental

Refer to the Special Provision titled ENVIRONMENTAL COMMITMENTS AND MITIGATION TRACKING SYSTEM (ECMTS).

10. Utilities

Design the retaining wall to accommodate the following utility facilities at the retaining wall:

(List the utility name and type of facility. Specify any geometric or design restrictions - vertical clearance, clearance to footing, etc. - or refer to the Special Provision that contains this information. If there are no utilities that affect the retaining wall and construction, indicate "None".)

If utility relocations are required as part of an alternate structure, secure approvals from the affected utility companies.

11. Other

(List any other design requirements not covered in Section II(e)1 through Section II(e)9. If none, indicate "None")

(f) Foundations

1. General - A *(specify "limited" or "comprehensive")* subsurface exploration investigation has been performed for this project. The subsurface exploration data, in conjunction with foundation requirements specified herein, should be used to develop the foundation design parameters. A foundation submission is required.

2. Allowable Foundation Types

Foundation types are allowed as follows:

(Specify allowable foundation types - e.g., piles, spread footing on rock micro piles, etc. - along with geotechnical design parameter limitations for each type)

2.a. Geotechnical Design Parameter Limitations

Determine the applicable resistances to be used to design the substructures, limited to the maximum Ultimate Capacities given below. Designs utilizing Ultimate Capacities exceeding the maximum values indicated below will not be accepted.

2.a.1. Spread Footings on Soil

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

2.a.2. Spread Footings on Rock

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

2.a.3. Pile Supported Foundations

Point Bearing Piles

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

End Bearing Piles:

(Provide the capacity based on the applicable controlling mechanism, i.e. structural or geotechnical, respectively, as shown below. Select one of the following)

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

Or

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

Friction Piles:

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

2.a.4. Drilled Caisson Supported Foundations

The Ultimate (Geotechnical) Unit Side Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

The Ultimate (Geotechnical) Unit Tip Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

2.a.5. Permanent Anchored Walls

- The Ultimate Resistance for Bond of Rock Anchor is limited to a maximum of *(specify value, xxx)* kips. Anchor must be founded in rock.
- Rock Parameters: *(list type(s): for example, Sandy Shale; Sandstone, slightly weathered)*

Recovery: *(specify value, xx)%*

Rock Quality Designation (RQD): *(specify value, xx-xx)%*

Maximum Uniaxial Compressive Strength: *(specify value, xxxx)* ksf

Refer to soil borings for more detailed information.
Soil Phi Angle: *(specify value, xx)* degrees

- *(Specify others)*

2.a.6. *(Specify others)*

3. Required Geotechnical Exploration

Provide and utilize the following number of borings for the foundation design, at a minimum:

(Specify number and locations)

Previously obtained borings as shown on the Conceptual TS&L Plans may be used as a required boring where the boring lies within the footprint of the footing of the retaining wall.

Perform the geotechnical exploration for the retaining wall in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications, and identify the publications they supersede)*

4. Laboratory Testing

(Specify required laboratory tests)

5. Foundation Submission

Prepare and submit a foundation report in accordance with the requirements of Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP), Section 1.9.4.3. Cost comparisons in accordance with Section 1.9.4.3.1, item (c) are not required.

6. Construction Requirements

6.a. Test Piles

(Specify minimum number of test piles or indicate "Not Applicable")

6.b. Subgrade Preparation

(Specify required subgrade preparation or indicate "Not Applicable")

6.c. Pile Dynamic Analysis

(Specify locations of required pile dynamic analysis or indicate "Not Applicable")

6.d. Load Tests

(Specify locations of required load tests or indicate "Not Applicable")

6.e. Settlement Monitoring

(Specify locations of required settlement monitoring or indicate "Not Applicable")

6.f. Other

(Specify other construction requirements or indicate "Not Applicable")

(g) Submittals

1. Final TS&L Submission

Include the following information in the TS&L submission:

1. Final TS&L submission letter: In accordance with DM-4, PP Section 1.9.3.3.1, item (a).
2. Final TS&L plans: In accordance with DM-4, PP Section 1.9.3.3.1, item (b).

3. Supply the following additional information:

(a) Route and section number, index map and segment/offset of limits

(b) Name of Lead Design Engineer

(c) Design traffic data including current and projected ADTT and class of highways on relevant roads

(d) Date of line and grade approval and design speed (if changes are made to the as-designed vertical and horizontal alignments)

(e) Copy of the H&H analysis submitted to the Department of Environmental Protection if the Contractor obtains the waterway permit(s) or if an amendment to the waterway permit(s) is necessary

4. Completed applicable Q/A Forms D-514, D-516 and/or D-517 (refer to DM-4 Appendix A)

Approval of the Final TS&L is contingent upon approval of the waterway permit(s) by the Department of Environmental Protection, as applicable.

2. Waterway (*As Applicable*)

In accordance with Section II(e)8 of this Special Provision.

3. Foundation Submission (*As Applicable*)

In accordance with DM-4, PP Section 1.9.4.3.1 and Section II(f) of this Special Provision for submittal requirements.

4. Final Structure Plans and Computations

In accordance with applicable section of DM-4. Include in the Final Structure Plans the Core Boring Logs as provided in the Conceptual Drawings in unmodified form; with the exception of superimposition of sheet numbering consistent with the Final Structure Plans and prominent designation of each sheet as "Information Provided by Others." Sign and seal each plan sheet in accordance with DM-4, PP Section 1.6.3.1, with the exception of the aforementioned Core Boring Logs. Upon completion of Quality Assurance review, or Owner's Perspective review, as applicable, and receipt of drawings stamped "Recommended for Construction,"

provide the Department with one (*Specify: "paper", "linen", "drafting film", "vellum" or "electronic"*) copy for signature by the District Bridge Engineer.

5. Revisions During Construction and As-Built Drawings

In accordance with DM-4, PP Section 1.10, except that the Lead Design Engineer is responsible for making changes to the contract drawings, and making and distributing necessary copies of the revised plans to all affected parties. The following shall replace DM-4, PP Section 1.10.5: "If a design error occurs, the Contractor is fully responsible for the costs associated with providing additional design analysis and construction modifications, acceptable to the Department, to correct the problem. The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item via work order."

Maintain and submit As-Built Drawings in accordance with Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures, Section 5.7, As-Built Plans, except include major quantity changes (such as foundation pile length changes, etc.).

All as-built drawings are the sole responsibility of the Contractor and must be submitted to the District within 3 months of final inspection acceptance as defined in Publication 408, Section 110.08(a).

(h) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as follows:

- Partial Plans Submissions: (*Specify partial plans submission review procedure, or indicate "None"*)
- Utilities: Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

III. MEASUREMENT AND PAYMENT-Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Final TS&L Approval
- Foundation Approval
- Final Plan Approval
- Final Plan - for Signature
- As-Built Drawings

Project Specific Details:

Special Provision: **D82140B - c82140 ITEM 8214-YYYY DESIGN OF CULVERT (AS-DESIGNED FOUNDATION PROVIDED), S-xxxxx**

Item(s) Associated:

Header:

ITEM 8214-YYYY Design of Culvert (As-Designed Foundation Provided), S-xxxxx

Provision Body:

I. DESCRIPTION - This work is the design and preparation of construction plans for a culvert of the type indicated on the Department's Conceptual Type, Size, and Location (TS&L) Plans or an alternate type culvert. Preparation of a Final TS&L Submission for the proposed structure type is also required.

II. DESIGN

(a) General

Select (A) when a full Conceptual TS&L is provided, (B) when a final Approved TS&L is provided, or (C) when the minimum Conceptual TS&L consisting of plan view, cross-section, and elevation with minimum widths, vertical clearance, and required waterway opening is provided. Delete the option not selected.)

(A) The Department's Conceptual TS&L Plans represent a culvert that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. A culvert as that shown on the Conceptual TS&L Plans or an alternate culvert subject to the requirements specified herein may be designed and constructed. Prepare and submit Final TS&L submission for the proposed bridge structure for review and approval.

(B) The Department's Approved TS&L Plans represent a culvert that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. A culvert subject to the requirements shown on the Approved TS&L Plans and as specified herein may be designed and constructed. Prepare and submit a Final TS&L submission for the proposed culvert for review and approval when proposing changes to the Approved TS&L Plans.

(C) Design and construct a culvert meeting the configuration and requirements as shown on the Conceptual TS&L Plans. Prepare and submit Final TS&L submission for the proposed culvert for review and approval.

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Foundation type(s) along with geotechnical design parameters are provided for the culvert foundation. Use the foundation type(s) and design parameters (hereinafter referred to as "as-designed") to design the culvert or develop an alternate foundation type and design parameters subject to the limitations specified.

Provide design and drawings in the units of measurement shown on the Conceptual TS&L Plans .

Provide a complete set of computations for the culvert, including the foundation. Provide additional calculations, as requested by the Department's District Bridge Engineer or Chief Bridge Engineer, to evaluate any details throughout the life of the contract.

Verify that an oversize and/or overweight permit can be issued for superloads before incorporating them into a design. Submit verification documentation with the Final TS&L submission.

Structure types, concepts, construction sequencing, or other details that are not covered in the design and construction specifications or standards, or practice not commonly used in Pennsylvania are allowed only when specifically indicated herein. Where design or construction that deviates from standard Department practice is proposed, a conceptual design shall be submitted before the Final TS&L for review and approval. Include in the submittal conceptual plans and a list of items that deviate from standard design and construction, including but not limited to design methodology, the computer program that will be used in the design, construction sequencing, and any specialized construction techniques. No extensions of contract time will be granted for pursuits of alternates or non-standard designs.

For precast box culverts completely constructed at locations utilizing a detour, no live loads will be allowed on the structure until the box segments are post-tensioned together. Provide post-tensioning connection details of precast box segments on the shop drawings. Provide connection design and details for approval during shop drawings and in accordance with BD-632M and BC-798M. Do not use galvanized strap connections except as noted.

For precast box culverts constructed in separate stages, no live load will be allowed on the structure until the box segments constructed in the stage are post-tensioned together. Provide post-tensioning connection design and details of each stage and for the post-tensioned connection of the separate stages together, for approval during Final Design and in accordance with BD-632M and BC-798M. Do not use galvanized strap connections except as noted.

(b) Additional Designer Qualifications

(List any additional qualifications necessary for the particular project over and above those listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD or indicate “None”)

(c) Additional Information/Data Made Available to the Contractor by the Department

The following information/data will be made available to the Contractor during the advertisement period: *(List the following, as applicable)*

- Test Boring Core Boxes: Test boring core boxes are available for inspection at *(specify location)*. Contact *(specify name and telephone number of person)* to arrange for a date and time to inspect the core boxes.
- *(List any other information/data that will be furnished)*

(d) Design Specifications

Develop the Final TS&L and prepare the structure construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications not listed in the Special Provision titled SPECIAL BIDDING-DESIGN-BUILD, and identify the publications they supersede)*

(e) Design Requirements

1. General

1.a. Comply with the following:

(List general requirements. Include the following, as applicable)

- MSE wingwalls *(are/are not)* allowed.
- Precast modular wingwalls *(are/are not)* allowed.
- Precast end sections *(are/are not)* allowed.
- Longitudinal joints in precast end sections *(are/are not)* not allowed.
- *(specify other)*

1.b. Allowable Alternate Culvert Types

(List allowable alternate culvert types. Include precast culvert, as applicable)

- Metal Plate Arches and Culverts *(are/are not)* allowed.

(specify other)

1.c. Allowable Changes to Geometry

(Specify allowable changes to the geometry)

2. Maintenance of Traffic During Construction

(Specify maintenance of traffic requirements related to the culvert design and construction or refer to the Special Provision where this information is provided)

3. Inspection and Maintenance Accessibility

Provide inspection and maintenance accessibility equivalent to that provided in the Conceptual TS&L Plans or alternate means acceptable to the Department. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be binding.

4. Waterway Requirements

(If the culvert is not over a waterway, indicate "Not Applicable")

Incorporate the following waterway requirements into the culvert design and construction:

4.a. Structure Shown on the Conceptual TS&L:

(For contracts which provide an approved waterway permit for the Conceptual TS&L structure, include the following:)

- An approved waterway permit for the Conceptual TS&L structure is provided – see *(refer to the specific permit here)*. Comply with all requirements of the approved permit(s), or obtain approval for permit modifications from the appropriate DEP office. Additional time will not be provided for permit modifications. Do not start construction work until approval for waterway permit modifications, if applicable, is obtained
- *(Specify waterway-related design and construction requirements for the structure in which a waterway permit was obtained. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans.)*

(For contracts where waterway permit acquisition is a Design-Build activity, include the following bullet(s) and 4.a.1 through 4.a.6; otherwise delete through 4.a.6:)

- Obtain approved waterway permit(s) for the project. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permit(s) are obtained.
- *(Specify waterway-related design and construction requirements for which the waterway permit materials shall be prepared. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans, such as temporary pipes, causeway, etc.)*

4.a.1. Hydraulic Analysis:

(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other.)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure have been approved by the Department. Prepare and submit for approval the appropriate waterway permit(s) using the provided H&H documents and in accordance with the conditions of the permit.

(or)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure prepared by the Department are preliminary and for information purposes only. Prepare, submit, and obtain approval on the final Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10. Prepare and submit for approval the appropriate waterway permit(s) using the final H&H documents and in accordance with the conditions of the permit.

4.a.2. Scour Analysis:

Not applicable for box culverts. *(Specify additional project specific scour requirements if warranted by special conditions.)*

(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other)

Included in the provided H&H documents.

(or)

Scour Analysis is preliminary and for information purposes only, Prepare Scour Analysis in conjunction with final H&H documents

4.a.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMIT FOR DESIGN-BUILD PROJECTS.

4.a.4. Permits: In accordance with the Special Provision titled PERMIT FOR DESIGN-BUILD PROJECTS.

4.a.5. Other *(List any other requirements)*

4.b. Alternate Structure

(Specify waterway-related design and construction requirements for alternate structures.)

- Obtain approved/amended waterway permit(s) for alternate structures. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD

PROJECTS for further details. Do not start construction work until approved waterway permit(s) are obtained.

- Do not increase the water surface elevations for the *(INSERT APPLICABLE FLOOD YEAR(S))* year storms above those given for the Conceptual TS&L.
- If the Conceptual TS&L structure impacts wetlands, no additional wetland impacts will be allowed for alternate structure types.

4.b.1. Hydraulic Analysis:

(Specify hydraulic analysis requirements for alternate structures. Address requirements for the completed culvert and construction conditions such as temporary pipes, causeway, etc.)

- Hydrologic and Hydraulic Report. Prepare, submit, and obtain approval on a revised Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10.

4.b.2. Scour Analysis: Not applicable for box culverts. *(Specify additional project specific scour requirements if warranted by special conditions.)*

4.b.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

4.b.4. Permits: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

4.b.5. Other *(List any other requirements)*

(List any other design requirements not covered in Section II(e)1 through Section II(e)6. If none, indicate "None".)

5. Environmental

Refer to the Special Provision titled ENVIRONMENTAL COMMITMENT AND MITIGATION TRACKING SYSTEM (ECMTS) REPORT.

6. Utilities

Design the culvert to accommodate the following utility facilities at the culvert:

(List the utility name and type of facility. Specify any geometric or design restrictions - vertical clearance, clearance to footing, etc. - or refer to the Special Provision that contains this information. If there are no utilities that affect the culvert design and construction, indicate "None")

If utility relocations are required as part of an alternate structure, be responsible for securing approvals from the affected utility companies.

(f) Foundations

1. General - Design the culvert using as-designed geotechnical design parameters and requirements or an alternate foundation type as allowed herein.

2. As-Designed Foundation - Use the following in conjunction with the foundation type(s) shown on the Conceptual TS&L Plans:

2.a Geotechnical Design Parameters *(list applicable type(s) as follows)*

2. a.1. Spread Footings on Soil: *(List for each culvert and wingwall, as applicable)*

Resistance Factor for Bearing, ϕ_b : *(specify value)*

Resistance Factor for Sliding, ϕ_τ : *(specify value)*

Number of Soil Layers: *(specify number)*

(Specify data for each layer in applicable units of measurement)

Layer Number: *(specify number)*

Soil Type: *(specify type)*

Soil Layer Thickness: *(specify value)*

Layer Limits: From Elevation *(specify value)*

To Elevation *(specify value)*

Moist Unit Weight/Density: *(specify value)*

Saturated Mass Unit Weight/Density: *(specify value)*

Cohesion, c : *(specify value)*

Elastic Modulus: *(specify value)*

Poisson's Ratio: *(specify value)*

Effective Internal Friction Angle, ϕ_f : *(specify value)*

N_{cq} : *(specify value or indicate "Not Applicable")*

$N_{\gamma q}$: *(specify value or indicate "Not Applicable")*

Maximum Allowable Settlement: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

2.a.2. Spread Footing on Rock: *(List for each culvert and wingwall, as applicable)*

Ultimate Bearing Capacity, q_{ult} : *(specify value)*

Allowable Settlement: *(specify value)*

Resistance Factor for Bearing, ϕ_b : *(specify value)*

Resistance Factor for Sliding, ϕ_τ : *(specify value)*

Rock Quality Designation, RQD: *(specify value)*

Uniaxial Compressive Strength, C_o : *(specify value)*

Concrete /Rock Friction Angle: *(specify value)*

Elastic Modulus, E: *(specify value)*

Poisson's Ratio: *(specify value)*

2.a.3. Pile Supported Footings: *(List for each substructure unit, as applicable)*

Pile Size: *(specify pile type and size)*

Pile Tip Reinforcement: *(specify "Required" or "Not Required")*

Service Axial Capacity: *(specify value)*

Strength Axial Capacity: *(specify value)*

Extreme Event Axial Capacity: *(specify value)*

Service Lateral Capacity: Weak Axis *(specify value)*

 Strong Axis *(specify value)*

Strength Lateral Capacity: Weak Axis *(specify value)*

Strong Axis *(specify value)*

Extreme Event Lateral Capacity: Weak Axis *(specify value)*

Strong Axis *(specify value)*

Strength Allowable Uplift: *(specify value)*

Extreme Event Allowable Uplift: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

Estimated Pile Tip Elevation: Refer to the Conceptual TS&L Plans

2.a.4. Drilled Caisson Supported Footings: *(List for each substructure unit, as applicable)*

Shaft Diameter: *(specify value)*

Rock Socket Diameter: *(specify value)*

Service Axial Capacity: *(specify value)*

Strength Axial Capacity: *(specify value)*

Extreme Event Axial Capacity: *(specify value)*

Service Lateral Capacity: *(specify value)*

Strength Lateral Capacity: *(specify value)*

Extreme Event Lateral Capacity: *(specify value)*

Strength Allowable Uplift: *(specify value)*

Extreme Event Allowable Uplift: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

Estimated Length of Shaft in Soil: Refer to the Conceptual TS&L Plans

Estimated Length of Shaft in Rock: Refer to the Conceptual TS&L Plans

Estimated Length of Rock Socket: Refer to the Conceptual TS&L Plans [\[CT8\]](#)

2.a.3. *(Specify others)*

2.b. Foundation Design Information

(Specify foundation design information that would be important for the Contractor's use in designing the culvert)

2.c. Construction Requirements

2.c.1. Test Piles – Provide a minimum of *(specify number or indicate “Not Applicable”)* test piles at *(specify locations or indicate “Not Applicable”)*

2.c. 2. Subgrade Preparation - Perform *(specify required special subgrade preparation operations or indicate “Not Applicable”)* according to the Special Provision *(list the applicable Special Provision.)*

2.c.3. Pile Dynamic Analysis - Perform pile dynamic analysis on the test piles at *(list locations or indicate “Not Applicable”)* according to the Special Provision *“(specify the applicable Special Provision or indicate “Not Applicable”).”*

2.c.4. Load Tests – Perform *(specify the number and locations, or indicate “Not Applicable”)* pile load test according to the Special Provision *“(specify the applicable Special Provision or indicate “Not Applicable”).”*

2.c.5. Settlement Monitoring - Perform settlement monitoring at *(specify locations or indicate "Not Applicable")* according to the Special Provision "*(specify the applicable Special Provision or indicate "Not Applicable").*"

2.c.6. Other *(specify other construction requirements, if any.)*

3. Foundations for Alternate Culverts

Foundations for alternate culverts as specified in Section II(e)1.b. are as follows:

3.a. Allowable Foundation Types

(Specify allowable foundation types, along with geotechnical design parameter limitations for alternate culverts.)

3.a.1. Geotechnical Design Parameter Limitations

Determine the applicable resistances to be used to design the substructures, limited to the maximum Ultimate Capacities given below. Designs utilizing Ultimate Capacities exceeding the maximum values indicated below will not be accepted.

3.a.2. Spread Footings on Soil

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

3.a.3. Spread Footings on Rock

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

3.a.4. Pile Supported Foundations

Point Bearing Piles

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

End Bearing Piles:

(Provide the capacity based on the applicable controlling mechanism, i.e. structural or geotechnical, respectively, as shown below. Select one of the following)

Ultimate pile capacity is limited a maximum yield strength of 50 ksi.

Or

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

Friction Piles:

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

3.a.5. Drilled Caisson Supported Foundations

The Ultimate (Geotechnical) Unit Side Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

The Ultimate (Geotechnical) Unit Tip Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

3.b. Foundation Submission

Prepare and submit a foundation report in accordance with the requirements of Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP), Section 1.9.4. Cost comparisons in accordance with Section 1.9.4.3.1(c) are not required.

3.c. Construction Requirements

3.c.1. Test Piles

(Specify minimum number of test piles or indicate “Not Applicable”)

3.c.2. Subgrade Preparation

(Specify required subgrade preparation or indicate "Not Applicable")

3.c.3. Pile Dynamic Analysis

(Specify locations of required pile dynamic analysis or indicate "Not Applicable")

3.c.4. Load Tests

(Specify locations of required load tests or indicate "Not Applicable")

3.c.5. Settlement Monitoring

(Specify locations of required settlement monitoring or indicate "Not Applicable")

3.c.6. Other

(Specify other construction requirements or indicate "Not Applicable")

(g) Submittals

1. Final TS&L Submission

Include the following information in the TS&L submission:

1. Final TS&L submission letter: In accordance with DM-4, PP Section 1.9.3.3.1, item (a).
2. Final TS&L plans: In accordance with DM-4, PP Section 1.9.3.3.1, item (b).

3. Supply the following additional information:

(a) Route and section number, index map and segment/offset of limits

(b) Name of Lead Design Engineer

(c) Design traffic data including current and projected ADTT and class of highways on relevant roads

(d) Date of line and grade approval and design speed (if changes are made to the as-designed vertical and horizontal alignments)

(e) Copy of the H&H analysis submitted to the Department of Environmental Protection if the Contractor obtains the waterway permit(s) or if an amendment to the waterway permit(s) is necessary

4. Completed applicable Q/A Forms D-512, D-514 (refer to DM-4, Appendix A)

Approval of the Final TS&L is contingent upon approval of the waterway permit(s) by the Department of Environmental Protection, as applicable.

2. Waterway

In accordance with Section II(e)6 of this Special Provision.

3. Foundation Submission (As Applicable)

In accordance with DM-4, PP Section 1.9.4 .3.1 and Section II(f) of this Special Provision for submittal requirements.

4. Final Structure Plans and Computations

In accordance with DM-4. Include in the Final Structure Plans the Core Boring Logs as provided in the Conceptual Drawings in unmodified form; with the exception of superimposition of sheet numbering consistent with the Final Structure Plans and prominent designation of each sheet as "Information Provided by Others." Sign and seal each plan sheet in accordance with DM-4, PP Section 1.6.3.1, with the exception of the aforementioned Core Boring Logs. Upon completion of Quality Assurance Review, or Owner's Perspective Review, as applicable, and receipt of drawings stamped "Recommended for Construction," provide the Department with one (*Specify: "paper", "linen", drafting film", "vellum" or "electronic"*) copy for signature by the District Bridge Engineer.

5. Revisions During Construction and As-Built Drawings

In accordance with DM-4, PP Section 1.10.6, except that the Lead Design Engineer is responsible for making changes to the contract drawings, and making and distributing necessary copies of the revised plans to all affected parties. The following shall replace DM-4, PP Section 1.10.5: "If a design error occurs, the Contractor is fully responsible for the costs associated with providing additional design analysis and construction modifications, acceptable to the Department, to correct the problem. The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item via work order."

Maintain and submit "As-Built" drawings in accordance with Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures, Section 5.7, As-Built Plans, except include major quantity changes (such as foundation pile length changes, etc.).

"As-Built" drawings are the sole responsibility of the Contractor and must be submitted to the District within 3 months of final inspection acceptance as defined in Publication [CT11](#) 408, Section 110.08(a).

(h) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provisions titled SPECIAL BIDDING – DESIGN-BUILD, except as follows:

- Partial Plans Submissions: *(Specify partial plans submission review procedure, or indicate "None")*
- Utilities: Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

III. MEASUREMENT AND PAYMENT-Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Final TS&L Approval
- Final Plan Approval
- Final Plan -for Signature
- As-Built Drawings

Project Specific Details:

Special Provision: **D82150B - c82150 ITEM 8215-YYYY DESIGN OF SOUND BARRIER WALL SYSTEM(AS-DESIGNED FOUNDATION**

PROVIDED), S-XXXXX

Item(s) Associated:

Header:

ITEM 8215-YYYY Design of Sound Barrier Wall (As-Designed Foundation Provided), S-XXXXX

Provision Body:

I. DESCRIPTION - This work is the design and preparation of construction plans for a sound barrier wall system of the type indicated on the Department's Conceptual Type, Size, and Location (TS&L) Plans or an alternate type sound barrier system. The term "Sound Barrier Wall System" refers to the combination of all components of the recommended noise abatement design, including (but not limited to) sound barrier panels, sound barrier posts, sound barrier caps (separate), sound barrier foundations, and sound barrier textures, colors, and coatings. Preparation of a Final TS&L Submission for the proposed sound barrier is also required.

II. DESIGN

(a) General

The Department's Conceptual TS&L Plans represent a sound barrier type and layout that will meet safety, geometric, acoustical, visual, and load carrying capacity requirements for the project. A sound barrier type and configuration as that shown on the Conceptual TS&L Plans or an alternate type sound barrier subject to the requirements specified herein may be designed and constructed. Prepare and submit a Final TS&L submission for the proposed sound barrier for review and approval.

Foundation type(s) along with geotechnical design parameters are provided for the sound barrier foundation. Use the foundation type(s) and design parameters (hereinafter referred to as "as-designed") to design the sound barrier or develop an alternate foundation type and design parameters subject to the limitations specified.

Provide design and drawings in the units of measurement shown on the Conceptual TS&L Plans.

Provide a complete set of computations for the sound barrier, including the foundation. Provide additional calculations, as requested by the Department's District Bridge Engineer or Chief Bridge Engineer, to evaluate any details throughout the life of the contract.

Structure types, concepts, construction sequencing, or other details that are not covered in the design and construction specifications or standards, or practice not commonly used in Pennsylvania are allowed only when specifically indicated herein. Where design or construction that deviates from standard Department practice is proposed, submit a conceptual design before the Final TS&L for review and approval. Include in the submittal conceptual plans and a list of items that deviate from standard design and construction, including but not limited to design methodology, the computer program that will be used in the design, construction sequencing, and any specialized construction techniques. No extensions of contract time will be granted for pursuits of alternates or non-standard designs.

(b) Additional Designer Qualifications

Individuals responsible for acoustical design must have a minimum of 7 years experience in the analysis of highway related noise using appropriate FHWA highway traffic noise modeling techniques on at least 3 individual projects involving the design of sound barrier systems. Individuals must be familiar with FHWA Traffic Noise Model application and PennDOT noise policies and procedures.

(List any additional qualifications necessary for the particular project over and above those listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD or indicate “None”)

(c) Additional Information/Data Made Available to the Contractor by the Department

The following information/data will be made available to the Contractor during the advertisement period: *(List the following, as applicable)*

- Test Boring Core Boxes: Test boring core boxes are available for inspection at **(specify location)**. Contact *(specify name and telephone number of person)* to arrange for a date and time to inspect the core boxes.
- The *(Insert date)* and *(Preliminary or Final)* Design Noise Report as well as any modifications suggested by the Department which have been developed since that time.
- FHWA TMN data files.
- *(List any other information/data that will be furnished)*

(d) Design Specifications

Develop the Final TS&L and prepare the sound barrier construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications, and Publication 24, Project Level Highway Traffic Noise Handbook. *(List any additional publications not listed in the Special Provision titled SPECIAL BIDDING- DESIGN-BUILD, and identify the publications they supersede)*

(e) Design Requirements

1. General

(List general requirements. Include the following, as applicable)

- Gaps that allow light to pass through any joints or seams are not allowed.
- *(specify other, such as requirements for access, hydrants, etc.)*

2. Alternate Sound Barrier Designs

2.a. Allowable Sound Barrier Types

(List allowable alternate sound barrier types)

2.b. Geometry

Design the sound barrier according to the geometrics shown on the Conceptual TS&L Plans, The horizontal and/or vertical configuration of the sound barrier system may be modified provided that:

- The line of sight break provided by the sound barrier system for any benefited residence is not reduced from that provided by the recommended barrier system, identified as Barrier Option *(insert option designation)* in Table *(insert Table designation)* of the *(insert date)* Final Design Noise Report, AND
- The noise level provided by the sound barrier system at any benefited residence is not reduced from that provided by the recommended barrier system identified as Barrier Option *(insert option designation)* in Table *(insert Table designation)* of the *(insert date)* Final Design Noise Report.

2.c. Other Requirements

- Alternate sound barrier designs that depart from the details shown on the Standard Drawings must be pre-approved before bidding.
- Provide a sound barrier system with a top of barrier profile as smooth and consistent as possible, using the following guidance:
 - o Stepped panels will be used. When using stepped rectangular sound wall panels, step panels in a uniform manner. For example, rather than having three level panels followed by a one-foot step, have four panels, each with 3 inch steps.
 - o For rectangular sound wall panels, keep steps at a maximum of 6 inches.
 - o For rectangular sound wall panels, transition uniformly from level sections or between steps of various dimensions. For example 6"step, 6" step, 6" step, 4" step, 2" step, 2" step, 2" step, 2" step, ; or level section, 2"step, 4" step, 6" step, 6"step, 6" step,
 - o Do not construct sound walls less than 5 feet in height above the finished ground elevation.
- Provide a sound barrier system with an aesthetic design that is compatible with the structural and engineering aspects of the sound barrier system design applying the following guidance:
 - o Ensure that systems utilizing stacked panels that the joint(s) between stacked panels is consistent with the specific aesthetic design pattern of the sound barrier. This consistency applies not just to the panels between two posts but between all panel sections within the sound barrier system. Do not intersperse full height and stacked panels on a continuous section of a sound barrier system. If such consistency cannot be assured, use full height panels.
 - o Provide a constructed sound barrier system with no visible form liner joint seams unless those seams are an integral part of the sound barrier system's aesthetic design. This applies to all components of the sound barrier system (panels, posts, caps, etc.) and applies to both full height and stacked panels designs.
 - o Keep post spacing consistent. Vary only if dictated by engineering design requirements such as drainage features, utilities, etc.
 - o Sound barrier panels and posts are integral parts of the aesthetic design of the sound barrier system. Provide concrete posts. No steel posts are permitted. Provide posts compatible with the panel design in terms of texture, color, acoustical profile, and scale.
 - o Incorporate incidental items such as access doors, fire hose connections, etc. in a manner consistent with the aesthetic aspects of the sound barrier systems

- o Provide caulking and coating materials compatible with the aesthetic aspects and acoustical requirements of the sound barrier system
- o Provide light-tight joints between panels and posts and between panels and caps to preclude acoustical leakage
- o On stacked panel systems, provide light-tight horizontal joints that preclude visible warping and acoustical leakage
- o The anticipated appearance of the completed barrier system, in place, will be criteria for acceptability of the proposed design.
- Provide the same architectural finish, noise abatement characteristics, proof of noise abatement characteristics, heights and lengths to the same limits as indicated for the sound barrier shown on the Conceptual TS&L Plans.
- For structure-mounted sound barrier, check structural adequacy and modify all affected structure components to ensure that service life of the structure or the sound barrier is not jeopardized. These components include barrier; slab; sidewalk (where applicable); beams, diaphragms and bracings; and bearings. Verify structural adequacy of both the structure and sound barrier. Substructure units need not be checked unless they are an integral part of the superstructure.
- Account for bridge deflection magnification at the top of the posts to ensure that panels are adequately restrained within the flange space of the post at the top of the posts under full live load plus impact of the bridge. Conversely, the posts and panels should not be influencing each other thereby causing any damage or future maintenance problems. Connecting panels or posts directly to the bridge barrier using bolts through the barrier is not allowed.
- Provide drainage as indicated on the Conceptual TS&L Plans.
- *(specify other)*

3. Seismic

Site Class *(specify “is” or “is not”)* Class E.

4. Maintenance of Traffic During Construction

(Specify maintenance of traffic requirements related to the sound barrier design and construction or refer to the Special Provision where this information is provided)

5. Inspection and Maintenance Accessibility

Provide inspection and maintenance accessibility as that provided in the Conceptual TS&L Plans. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be binding or alternate means acceptable to the Department.

6. Environmental

Refer to the Special Provision titled ENVIRONMENTAL COMMITMENT AND MITIGATION TRACKING SYSTEM (ECMTS) REPORT.

7. Utilities

Design the sound barrier to accommodate the following utility facilities at the sound barrier:

(List the utility name and type of facility. Specify any geometric or design restrictions - vertical clearance, clearance to footing, etc. - or refer to the Special Provision that contains this information. If there are no utilities that affect the sound barrier wall and construction, indicate "None".)

If utility relocations are required as part of an alternate structure, secure approvals from the affected utility companies.

8. Other

(List any other design requirements not covered in Section II(e)1 through Section II(e)7. If none, indicate "None")

(f) Foundations

1. General - Design the sound barrier units using as-designed geotechnical design parameters and requirements or an alternate foundation type as allowed herein.

2. As-Designed Foundation - Use the following in conjunction with the foundation type(s) shown on the Conceptual TS&L Plans:

2.a. Geotechnical Design Parameters

(List applicable type(s) as follows for use with BD-677M, BD-678M or BD-680M)

2.a.1. Spread Footings:

Foundation design as per BD-677M and/or BD-678M is acceptable where applicable.

Use the following soil/rock parameters for design in lieu of BD-677M / BD-678M or where BD-677M / BD-678M is not applicable.

Allowable Bearing Pressure:

Footing supported on soil: allowable bearing pressure is limited to a maximum of: *(specify value, XX)* tsf

Footing supported on rock; allowable bearing pressure is limited to a maximum of: *(specify value, XX)* tsf

Soil Parameters

Soil Type: *(specify types)*

Average N-value = *(specify value)*

Moist Unit Weight, γ_m = *(specify value)* pcf

Saturated Unit Weight, γ_s = *(specify value)* pcf

Effective Unit Weight, γ' = *(specify value)* pcf

Cohesion, c = *(specify value)*

Effective Internal Friction Angle, ϕ_f = *(specify value)* degrees

Elastic Modulus, E_s = *(specify value)* ksi

Poisson's Ratio, n = *(specify value)*

Rock Parameters

Rock Types: *(specify types)*

Uniaxial Compressive Strength, C_o = *(specify value)* ksf

Average Recovery of Bedrock = *(specify value)*%

Average RQD = *(specify value)*%

Unit Weight, γ = *(specify value)* pcf

Interface Friction Angle, δ = *(specify value)* degrees

Ultimate Bearing Capacity, Q_{ult} = *(specify value)* tsf

Elastic Modulus, E_m = *(specify value)* ksi

Poisson's Ratio, n = *(specify value)*

2.a.2. Drilled Caisson:

Foundation design as per BD-677M / BD-678M is acceptable where applicable; use soil type *(specify type)* for design with the standards.

Use the following soil/rock parameters for design in lieu of BD-677M / BD-678M or where BD-677M / BD-678M is not applicable:

Soil Parameters

Soil Type: *(specify types)*

Average N-value = *(specify value)*

Moist Unit Weight, γ_m = *(specify value)* pcf

Saturated Unit Weight, γ_s = *(specify value)* pcf

Effective Unit Weight, γ' = *(specify value)* pcf

Cohesion, c = *(specify value)*

Effective Internal Friction Angle, ϕ_f = *(specify value)* degrees

Elastic Modulus, E_s = *(specify value)* ksi

Poisson's Ratio, n = *(specify value)*

Rock Parameters

Rock Types: *(specify types)*

Uniaxial Compressive Strength, C_o = *(specify value)* ksf

Average Recovery of Bedrock = *(specify value)*%

Average RQD = *(specify value)*%

Unit Weight, γ = *(specify value)* pcf

Interface Friction Angle, δ = *(specify value)* degrees

Ultimate Bearing Capacity, Q_{ult} = *(specify value)* tsf

Elastic Modulus, E_m = *(specify value)* ksi

Poisson's Ratio, n = *(specify value)*

2.b. Foundation Design Information

(Specify foundation design information that would be important for the Contractor's use in designing the sound barrier)

The BD 677M and BD-678M standard foundation designs are applicable for level ground and consider only footings and caissons on or in soil. The Contractor is required to provide a design if the ground line is sloped.

2.b.1. Spread Footing:

- Coefficient of sliding friction:

Footing supported on soil = *(specify value)*.

Footing supported on rock = *(specify value)*.

- Design spread footing to incorporate the slope of the proposed ground line where applicable.

(Specify others)

2.b.2. Drilled Shaft:

- For shafts extending into bedrock, provide minimum 3-foot rock socket
- The subsurface conditions may vary within the project, which may result in different rock/soil parameters than those listed above. Alternate shaft design is allowed if the soil/rock parameters differ significantly; however, the design parameters must be approved by the Department before alternate design development.

(Specify others)

2.c. Construction Requirements

2.c.1. Subgrade Preparation -Perform *(specify required special subgrade preparation operations or indicate according to the Special Provision (list the applicable Special Provision))*.

2.c.2. Settlement Monitoring -Perform settlement monitoring at *(specify locations or indicate "Not Applicable")* according to the Special Provision "*(specify the applicable Special Provision or indicate "Not Applicable")*".

2.c.3. Other *(specify other construction requirements, if any)*

3. Alternate Foundations

Alternate foundations are allowed as follows:

3.a. Allowable Foundation Types

(Specify allowable alternate foundation types along with geotechnical design parameter limitations for each type)

3.a.1. Geotechnical Design Parameter Limitations

Determine the applicable resistances to be used to design the substructures, limited to the maximum Ultimate Capacities given below. Designs utilizing Ultimate Capacities exceeding the maximum values indicated below will not be accepted.

3.a.2. Spread Footings on Soil

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

3.a.3. Spread Footings on Rock

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

3.a.4. Pile Supported Foundations

Point Bearing Piles

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

End Bearing Piles:

(Provide the capacity based on the applicable controlling mechanism, i.e. structural or geotechnical, respectively, as shown below. Select one of the following)

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

or

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

Friction Piles:

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

3.a.5. Drilled Caisson Supported Foundations

The Ultimate (Geotechnical) Unit Side Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

The Ultimate (Geotechnical) Unit Tip Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

(Specify others)

3.b. Required Geotechnical Exploration

Provide and utilize the following number of borings for the foundation design, at a minimum:

- *(specify number and locations)*

Previously obtained borings as shown on the Conceptual TS&L Plans may be used as a required boring where the boring lies within the footprint of the footing of the sound barrier.

Perform the geotechnical exploration for the sound barrier as described herein and in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications, and identify the publications they supersede)*

3.c. Foundation Submission

Prepare and submit a foundation report in accordance with the requirements of Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP), Section 1.9.4.3. Cost comparisons in accordance with Section 1.9.4.3.1, item (c) are not required.

3.d. Construction Requirements

3.d.1. Subgrade Preparation

(Specify required subgrade preparation or indicate "Not Applicable")

3.d.2. Settlement Monitoring

(Specify locations of required settlement monitoring or indicate "Not Applicable")

3.d.3. Other

(Specify other construction requirements or indicate "Not Applicable")

(g) Submittals

1. Final TS&L Submission

Include the following information in the TS&L submission:

1. Final TS&L submission letter: In accordance with DM-4, PP Section 1.9.3.3.1, item (a).

2. Final TS&L plans: In accordance with DM-4 PP Section 1.9.3.3.1, item (b).

3. Supply the following additional information:

(a) Route and section number, index map and segment/offset of limits

(b) Name of Lead Design Engineer

(c) Design traffic data including current and projected ADTT and class of highways on relevant roads

(d) Date of line and grade approval and design speed (if changes are made to the as-designed vertical and horizontal alignments)

4. Completed applicable Q/A Form D-518, (refer to DM-4, Appendix A).

2. Foundation Submission (As Applicable)

In accordance with DM-4, PP Section 1.9.4.3.1 and Section II(f) of this Special Provision for submittal requirements.

3. Final Structure Plans and Computations

In accordance with DM-4. Include in the Final Structure Plans the Core Boring Logs as provided in the Conceptual Drawings in unmodified form; with the exception of superimposition of sheet numbering consistent with the Final Structure Plans and prominent designation of each sheet as "Information Provided by Others." Sign and seal each plan sheet in accordance with DM-4, PP Section 1.6.3.1, with the exception of the aforementioned Core Boring Logs. Upon completion of Quality Assurance Review, or Owner's Perspective Review, as applicable, and receipt of drawings stamped "Recommended for Construction," provide the Department with one (*Specify: "paper", "linen", "drafting film", "vellum", or "electronic"*) copy for signature by the District Bridge Engineer.

4. Revisions During Construction and As-Built Drawings

In accordance with DM-4, PP Section 1.10.6, except that the Contractor is responsible for making changes to the contract drawings, and making and distributing necessary copies of the revised plans to all affected parties. The following shall replace DM-4, PP Section 1.10.5: "If a design error occurs, the Contractor is fully responsible for the costs associated with providing additional design analysis and construction modifications, acceptable to the Department, to correct the problem. The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item via work order."

Maintain and submit "As-Built" drawings in accordance with Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures, Section 5.7, As-Built Plans, except include major quantity changes (such as foundation pile length changes, etc.).

"As-Built" drawings are the sole responsibility of the Contractor and must be submitted to the District within 3 months of final inspection acceptance as defined in Publication 408, Section 110.08(a).

(h) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as follows:

- Partial Plans Submissions: (*Specify partial plans submission review procedure, or indicate "None"*)
- Utilities: Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

III. MEASUREMENT AND PAYMENT-Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Final TS&L Approval
- Final Plan Approval
- Final Plan - for Signature
- As-Built Drawings

Project Specific Details:

Special Provision: **D82151B - c82151 ITEM 8219-YYYY DESIGN OF SOUNDE
BARRIER WALL (NO AS-DESIGNED FOUNDATION
PROVIDED), S-XXXXX**

Item(s) Associated:

Header:

ITEM 8219-YYYY Design of Sound Barrier Wall (No As-Designed Foundation Provided), S-XXXXX

Provision Body:

I. DESCRIPTION - This work is the design and preparation of construction plans for a sound barrier system of the type indicated on the Department's Conceptual Type, Size, and Location (TS&L) Plans or an alternate sound barrier system. The term “Sound Barrier System” refers to the combination of all components of the recommended noise abatement design, including (but not limited to) sound barrier panels, sound barrier posts, sound barrier caps (separate), sound barrier foundations, and sound barrier textures, colors, and coatings. Preparation of a Final TS&L Submission and a Foundation Submission for the proposed sound barrier type is also required.

II. DESIGN

(a) General

The Department's Conceptual TS&L Plans represent a sound barrier type and layout that will meet safety, geometric, acoustical, visual, and load carrying capacity requirements for the project. A sound barrier type and configuration as that shown on the Conceptual TS&L Plans or an alternate type sound barrier subject to the requirements specified herein may be designed and constructed. Prepare and submit a Final TS&L submission for the proposed sound barrier for review and approval.

Allowable foundation type(s) along with geotechnical design parameter limitations are provided for the sound barrier foundation. Use this information to prepare the foundation submission for the sound barrier.

Provide design and drawings in the units of measurement shown on the Conceptual TS&L Plans.

Provide a complete set of computations for the sound barrier, including the foundation. Provide additional calculations, as requested by the Department's District Bridge Engineer or Chief Bridge Engineer, to evaluate any details throughout the life of the contract.

Structure types, concepts, construction sequencing, or other details that are not covered in the design and construction specifications or standards, or practice not commonly used in Pennsylvania, are allowed only when specifically indicated herein. Where design or construction that deviates from standard Department practice is proposed, submit a conceptual design before the Final TS&L for review and approval. Include in the submittal conceptual plans and a list of items that deviate from standard design and construction, including but not limited to design methodology, the computer program that will be used in the design, construction sequencing, and any specialized construction techniques. No extensions of time will be granted for pursuits of alternates or non-standard designs.

(b) Additional Designer Qualifications

Individuals responsible for acoustical design must have a minimum of 7 years experience in the analysis of highway related noise using appropriate FHWA highway traffic noise modeling techniques on at least 3 individual projects involving the design of sound barrier systems. Individuals must be familiar with FHWA Traffic Noise Model application and PennDOT noise policies and procedures.

(List any additional qualifications necessary for the particular project over and above those listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD or indicate “None”)

(c) Additional Information/Data Made Available to the Contractor by the Department

The following information/data will be made available to the Contractor during the advertisement period: *(List the following, as applicable)*

- Test Boring Core Boxes: Test boring core boxes are available for inspection at *(specify location)*. Contact *(specify name and telephone number of person)* to arrange for a date and time to inspect the core boxes.
- The **(Insert date)** and *(Preliminary or Final)* Design Noise Report as well as any modifications suggested by The Department which have been developed since that time.
- FHWA TMN data files.
- *(List any other information/data that will be furnished)*

(d) Design Specifications

Develop the Final TS&L and prepare the sound barrier construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications, and Publication 24, Project Level Highway Traffic Noise Handbook. *(List any additional publications, and identify the publications they supersede)*

(e) Design Requirements

1. General

(List general requirements. Include the following, as applicable)

- Gaps that allow light to pass through any joints or seams are not allowed.
- *(specify other, such as requirements for access, hydrants, etc.)*

2. Alternate Sound Barrier Designs

2.a. Allowable Sound Barrier Types:

(List allowable alternate sound barrier types)

2.b. Geometry

Design the sound barrier system according to the geometrics shown on the Conceptual TS&L Plans. The horizontal and/or vertical configuration of the sound barrier system may be modified provided that:

- The line of sight break provided by the sound barrier system for any benefited residence is not reduced from that provided by the recommended barrier system, identified as Barrier Option *(insert option designation)* in Table *(insert Table designation)* of the *(insert date)* Final Design Noise Report, AND
- The noise level provided by the sound barrier system at any benefited residence is not reduced from that provided by the recommended barrier system identified as Barrier Option *(insert option designation)* in Table *(insert Table designation)* of the *(insert date)* Final Design Noise Report.

2.c. Other Requirements

- Alternate sound barrier designs that depart from the details shown on the Standard Drawings must be pre-approved before bidding.
- Provide a sound barrier system with a top of barrier profile as smooth and consistent as possible, using the following guidance:
 - o Stepped panels will be used. When using stepped rectangular sound wall panels, step panels in a uniform manner. For example, rather than having three level panels followed by a one-foot step, have four panels, each with 3 inch steps.
 - o For rectangular sound wall panels, keep steps at a maximum of 6 inches.
 - o For rectangular sound wall panels, transition uniformly from level sections or between steps of various dimensions. For example 6" step, 6" step, 6" step, 4" step, 2" step, 2" step, 2" step, 2" step, ; or level section, 2" step, 4" step, 6" step, 6" step, 6" step,
 - o Do not construct sound walls less than 5 feet in height above the finished ground elevation.

- Provide a sound barrier system with an aesthetic design that is compatible with the structural and engineering aspects of the sound barrier system design applying the following guidance:
 - o Ensure that systems utilizing stacked panels that the joint(s) between stacked panels is consistent with the specific aesthetic design pattern of the sound barrier. This consistency applies not just to the panels between two posts but between all panel sections within the sound barrier system. Do not intersperse full height and stacked panels on a continuous section of a sound barrier system. If such consistency cannot be assured, use full height panels.
 - o Provide a constructed sound barrier system with no visible form liner joint seams unless those seams are an integral part of the sound barrier system's aesthetic design. This applies to all components of the sound barrier system (panels, posts, caps, etc.) and applies to both full height and stacked panels designs.
 - o Keep post spacing consistent. Vary only if dictated by engineering design requirements such as drainage features, utilities, etc.
 - o Sound barrier panels and posts are integral parts of the aesthetic design of the sound barrier system. Provide concrete posts. No steel posts are permitted. Provide posts compatible with the panel design in terms of texture, color, acoustical profile, and scale.
 - o Incorporate incidental items such as access doors, fire hose connections, etc. in a manner consistent with the aesthetic aspects of the sound barrier systems.
 - o Provide caulking and coating materials compatible with the aesthetic aspects and acoustical requirements of the sound barrier system.
 - o Provide light-tight joints between panels and posts and between panels and caps to preclude acoustical leakage.
 - o On stacked panel systems, provide light-tight horizontal joints that preclude visible warping and acoustical leakage.
 - o The anticipated appearance of the completed barrier system, in place, will be criteria for acceptability of the proposed design.
- For structure-mounted sound barrier, check structural adequacy and modify all affected structure components to ensure that service life of the structure or the sound barrier is not jeopardized. These components include barrier; slab; sidewalk (where applicable); beams, diaphragms and bracings; and bearings. Verify structural adequacy of both the structure and sound barrier. Substructure units need not be checked unless they are an integral part of the superstructure.
- Account for bridge deflection magnification at the top of the posts to ensure that panels are adequately restrained within the flange space of the post at the top of the posts under full live load plus impact of the bridge. Conversely, the posts and panels should not be influencing each other thereby causing any damage or future maintenance problems. Connecting panels or posts directly to the bridge barrier using bolts through the barrier is not allowed.
- Provide drainage as indicated on the Conceptual TS&L Plans.
- *(specify other)*

3. Seismic

Site Class *(specify "is" or "is not")* Class E.

4. Maintenance of Traffic During Construction

(Specify maintenance of traffic requirements related to the sound barrier design and construction or refer to the Special Provision where this information is provided)

5. Inspection and Maintenance Accessibility

Provide inspection and maintenance accessibility as that provided in the Conceptual TS&L Plans. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be binding alternate means acceptable to the Department.

6. Environmental

Refer to the Special Provision titled ENVIRONMENTAL COMMITMENT AND MITIGATION TRACKING SYSTEM (ECMTS).

7. Utilities

Design the sound barrier to accommodate the following utility facilities at the sound barrier:

(List the utility name and type of facility. Specify any geometric or design restrictions - vertical clearance, clearance to footing, etc. - or refer to the Special Provision that contains this information. If there are no utilities that affect the sound barrier and construction, indicate "None".)

If utility relocations are required as part of an alternate structure, secure approvals from the affected utility companies.

8. Other

(List any other design requirements not covered in Section II(e)1 through Section II(e)7. If none, indicate "None")

(f) Foundations

1. General - A (*specify "limited" or "comprehensive"*) subsurface exploration has been performed for this project. The subsurface exploration data, in conjunction with foundation requirements specified herein, should be used to develop the foundation design parameters. A foundation submission is required.

2. Allowable Foundation Types

Allowable foundation types are as follows:

(Specify allowable foundation types e.g. caissons, spread footing on soil, etc. - along with geotechnical design parameter limitations for each type)

(Specify foundation design information that would be important for the Contractor's use in designing the sound barrier)

2.a. Spread Footings:

Foundation design as per BD-677M / BD-678M is acceptable where applicable.

The BD 677M and BD-678M standard foundation designs are applicable for level ground and consider only footings and caissons on or in soil. Provide a design if the ground line is sloped.

Use the following soil/rock parameters for design in lieu of BD-677M / BD-678M or where BD-677M / BD-678M is not applicable.

Allowable Bearing Pressure:

Footing supported on soil: Allowable bearing pressure is limited to a maximum of *(specify value, XX)* tsf

Footing supported on rock: Allowable bearing pressure is limited to a maximum of *(specify value, XX)* tsf

Soil Parameters

Soil Type: *(specify types)*

Average N-value = *(specify value)*

Moist Unit Weight, γ_m = *(specify value)* pcf

Saturated Unit Weight, γ_s = *(specify value)* pcf

Effective Unit Weight, γ' = *(specify value)* pcf

Cohesion, c = *(specify value)*

Effective Internal Friction Angle, ϕ_f = *(specify value)* degrees

Elastic Modulus, E_s = *(specify value)* ksi

Poisson's Ratio, n = *(specify value)*

Rock Parameters

Rock Types: *(specify types)*

Uniaxial Compressive Strength, C_o = *(specify value)* ksf

Average Recovery of Bedrock = *(specify value)*%

Average RQD = *(specify value)*%

Unit Weight, γ = *(specify value)* pcf

Interface Friction Angle, δ = *(specify value)* degrees

Ultimate Bearing Capacity, Q_{ult} = *(specify value)* tsf

Elastic Modulus, E_m = *(specify value)* ksi

Poisson's Ratio, n = *(specify value)*

- Coefficient of sliding friction:

Footing supported on soil = *(specify value)*.

Footing supported on rock = *(specify value)*.

- Design spread footing to incorporate the slope of the proposed ground line where applicable.

(Specify others)

2.b. Drilled Caisson:

Foundation design as per BD-677M and/or BD-678M is acceptable where applicable; use soil type *(specify type)* for design with the standards.

The BD 677M and BD-678M standard foundation designs are applicable for level ground and consider only footings and caissons on or in soil. Provide a design if the ground line is sloped.

Use the following soil/rock parameters for design in lieu of BD-677M / BD-678M or where BD-677M / BD-678M is not applicable:

Soil Parameters

Soil Type: *(specify types)*

Average N-value = *(specify value)*

Moist Unit Weight, γ_m = *(specify value)* pcf

Saturated Unit Weight, γ_s = *(specify value)* pcf

Effective Unit Weight, γ' = *(specify value)* pcf

Cohesion, c = *(specify value)*

Effective Internal Friction Angle, ϕ_f = *(specify value)* degrees

Elastic Modulus, E_s = *(specify value)* ksi

Poisson's Ratio, n = *(specify value)*

Rock Parameters

Rock Types: *(specify types)*

Uniaxial Compressive Strength, C_o = *(specify value)* ksf

Average Recovery of Bedrock = *(specify value)*%

Average RQD = *(specify value)*%

Unit Weight, γ = *(specify value)* pcf

Interface Friction Angle, δ = *(specify value)* degrees

Ultimate Bearing Capacity, Q_{ult} = *(specify value)* tsf

Elastic Modulus, E_m = *(specify value)* ksi

Poisson's Ratio, n = *(specify value)*

- For shafts extending into bedrock, provide minimum 3-foot rock socket.
- The subsurface conditions may vary within the project, which may result in different rock/soil parameters than those listed above. Alternate shaft design is allowed if the soil/rock parameters differ significantly; however, the design parameters must be approved by the Department before alternate design development.

(Specify others)

3. Required Geotechnical Exploration

Provide and utilize the following number of borings for the foundation design, at a minimum:

- *(specify number and locations)*

Previously obtained borings as shown on the Conceptual TS&L Plans may be used as a required boring where the boring lies within the footprint of the footing of the sound barrier.

Perform the geotechnical exploration for the sound barrier as described herein and in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications, and identify the publications they supersede)*

4. Laboratory Testing

(Specify required Laboratory Testing)

5. Foundation Submission

Prepare and submit a foundation report according the requirements of Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP), Section 1.9.4. Cost comparisons per Section 1.9.4.3.1, item (c) are not required.

6. Construction Requirements

6.a. Subgrade Preparation

(Specify required subgrade preparation or indicate "Not Applicable")

6.b. Settlement Monitoring

(Specify locations of required settlement monitoring or indicate "Not Applicable")

6.c. Other

(Specify other construction requirements or indicate "Not Applicable")

(g) Submittals

1. Final TS&L Submission

Include the following information in the TS&L submission:

1. Final TS&L submission letter: In accordance with DM-4, PP Section 1.9.3.3.1, item (a).

2. Final TS&L plans: In accordance with DM-4, PP Section 1.9.3.3.1, item (b).

3. Supply the following additional information:

(a) Route and section number, index map and segment/offset of limits

(b) Name of Lead Design Engineer

(c) Design traffic data including current and projected ADTT and class of highways on relevant roads

(d) Date of line and grade approval and design speed (if changes are made to the as-designed vertical and horizontal alignments)

4. Completed applicable Q/A Form D-518 (refer to DM-4, Appendix A).

2. Foundation Submission (As Applicable)

In accordance with DM-4, PP Section 1.9.4.3.1 and Section II(f) of this Special Provision for submittal requirements.

3. Final Structure Plans and Computations

In accordance with DM-4. Include in the Final Structure Plans the Core Boring Logs as provided in the Conceptual Drawings in unmodified form; with the exception of superimposition of sheet numbering consistent with the Final Structure Plans and prominent designation of each sheet as "Information Provided by Others." Sign and seal each plan sheet in accordance with DM-4, PP Section 1.6.3.1, with the exception of the aforementioned Core Boring Logs. Upon completion of Quality Assurance Review, or Owner's Perspective Review, as applicable, and receipt of drawings stamped "Recommended for Construction," provide the Department with one (*Specify: "paper", "linen", "drafting film", "vellum", or "electronic"*) copy for signature by the District Bridge Engineer.

4. Revisions During Construction and As-Built Drawings

In accordance with DM-4, PP Section 1.10.6, except that the Contractor is responsible for making changes to the contract drawings, and making and distributing necessary copies of the revised plans to all affected parties. The following shall replace DM-4, PP Section 1.10.5: "If a design error occurs, the Contractor is fully responsible for the costs associated with providing additional design analysis and construction modifications, acceptable to the Department, to correct the problem. The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item via work order."

Maintain and submit "As-Built" drawings in accordance with Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures, Section 5.7, As-Built Plans, except include major quantity changes (such as foundation pile length changes, etc).

"As-built" drawings are the sole responsibility of the Contractor and must be submitted to the District within 3 months of final inspection acceptance as defined in Publication 408, Section 110.08(a).

(h) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as follows;

- Partial Plans Submissions: *(Specify partial plans submission review procedure or indicate "None")*
- Utilities: Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

III. MEASUREMENT AND PAYMENT-Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Final TS&L Approval
- Foundation Approval
- Final Plan Approval
- Final Plan - for Signature
- As-Built Drawings

Project Specific Details:

Special Provision: **D82160B - c82160 ITEM 8216-YYYY DESIGN OF REHABILITATION AND/OR WIDENING OF BRIDGE STRUCTURE (AS-DESIGNED...**

Item(s) Associated:

Header:

ITEM 8216-YYYY Design of Rehabilitation and/or Widening of Bridge Structure (As-Designed Foundation Provided), S-xxxxxx

Provision Body:

I. DESCRIPTION – This work is the design and preparation of construction plans for bridge rehabilitation work as indicated on the Department's Conceptual Type Size and Location (TS&L) Plans. Widening of the bridge is also included, when specified. Preparation of a Final TS&L Submission for the proposed work is required.

II. DESIGN

(a) General

The Department's Conceptual TS&L Plans represent the required work that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. Alternate methods of meeting the designated rehabilitation work may be used subject to the requirements specified herein. Prepare and submit a Final TS&L submission for the proposed work for review and approval.

Foundation type(s) along with geotechnical design parameters are provided for the structure foundation. Use this foundation type(s) and design parameters (hereinafter referred to as "as-designed") to design the substructure units or develop an alternate foundation type and design parameters subject to the limitations specified.

Provide design and drawings in the units of measurement shown on the Conceptual TS&L Plans.

Provide a complete set of computations for superstructure and substructure, including the foundation. Provide additional calculations, as requested by the Department's District Bridge Engineer or Chief Bridge Engineer, to evaluate any details throughout the life of the contract.

Verify that an oversize and/or overweight permit can be issued for superloads before incorporating them into a design. Submit verification documentation with the Final TS&L submission.

Structure types, concepts, construction sequencing, or other details that are not covered in the design and construction specifications or standards, or practice not commonly used in Pennsylvania are allowed only when specifically indicated herein. Where design or construction that deviates from standard Department practice is proposed, submit a conceptual design before the Final TS&L for review and approval. Include in the submittal conceptual plans and a list of items that deviate from standard design and construction, including but not limited to design methodology, the computer program that will be used in the design, construction sequencing, and any specialized construction techniques. No extensions of contract time will be granted for pursuits of alternates or non-standard designs.

(b) Additional Designer Qualifications

(List any additional qualifications necessary for the particular project over and above those listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD or indicate “None”)

(c) Additional Information/Data Made Available to the Contractor by the Department

The following information/data will be made available to the Contractor during the advertisement period: *(List the following, as applicable)*

- Test Boring Core Boxes: Test boring core boxes are available for inspection at *(specify location)*. Contact *(list name and telephone number of person)* to arrange for a date and time to inspect the core boxes.
- *(List any other information/data that will be furnished)*

(d) Design Specifications

Develop the Final TS&L and prepare the structure construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications not listed in the Special Provision titled SPECIAL BIDDING-DESIGN-BUILD, and identify the publications they supersede)*

(e) Design Requirements

1. General

(List general requirements. Include the following, as applicable)

- Slip-formed barriers *(are/are not)* allowed.
- Lightweight concrete *(is/is not)* allowed.
- Do not use the BLC Standard Drawings.
- Do not use precast bridge barriers
- Barrier type differing from that shown on the Conceptual TS&L *(is/is not)* allowed. *(Specify acceptable alternate barrier type(s) if applicable)*
- *(specify other)*

2. Geometry

Design the structure according to the geometrics shown on the Conceptual TS&L Plans, except changes will be allowed as follows:

- Substructure Unit Locations: *(Specify allowable changes or indicate “No Change Allowed”)*

- Bridge Length: *(Specify allowable changes or indicate "No Change Allowed")*
- Lane, Shoulder, and Sidewalk Widths: *(Specify allowable changes or indicate "No Change Allowed")*
- Staged Construction Requirements: *(Specify allowable changes / criteria such as those given below, or indicate "No Changes Allowed")*
 - o Allow for staged construction while maintaining *(specify number)* lanes of vehicular traffic during all stages of construction.
 - o Minimum temporary lane widths of *(specify value)* are required.
 - o Provide a maximum of *(specify number)* longitudinal construction joint(s) in the deck slab. The longitudinal construction joint must be positioned within the *(specify criteria. For example "middle 1/3", or "middle 1/2")* width of the top flange of a beam.
 - o *(Specify other)*

3. Seismic

Site Class *(specify "is" or "is not")* Class E.

Design the connection force effect in the restrained directions between the superstructure and substructure as 0.25 times the vertical reaction due to the tributary permanent load.

4. Superstructure

Incorporate the following requirements into the superstructure design: *(Specify requirements and limitations. Include the following as applicable)*

- Do not use less than *(specify number)* girders in the superstructure. Use more girders if required for future redecking.
- Deck Expansion Joints: *(Specify number and locations of allowable expansion joints)*
- Approach Slabs: *(Specify type, length, width, and/or other requirements for the approach slabs).*
- Precast panel forms for placing the concrete deck slab in lieu of metal stay-in-place forms *(are/are not)* allowed.
- Provide live load ratings with *(and without)* future wearing surface.
- For steel girder designs, do not include longitudinal stiffeners in computing the steel section properties.
- For prestressed concrete beam designs, prestressed concrete beam sections differing significantly from the standards specified herein will be considered as nonstandard sections subject to the requirements of Publication 408, Section 1107.03(a)4. Do not deviate from the minimum flange and web thickness or section properties shown in the Bridge Design Standard Drawings.
- Provide provisions for future jacking of superstructure for bearing repair or replacement. *(Delete if not needed)*
- *(specify other)*

5. Substructure

Incorporate the following requirements into the substructure design: *(Specify requirements and limitations. Include the following, as applicable)*

- MSE abutments or wingwalls **(are/are not)** allowed.
- Precast modular retaining walls **(are/are not)** allowed. Design will utilize the existing abutments.
- Do not change the number or location of substructure units.
- Repair or replace any damage to the substructure beyond the removal area caused by the Contractor's operations at no cost to the Department.
- Maintain fixity and expansion configuration of the existing structure.
- Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP) Section 5.5.5.2 is waived if the total proposed superstructure dead load is within **(specify criteria +XX% -YY%)** of the **(specify “existing” or “Conceptual TS&L”)** superstructure dead load and if bearing fixities match existing.
- **(specify other)**

6. Temporary Bridges

(Specify design and construction requirements for temporary bridges or refer to the Special Provision where this information is provided. If temporary bridges are not applicable, indicate “Not Applicable”.)

7. Maintenance of Traffic During Construction

(Specify maintenance of traffic requirements related to the bridge design and construction or refer to the Special Provision where this information is provided)

8. Railroad Requirements

(If the bridge is not over or adjacent to a railroad, indicate “Not Applicable”.)

Design the structure to meet the following railroad requirements:

- Minimum Horizontal Clearance: **(specify value or indicate “Not Applicable”)**
- Minimum Vertical Clearance: **(specify value or indicate “Not Applicable”)**
- Temporary Support for Railroad Tracks: **(specify requirements, refer to the Special Provision where this information is provided, or indicate “Not Applicable”)**
- Other **(specify other requirements, as applicable, such as catenary involvement, shielding, temporary clearances, etc.)**

9. Future Widening Requirements

In addition to DM-4 requirements, incorporate the following future widening provisions into the design: **(Specify geometric, design, and construction requirements or indicate “None”)**

10. Future Redecking Requirements

In addition to the requirements in DM-4, incorporate the following future redecking provisions into the design: *(Specify requirements or indicate “None”. Include the following, as applicable)*

- Allow for redecking in staged construction while maintaining *(specify number)* lanes of vehicular traffic during all stages of construction.
- Minimum lane widths of *(specify value)* are required.
- Design beams to carry standard design live loads at all stages of redecking.
- Allow for a maximum of *(specify number)* longitudinal construction joint(s) in the deck slab. The longitudinal construction joint must be positioned within the width of the top flange of a beam.
- Maintenance of pedestrian traffic *(is/is not)* required during future redecking. *(If pedestrian traffic is to be maintained, specify minimum travelway width and barrier protection requirements)*
- The superstructure and substructure must be designed to meet all Strength and Service Limit States for the specified future staging shown on the Conceptual TS&L *(as applicable)*.

11. Inspection and Maintenance Accessibility

Provide inspection and maintenance accessibility equivalent to that provided in the Conceptual TS&L Plans, or alternate means acceptable to the Department. In case of a disagreement on accessibility, the Chief Bridge Engineer’s decision will be binding.

12. On-Bridge Lighting

(Specify on-bridge lighting requirements. Indicate whether lighting locations shown on the Conceptual TS&L Plans may or may not be changed. If there is no on-bridge lighting, indicate “None”.)

13. Waterway Requirements

(If the bridge is not over a waterway, indicate “Not Applicable”.)

Incorporate the following waterway requirements into the bridge design and construction:

13.a. Structure Shown on the Conceptual TS&L:

(For contracts which provide an approved waterway permit for the Conceptual TS&L structure, include the following three bullets; otherwise delete the following three bullets:)

- An approved waterway permit for the Conceptual TS&L structure is provided – see *(refer to the specific permit here)*. Comply with all requirements of the approved permit(s), or obtain approval for permit modifications from the appropriate DEP office. Additional time will not be provided for permit modifications. Do not start construction work until approval for waterway permit modifications, if applicable, is obtained.
- *(Specify waterway-related design and construction requirements for the structure in which a waterway permit was obtained. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans.)*
- If the waterway permit obtained by the Department includes a causeway permit, be responsible for obtaining any causeway permit amendments necessary due to change of causeway design during final design and/or construction.

(For contracts where waterway permit acquisition is a Design-Build activity, include the following bullet(s) and 13.a.1 through 13.a.5; otherwise delete through 13.a.5:)

- Obtain approved waterway permit(s) for the project. Comply with all requirements of the approved permit(s). Refer to the special provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permits are obtained.
- *(Specify waterway-related design and construction requirements for which the waterway permit materials will be prepared. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans, such as temporary pipes, causeway, etc.)*

13.a.1. Hydraulic Analysis:

(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other.)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure have been approved by the Department. Prepare and submit for approval the appropriate waterway permit(s) using the provided H&H documents and in accordance with the conditions of the permit.

(or)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure prepared by the Department are preliminary and for information purposes only. Prepare, submit, and obtain approval on the final Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10. Prepare and submit for approval the appropriate waterway permit(s) using the final H&H documents and in accordance with the conditions of the permit.

13.a.2. Scour Analysis: *(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other)*

- Included in the provided H&H documents.

(or)

- Scour Analysis is preliminary and for information purposes only. Prepare Scour Analysis in conjunction with final H&H documents.

13.a.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.a.4. Permits: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.a.5. Other *(List any other requirements)*

13.b. Alternate Structure

(Specify waterway-related design and construction requirements for alternate structures. If the bridge is not over a waterway, indicate "Not Applicable")

- Obtain approved/amended waterway permit(s) for alternate structures. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permits are obtained.
- Alternate Structures with low chord elevations less than the Conceptual TS&L structure may be used, dependent upon approved hydraulic analyses, and provided that the water surface elevations are less than the Conceptual TS&L.
- Do not increase the water surface elevations for the *(INSERT APPLICABLE FLOOD YEAR(S))* year storms above those given for the Conceptual TS&L.
- If the Conceptual TS&L structure impacts wetlands, no additional wetland impacts will be allowed for alternate structure types.

13.b.1. Hydraulic Analysis

(Specify hydraulic analysis requirements for alternate structures. Address requirements for the completed bridge and construction conditions such as temporary pipes, causeway, etc.)

- Hydrologic and Hydraulic Report. Prepare, submit, and obtain approval on a revised Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10.

13.b.2. Scour Analysis *(Specify additional project specific scour requirements)*

13.b.3. FEMA and NEPA Coordination - In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.b.4. Permits In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.b.5. Other *(List any other requirements)*

14. Environmental

Refer to the Special Provision titled ENVIRONMENTAL COMMITMENT AND MITIGATION TRACKING SYSTEM (ECMTS) REPORT.

15. Utilities

Refer to the Conceptual TS&L Plans for general utility details and a listing of required on-bridge utility materials, and material acquisition and installation responsibilities.

Design the bridge structure to accommodate the following utility facilities on, under, or above the bridge:

(List the utility name and type of facility. Specify whether the utility facility is on, under, above or near the bridge. Also, specify any geometric or design restrictions - vertical clearance, clearance to footing, etc. - or refer to the Special Provision that contains this information. If there are no utilities that affect the bridge design and construction, indicate "None".)

If utility relocations are required as part of an alternate structure, obtain approvals from the affected utility companies.

16. Other

(List any other design requirements not covered in Section II(e)1 through Section II(e)15. If none, indicate "None")

(f) Foundations

1. General - Design the substructure units using as-designed geotechnical design parameters and requirements or an alternate foundation type as allowed herein.

2. As-Designed Foundation - Use the following in conjunction with the foundation type(s) shown on the Conceptual TS&L Plans:

2.a. Geotechnical Design Parameters *(list applicable type(s) as follows)*

2.a.1. Spread Footings on Soil: *(List for each substructure unit, as applicable)*

Resistance Factor for Bearing, ϕ_b : *(specify value)*

Resistance Factor for Sliding, ϕ_τ : *(specify value)*

Number of Soil Layers: *(specify number)*

(Specify data for each layer in applicable units of measurement)

Layer Number: *(specify number)*

Soil Type: *(specify type)*

Soil Layer Thickness: *(specify value)*

Layer Limits: From Elevation *(specify value)*

To Elevation *(specify value)*

Moist Unit Weight/Density: *(specify value)*

Saturated Mass Unit Weight/Density: *(specify value)*

Cohesion, c : *(specify value)*

Elastic Modulus: *(specify value)*

Poisson's Ratio: *(specify value)*

Effective Internal Friction Angle, ϕ_f : *(specify value)*

N_{cq} : *(specify value or indicate "Not Applicable")*

$N_{\gamma q}$: *(specify value or indicate "Not Applicable")*

Maximum Allowable Settlement: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

2.a.2. Spread Footing on Rock:*(List for each substructure unit, as applicable)*

Ultimate Bearing Capacity, q_{ult} : *(specify value)*

Allowable Settlement: *(specify value)*

Resistance Factor for Bearing ϕ_b : *(specify value)*

Resistance Factor for Sliding ϕ_τ : *(specify value)*

Rock Quality Designation, RQD: *(specify value)*

Uniaxial Compressive Strength, C_o : *(specify value)*

Concrete /Rock Friction Angle: *(specify value)*

Elastic Modulus, E: *(specify value)*

Poisson's Ratio: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

2.a.3. Pile Supported Footings:*(List for each substructure unit, as applicable)*

Pile Size: *(specify pile type and size)*

Pile Tip Reinforcement: *(specify "Required" or "Not Required")*

Service Axial Capacity: *(specify value)*

Strength Axial Capacity: *(specify value)*

Extreme Event Axial Capacity: *(specify value)*

Service Lateral Capacity: Weak Axis *(specify value)*

 Strong Axis *(specify value)*

Strength Lateral Capacity: Weak Axis *(specify value)*

 Strong Axis *(specify value)*

Extreme Event Lateral Capacity: Weak Axis *(specify value)*

 Strong Axis *(specify value)*

Strength Allowable Uplift: *(specify value)*

Extreme Event Allowable Uplift: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

Estimated Pile Tip Elevation: Refer to the Conceptual TS&L Plans

2.a.4. Drilled Caisson Supported Footings: *(List for each substructure unit, as applicable)*

Shaft Diameter: *(specify value)*

Rock Socket Diameter: *(specify value)*

Service Axial Capacity: *(specify value)*

Strength Axial Capacity: *(specify value)*

Extreme Event Axial Capacity: *(specify value)*

Service Lateral Capacity: *(specify value)*

Strength Lateral Capacity: *(specify value)*

Extreme Event Lateral Capacity: *(specify value)*

Strength Allowable Uplift: *(specify value)*

Extreme Event Allowable Uplift: *(specify value)*

Bottom of Footing Elevation: Refer to the Conceptual TS&L Plans

Estimated Length of Shaft in Soil: Refer to the Conceptual TS&L Plans

Estimated Length of Shaft in Rock: Refer to the Conceptual TS&L Plans

Estimated Length of Rock Socket: Refer to the Conceptual TS&L Plans

2.b. Foundation Design Information

(Specify foundation design information that would be important for the Lead Design Engineer's use in designing the substructure units)

2.c. Construction Requirements

2.c.1. Test Piles

- Provide a minimum of *(specify number or indicate "Not Applicable")* test piles at each abutment
- Provide a minimum of *(specify number or indicate "Not Applicable")* test piles at each pier.

2.c.2. Subgrade Preparation - Perform *(specify required special subgrade preparation operations or indicate "Not Applicable")* according to the Special Provision *(list the applicable Special Provision)*.

2.c.3. Pile Dynamic Analysis – Perform pile dynamic analysis on the test piles at *(list locations or indicate "Not Applicable")* according to the Special Provision *"(specify the applicable Special Provision or indicate "Not Applicable")"*.

2.c.4. Load Tests – Perform *(specify the number and locations, or indicate "Not Applicable")* pile load test according to the Special Provision *"(specify the applicable Special Provision or indicate "Not Applicable")"*.

2.c.5. Settlement Monitoring – Perform settlement monitoring at *(specify locations or indicate "Not Applicable")* according to the Special Provision *"(specify the applicable Special Provision or indicate "Not Applicable")"*.

2.c.6. Other *(specify other construction requirements, if any)*

3. Alternate Foundations

Alternate foundations are allowed as follows:

3.a. Allowable Foundation Types

(Specify allowable foundation types - e.g., piles, spread footing on rock micro piles, etc. - along with geotechnical design parameter limitations for each type)

3.a.1. Geotechnical Design Parameter Limitations

Determine the applicable resistances to be used to design the substructures, limited to the maximum Ultimate Capacities given below. Designs utilizing Ultimate Capacities exceeding the maximum values indicated below will not be accepted.

3.a.2. Spread Footings on Soil

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

3.a.3. Spread Footings on Rock

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

3.a.4. Pile Supported Foundations

Point Bearing Piles

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

End Bearing Piles:

(Provide the capacity based on the applicable controlling mechanism, i.e. structural or geotechnical, respectively, as shown below. Select one of the following)

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

or

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

Friction Piles:

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

3.a.5. Drilled Caisson Supported Foundations

The Ultimate (Geotechnical) Unit Side Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

The Ultimate (Geotechnical) Unit Tip Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

3.b. Required Geotechnical Exploration

Provide and utilize the following number of borings for the foundation design, at a minimum:

- Abutments – *(specify number)*
- Piers - *(specify number)*

Previously obtained borings as shown on the Conceptual TS&L Plans may be used as a required boring where the boring lies within the footprint of the footing of the substructure unit.

Perform the geotechnical exploration for the bridge structure as described herein and in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications, and identify the publications they supersede)*

3.c. Foundation Submission

Prepare and submit a foundation report in accordance with the requirements of DM-4, PP Section 1.9.4.3. Cost comparisons in accordance with Section 1.9.4.3.1, item (c) are not required.

3.d. Construction Requirements

3.d.1. Test Piles

(Specify minimum number of test piles or indicate “Not Applicable”)

3.d.2. Subgrade Preparation

(Specify required subgrade preparation or indicate “Not Applicable”)

3.d.3. Pile Dynamic Analysis

(Specify locations of required pile dynamic analysis or indicate “Not Applicable”)

3.d.4. Load Tests

(Specify locations of required load tests or indicate “Not Applicable”)

3.d.5. Settlement Monitoring

(Specify locations of required settlement monitoring or indicate “Not Applicable”)

3.d.6. Other

(Specify other construction requirements or indicate “Not Applicable”)

(g) Submittals

1. Final TS&L Submission

Include the following information in the TS&L submission:

1. Final TS&L submission letter: In accordance with DM -4, PP Section 1.9.3.3.1, item (a).
2. Final TS&L plans: In accordance with DM -4, PP Section 1.9.3.3.1, item (b).

3. Supply the following additional information:

(a) Route and section number, index map and segment/offset of limits

(b) Name of Lead Design Engineer

(c) Design traffic data including current and projected ADTT and class of highways on relevant roads

(d) Date of line and grade approval and design speed (if changes are made to the as-designed vertical and horizontal alignments)

(e) Copy of the H&H analysis submitted to the Department of Environmental Protection if the Contractor obtains the waterway permit(s) or if an amendment to the waterway permit(s) is necessary

4. Completed applicable Q/A Forms D-501, D-502, D-503, and/or D-504 (refer to DM-4 Appendix A).

Approval of the Final TS&L is contingent upon approval of the waterway permit(s) by the Department of Environmental Protection, as applicable.

2. Waterway (As Applicable)

In accordance with Section II(e)13 of this Special Provision.

3. Foundation Submission (As Applicable)

In accordance with DM-4, PP Section 1.9.4.3.1 and Section II(f) of this Special Provision for submittal requirements.

4. Final Structure Plans and Computations

In accordance with DM-4. Include in the Final Structure Plans the Core Boring Logs as provided in the Conceptual Drawings in unmodified form; with the exception of superimposition of sheet numbering consistent with the Final Structure Plans and prominent designation of each sheet as "Information Provided by Others." Sign and seal each plan sheet in accordance with DM-4, PP Section 1.6.3.1, with the exception of the aforementioned Core Boring Logs. Upon completion of Quality Assurance Review, or Owner's Perspective Review, as applicable, and receipt of drawings stamped "Recommended for Construction," provide the Department with one (*Specify: "paper", "linen", drafting film", "vellum" or "electronic"*) copy for signature by the District Bridge Engineer.

5. Revisions During Construction and As-Built Drawings

In accordance with DM-4, PP Section 1.10.6, except that the Contractor is responsible for making changes to the contract drawings, and making and distributing necessary copies of the revised plans to all affected parties. The following shall replace DM-4 PP Section 1.10.5: "If a design error occurs, the Contractor is fully responsible for the costs associated with providing additional design analysis and construction modifications, acceptable to the Department, to correct the problem. The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item via work order."

Maintain and submit "As-Built" drawings in accordance with Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures, Section 5.7, As-Built Plans, except include major quantity changes (such as foundation pile length changes, etc.).

All "As-Built" drawings are the sole responsibility of the Contractor and must be submitted to the District within 3 months of final inspection acceptance as defined in Publication 408, Section 110.08(a).

(h) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as follows;

- Partial Plans Submissions: *(Specify partial plans submission review procedure, or indicate "None")*
- Utilities: Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

III. MEASUREMENT AND PAYMENT—Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Final TS&L Approval
- Final Plan Approval – Substructure
- Final Plan Approval – Superstructure
- Final Plan – for Signature
- As-Built Drawings

Project Specific Details:

Special Provision: **D82170B - c82170 ITEM 8217-YYYY DESIGN OF**

REHABILITATION AND/OR WIDENING OF BRIDGE STRUCTURE (NO...

Item(s) Associated:

Header:

ITEM 8217-YYYY Design of Rehabilitation and/or Widening of Bridge Structure (No-As Designed Foundation Provided), S-xxxxx

Provision Body:

I. DESCRIPTION - This work is the design and preparation of construction plans for bridge rehabilitation work as indicated on the Department's Conceptual Type, Size, and Location (TS&L) Plans. Widening of the bridge is also included, when specified. Preparation of a Final TS&L Submission and, as applicable, a Foundation Submission for the proposed work is required.

II. DESIGN

(a) General

The Department's Conceptual TS&L Plans represent the required work that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. Alternate methods of meeting the designated rehabilitation work may be used subject to the requirements specified herein. Prepare and submit a Final TS&L submission for the proposed work for review and approval.

Allowable foundations type(s) along with geotechnical design parameter limitations are provided for the structure foundation. Use this information to prepare the foundation submission for the structure.

Provide design and drawings in the units of measurement shown on the Conceptual TS&L Plans.

Provide a complete set of computations for superstructure and substructure, including the foundation. Provide additional calculations, as requested by the Department's District Bridge Engineer or Chief Bridge Engineer, to evaluate any details throughout the life of the contract.

Verify that an oversize and/or overweight permit can be issued for superloads before incorporating them into a design. Submit verification documentation with the Final TS&L submission.

Structure types, concepts, construction sequencing, or other details that are not covered in the design and construction specifications or standards, or practice not commonly used in Pennsylvania are allowed only when specifically indicated herein. Where design or construction that deviates from standard Department practice is proposed, submit a conceptual design before the Final TS&L for review and approval. Include in the submittal conceptual plans and a list of items that deviate from standard design

and construction, including but not limited to design methodology, the computer program that will be used in the design, construction sequencing, and any specialized construction techniques. No extensions of contract time will be granted for pursuits of alternates or non-standard designs.

(b) Additional Designer Qualifications

(List any additional qualifications necessary for the particular project over and above those listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD or indicate “None”)

(c) Information/Data Made Available to the Contractor by the Department

The following information/data will be made available to the Contractor during the advertisement period: *(List the following, as applicable)*

- Test Boring Core Boxes: Test boring core boxes are available for inspection at *(specify location)*. Contact *(specify name and telephone number of person)* to arrange for a date and time to inspect the core boxes.
- *(List any other information/data that will be furnished)*

(d) Design Specifications

Develop the Final TS&L and design the structure construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications not listed in the Special Provision titled SPECIAL BIDDING-DESIGN-BUILD, and identify the publications they supersede)*

(e) Design Requirements

1. General

(List general requirements. Include the following, as applicable)

- Slip-formed barriers *(are/are not)* allowed
- Lightweight concrete *(is/is not)* allowed.
- Do not use the BLC Standard Drawings.
- Do not use precast bridge barriers
- Barrier type differing from that shown on the Conceptual TS&L *(is/is not)* allowed. *(Specify acceptable alternate barrier type(s) if applicable)*
- *(specify other)*

2. Geometry

Design the structure according to the geometrics shown on the Conceptual TS&L Plans, except changes will be allowed as follows:

- Substructure Unit Locations: *(Specify allowable changes or indicate "No Change Allowed")*
- Bridge Length: *(Specify allowable changes or indicate "No Change Allowed")*
- Lane, Shoulder, and Sidewalk Widths: *(Specify allowable changes or indicate "No Change Allowed")*
- Staged Construction Requirements: *(Specify allowable changes / criteria such as those given below, or indicate "No Changes Allowed")*
 - o Allow for staged construction while maintaining *(specify number)* lanes of vehicular traffic during all stages of construction.
 - o Minimum temporary lane widths of *(specify value)* are required.
 - o Provide a maximum of *(specify number)* longitudinal construction joint(s) in the deck slab. The longitudinal construction joint must be positioned within the *(specify criteria. For example "middle 1/3", or "middle 1/2")* width of the top flange of a beam.
 - o *(Specify other)*

3. Seismic

Site Class *(specify "is" or "is not")* Class E.

Design the connection force effect in the restrained directions between the superstructure and substructure as 0.25 times the vertical reaction due to the tributary permanent load.

4. Superstructure

Incorporate the following requirements into the superstructure design: *(Specify requirements and limitations. Include the following as applicable)*

- Do not use less than *(specify number)* girders in the superstructure. Use more girders if required for future redecking.
- Deck Expansion Joints: *(Specify number and locations of allowable deck expansion joints)*
- Approach Slabs: *(Specify type, length, width, and/or other requirements for the approach slabs).*
- Precast panel forms for placing the concrete deck slab in lieu of metal stay-in-place forms *(are/are not)* allowed.
- Provide live load ratings with *(and without)* future wearing surface.
- For steel girder designs, do not include longitudinal stiffeners in computing the steel section properties.
- For prestressed concrete beam designs, prestressed concrete beam sections differing significantly from the standards specified herein will be considered as nonstandard sections subject to the requirements of Publication 408, Section 1107.03(a)4. Do not deviate from the minimum flange and web thickness or section properties shown in the Bridge Design Standard Drawings.
- Provide provisions for future jacking of superstructure for bearing repair or replacement. *(Delete if not needed)*
- *(specify other)*

5. Substructure

Incorporate the following requirements into the substructure design: *(Specify requirements and limitations. Include the following, as applicable)*

- MSE abutments or wingwalls *(are/are not)* allowed.
- Precast modular retaining walls *(are/are not)* allowed.
- Do not change the number or location of substructure units.
- Repair or replace any damage to the substructure beyond the removal area caused by the Contractor's operations at no cost to the Department.
- Maintain fixity and expansion configuration of the existing structure.
- Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP) Section 5.5.2 is waived if the total proposed superstructure dead load is within *(specify criteria +XX% -YY%)* of the *(specify "existing" or "Conceptual TS&L")* superstructure dead load and if bearing fixities match existing.
- *(specify other)*

6. Temporary Bridges

(Specify design and construction requirements for temporary bridges or refer to the Special Provision where this information is provided. If temporary bridges are not applicable, indicate "Not Applicable".)

7. Maintenance of Traffic During Construction

(Specify maintenance of traffic requirements related to the bridge design and construction or refer to the Special Provision where this information is provided)

8. Railroad Requirements

(If the bridge is not over or adjacent to a railroad, indicate "Not Applicable".)

Design the structure to meet the following railroad requirements:

- Minimum Horizontal Clearance: *(specify value or indicate "Not Applicable")*
- Minimum Vertical Clearance: *(specify value or indicate "Not Applicable")*
- Temporary Support for Railroad Tracks: *(specify requirements, refer to the Special Provision where this information is provided, or indicate "Not Applicable")*
- Other *(specify other requirements, as applicable, such as catenary involvement, shielding, temporary clearances, etc.)*

9. Future Widening Requirements

In addition to DM-4 requirements, incorporate the following future widening provisions into the design: *(Specify geometric, design, and construction requirements or indicate "None")*

10. Future Redecking Requirements

In addition to the requirements in DM-4, incorporate the following future redecking provisions into the design: *(Specify requirements or indicate "None". Include the following, as applicable)*

- Allow for redecking in staged construction while maintaining *(specify number)* lanes of vehicular traffic during all stages of construction.
- Minimum lane widths of *(specify value)* are required.
- Design beams to carry standard design live loads at all stages of redecking.
- Allow for a maximum of *(specify number)* longitudinal construction joint(s) in the deck slab. The longitudinal construction joint must be positioned within the width of the top flange of a beam.
- Maintenance of pedestrian traffic **(is/is not)** required during future redecking. *(If pedestrian traffic is to be maintained, specify minimum travelway width and barrier protection requirements)*
- The superstructure and substructure must be designed to meet all Strength and Service Limit States for the specified future staging shown on the Conceptual TS&L *(as applicable)*.

11. Inspection and Maintenance Accessibility

Provide inspection and maintenance accessibility equivalent to that provided in the Conceptual TS&L Plans, or alternate means acceptable to the Department. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be binding.

12. On-Bridge Lighting

(Specify on-bridge lighting requirements. Indicate whether lighting locations shown on the Conceptual TS&L Plans may or may not be changed. If there is no on-bridge lighting, indicate "None".)

13. Waterway Requirements

(If the bridge is not over a waterway, indicate "Not Applicable".)

Incorporate the following waterway requirements into the bridge design and construction:

13.a. Structure Shown on the Conceptual TS&L:

(For contracts which provide an approved waterway permit for the Conceptual TS&L structure, include the following three bullets; otherwise delete the following three bullets:)

- An approved waterway permit for the Conceptual TS&L structure is provided – see *(refer to the specific permit here)*. Comply with all requirements of the approved permit(s), or obtain approval for permit modifications from the appropriate DEP office. Additional time will not be provided for permit modifications. Do not start construction work until approval for waterway permit modifications, if applicable, is obtained.
- *(Specify waterway-related design and construction requirements for the structure in which a waterway permit was obtained. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans.)*
- If the waterway permit obtained by the Department includes a causeway permit, be responsible for obtaining any causeway permit amendments necessary due to change of causeway design during final design and/or construction.

(For contracts where waterway permit acquisition is a Design-Build activity, include the following bullet(s) and 13.a1 through 13.a.5; otherwise delete through 13.a.5:)

- Obtain approved waterway permit(s) for the project. Comply with all requirements of the approved permit(s). Refer to the special provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permits are obtained.
- *(Specify waterway-related design and construction requirements for which the waterway permit materials will be prepared. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans, such as temporary pipes, causeway, etc.)*

13.a.1. Hydraulic Analysis:

(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure have been approved by the Department. Prepare and submit for approval the appropriate waterway permit(s) using the provided H&H documents and in accordance with the conditions of the permit.

(or)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure prepared by the Department are preliminary and for information purposes only. Prepare, submit, and obtain approval on the final Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10. Prepare and submit for approval the appropriate waterway permit(s) using the final H&H documents and in accordance with the conditions of the permit.

13.a.2. Scour Analysis: *(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other)*

- Included in the provided H&H documents.

(or)

- Scour Analysis is preliminary and for information purposes only. Prepare Scour Analysis in conjunction with final H&H documents.

13.a.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.a.4. Permits: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.a.5. Other *(List any other requirements)*

13.b. Alternate Structure

(Specify waterway-related design and construction requirements for alternate structures. If the bridge is not over a waterway, indicate "Not Applicable")

- Obtain approved/amended waterway permit(s) for alternate structures. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permits are obtained.
- Alternate Structures with low chord elevations less than the Conceptual TS&L structure may be used, dependent upon approved hydraulic analyses, and provided that the water surface elevations are less than the Conceptual TS&L.
- Do not increase the water surface elevations for the *(INSERT APPLICABLE FLOOD YEAR(S))* year storms above those given for the Conceptual TS&L.
- If the Conceptual TS&L structure impacts wetlands, no additional wetland impacts will be allowed for alternate structure types.

13.b.1. Hydraulic Analysis

(Specify hydraulic analysis requirements for alternate structures. Address requirements for the completed bridge and construction conditions such as temporary pipes, causeway, etc.)

- Hydrologic and Hydraulic Report. Prepare, submit, and obtain approval on a revised Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10.

13.b.2. Scour Analysis *(Specify additional project specific scour requirements)*

13.b.3. FEMA and NEPA Coordination - In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.b.4. Permits - In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

13.b.5. Other *(List any other requirements)*

14. Environmental

Refer to the Special Provision titled ENVIRONMENTAL COMMITMENT AND MITIGATION TRACKING SYSTEM (ECMTS) REPORT.

15. Utilities

Refer to the Conceptual TS&L Plans for general utility details and a listing of required on-bridge utility materials, and material acquisition and installation responsibilities.

Design the bridge structure to accommodate the following utility facilities on, under, or above the bridge:

(List the utility name and type of facility. Specify whether the utility facility is on, under, above or near the bridge. Also, specify any geometric or design restrictions - vertical clearance, clearance to footing, etc. - or refer to the Special Provision that contains this information. If there are no utilities that affect the bridge design and construction, indicate "None".)

If utility relocations are required as part of an alternate structure, obtain approvals from the affected utility companies.

16. Other

(List any other design requirements not covered in Section II(e)1 through Section II(e)15. If none, indicate "None".)

(f) Foundations

(Specify foundation design requirements and limitations in Section II (f)1 through Section II (f)6. If there is no foundation involvement with the specified rehabilitation work indicate "Not Applicable" and delete Section II (f)1 through Section II (f)6.)

1. General- A (*specify "limited" or "comprehensive"*) subsurface exploration investigation has been performed for this project. The subsurface exploration data, in conjunction with foundation requirements specified herein, should be used to develop the foundation design parameters. A foundation submission is required.

2. Allowable Foundation Types

Foundation types are allowed as follows:

(Specify allowable foundation types - e.g., piles, spread footing on rock micro piles, etc. - along with geotechnical design parameter limitations for each type)

2.a. Geotechnical Design Parameter Limitations

Determine the applicable resistances to be used to design the substructures, limited to the maximum Ultimate Capacities given below. Designs utilizing Ultimate Capacities exceeding the maximum values indicated below will not be accepted.

2.a.1. Spread Footings on Soil

The Ultimate Bearing Capacity is limited to a maximum of (*specify value, X.X*) tsf

2.a.2. Spread Footings on Rock

The Ultimate Bearing Capacity is limited to a maximum of (*specify value, X.X*) tsf

2.a.3. Pile Supported Foundations

Point Bearing Piles

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

End Bearing Piles:

(Provide the capacity based on the applicable controlling mechanism, i.e. structural or geotechnical, respectively, as shown below. Select one of the following)

Ultimate pile capacity is limited to a maximum yield strength of 50 ksi.

or

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

Friction Piles:

Ultimate pile capacity is limited to *(specify value, XX)* Tons.

2.a.4. Drilled Caisson Supported Foundations

The Ultimate (Geotechnical) Unit Side Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

The Ultimate (Geotechnical) Unit Tip Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

3. Required Geotechnical Exploration

Provide and utilize the following number of borings for the foundation design at a minimum:

- Abutments - *(specify number)*
- Piers - *(specify number)*

Previously obtained borings as shown on the Conceptual TS&L Plans may be used as a required boring where the boring lies within the footprint of the footing of the substructure unit.

Perform the geotechnical exploration for the bridge structure in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications, and identify the publications they supersede)*

4. Laboratory Testing

(Specify required laboratory tests)

5. Foundation Submission

Prepare and submit a foundation report in accordance with the requirements of DM-4, PP Section 1.9.4.3. Cost comparisons in accordance with Section 1.9.4.3.1, item (c) are not required.

6. Construction Requirements

6.a. Test Piles

(Specify minimum number of test piles or indicate "Not Applicable")

6.b. Subgrade Preparation

(Specify required subgrade preparation or indicate "Not Applicable")

6. c. Pile Dynamic Analysis

(Specify locations of required pile dynamic analysis or indicate "Not Applicable")

6. d. Load Tests

(Specify locations of required load tests or indicate "Not Applicable")

6.e. Settlement Monitoring

(Specify locations of required settlement monitoring or indicate "Not Applicable")

6.f. Other

(Specify other construction requirements or indicate "Not Applicable")

(g) Submittals

1. Final TS&L Submission

Include the following information in the TS&L submission:

1. Final TS&L submission letter: In accordance with DM-4, PP Section 1.9.3.3.1, item (a).

2. Final TS&L plans: In accordance with DM-4, PP Section 1.9.3.3.1, item (b).

3. Supply the following additional information

(a) Route and section number, index map and segment/offset of limits

(b) Name of Lead Design Engineer

(c) Design traffic data including current and projected ADTT and class of highways on relevant roads

(d) Date of line and grade approval and design speed (if changes are made to the as-designed vertical and horizontal alignments)

(e) Copy of the H&H analysis submitted to the Department of Environmental Protection if the contractor obtains the waterway permit(s) or if an amendment to the waterway permit is necessary

4. Completed applicable Q/A Forms D-501, D-502, D-503, and/or D-504 (refer to DM-4 Appendix A)

Approval of the Final TS&L is contingent upon approval of the waterway permit by the Department of Environmental Protection, as applicable.

2. Waterway (As Applicable)

In accordance with Section II(e)13 of this Special Provision.

3. Foundation Submission (As Applicable)

In accordance with DM-4, PP Section 1.9.4.3.1 and Section II(f) of this Special Provision for submittal requirements.

4. Final Structure Plans and Computations

In accordance with DM-4. Include in the Final Structure Plans the Core Boring Logs as provided in the Conceptual Drawings in unmodified form; with the exception of superimposition of sheet numbering consistent with the Final Structure Plans and prominent designation of each sheet as "Information Provided by Others." Sign and seal each plan sheet in accordance with DM-4, PP Section 1.6.3.1, with the exception of the aforementioned Core Boring Logs. Upon completion of Quality Assurance Review, or Owner's Perspective Review, as applicable, and receipt of drawings stamped "Recommended for Construction," provide the Department with one (*Specify: "paper", "linen", drafting film", "vellum" or "electronic"*) copy for signature by the District Bridge Engineer.

5. Revisions During Construction and As-Built Drawings

In accordance with DM-4, PP Section 1.10.6, except that the Contractor is responsible for making changes to the contract drawings, and making and distributing necessary copies of the revised plans to all affected parties. The following shall replace DM-4 PP Section 1.10.5: "If a design error occurs, the Contractor is fully responsible for the costs associated with providing additional design analysis and construction modifications, acceptable to the Department, to correct the problem. The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item via work order."

Maintain and submit "As-Built" drawings in accordance with Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures, Section 5.7, As-Built Plans, except include major quantity changes (such as foundation pile length changes, etc.).

"As-built" drawings are the sole responsibility of the Contractor and must be submitted to the District within 3 months of final inspection acceptance as defined in Publication 408, Section 110.08(a).

(h) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as follows;

- Partial Plans Submissions: (*Specify partial plans submission review procedure, or indicate "None"*)
- Utilities: Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

III. MEASUREMENT AND PAYMENT-Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Final TS&L Approval
- Foundation Approval
- Final Plan Approval – Substructure
- Final Plan Approval – Superstructure
- Final Plan – for Signature
- As-Built Drawings

Project Specific Details:

Special Provision: **D82180B - c82180 ITEM 8218-YYYY DESIGN OF
SUPERSTRUCTURE REPLACEMENT, S-xxxxx**

Item(s) Associated:

Header:

ITEM 8218-YYYY Design of Superstructure Replacement, S-xxxxx

Provision Body:

I. DESCRIPTION – This work is the design and preparation of construction plans for a bridge superstructure of the type indicated on the Department’s Conceptual Type, Size, and Location (TS&L) Plans or an alternate type bridge superstructure. Preparation of a Final TS&L Submission for the proposed superstructure type is also required.

II. DESIGN

(a) General

The Department’s Conceptual TS&L Plans represent a superstructure type and layout that will meet safety, hydraulic, geometric, environmental, and load carrying capacity requirements for the project. A structure type and configuration as that shown on the Conceptual TS&L Plans or an alternate type bridge superstructure subject to the requirements specified herein may be designed and constructed. Prepare and submit a Final TS&L submission for the proposed bridge superstructure for review and approval.

Provide design and drawings in the units of measurement shown on the Conceptual TS&L Plans.

Provide a complete set of computations for the superstructure. Provide additional calculations, as requested by the Department's District Bridge Engineer or Chief Bridge Engineer, to evaluate any details throughout the life of the contract.

Verify that an oversize and/or overweight permit can be issued for superloads before incorporating them into a design. Submit verification documentation with the Final TS&L submission.

Structure types, concepts, construction sequencing, or other details that are not covered in the design and construction specifications or standards, or practice not commonly used in Pennsylvania are permitted only when specifically indicated herein. Where design or construction that deviates from standard Department practice is proposed, submit a conceptual design before the Final TS&L for review and approval. Include in the submittal conceptual plans and a list of items that deviate from standard design and construction, including but not limited to design methodology, the computer program that will be used in the design, construction sequencing, and any specialized construction techniques. No extensions of contract time will be granted for pursuits of alternates or non-standard designs.

(b) Additional Designer Qualifications

(List any additional qualifications necessary for the particular project over and above those listed in the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD or indicate "None")

(c) Additional Information/Data Made Available to the Contractor by the Department

The following information/data will be made available to the Contractor during the advertisement period: *(List the following, as applicable)*

- *(List any other information/data that will be furnished)*

(d) Design Specifications

Develop the Final TS&L and prepare the structure construction plan in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications not listed in the Special Provision titled SPECIAL BIDDING-DESIGN-BUILD, and identify the publications they supersede)*

(e) Design Requirements

1. General

(List general requirements. Include the following, as applicable)

- Slip-formed barriers *(are/are not)* permitted
- Segmental concrete construction *(is/is not)* permitted.
- Lightweight concrete *(is/is not)* permitted.
- Do not use precast bridge barrier
- Barrier type differing from that shown on the Conceptual TS&L *(is/is not)* allowed. *(Specify acceptable alternate barrier type(s) if applicable)*
- *(specify other)*

2. Geometry

Design the superstructure according to the geometrics shown on the Conceptual TS&L Plans, except changes will be permitted as follows:

- Vertical Alignment: *(Specify allowable changes or indicate “No Change Permitted”)*
- Lane, Shoulder, and Sidewalk Widths: *(Specify allowable changes or indicate “No Change Permitted”)*
- Staged Construction Requirements: *(Specify allowable changes / criteria such as those given below, or indicate “No Changes Allowed”)*
 - o Allow for staged construction while maintaining *(specify number)* lanes of vehicular traffic during all stages of construction.
 - o Minimum temporary lane widths of *(specify value)* are required.
 - o Provide a maximum of *(specify number)* longitudinal construction joint(s) in the deck slab. The longitudinal construction joint must be positioned within the *(specify criteria. For example “middle 1/3”, or “middle 1/2”)* width of the top flange of a beam.
- *(Specify other)*

3. Seismic

Site Class *(specify “is” or “is not”)* Class E.

Design the connection force effect in the restrained directions between the superstructure and substructure as 0.25 times the vertical reaction due to the tributary permanent load.

4. Superstructure

Incorporate the following requirements into the superstructure design: *(Specify requirements and limitations. Include the following as applicable)*

- Do not use less than *(specify number)* girders in the superstructure. Use more girders if required for future redecking.
- Deck Expansion Joints: *(Specify number and locations of allowable deck expansion joints)*
- Steel box girders *(are/are not)* permitted
- Precast panel forms for placing the concrete deck slab in lieu of metal stay-in-place forms *(are/are not)* permitted.

- Provide live load ratings with **(and without)** future wearing surface.
- For steel girder designs, do not include longitudinal stiffeners in computing the steel section properties.
- For prestressed concrete beam designs, prestressed concrete beam sections differing significantly from the standards specified herein will be considered as nonstandard sections subject to the requirements of Pub. 408, Section 1107.03(a)4. Do not deviate from the minimum flange and web thickness or section properties shown in the Bridge Design Standard Drawings.
- Provide provisions for future jacking of superstructure for bearing repair or replacement. **(Delete if not needed)**
- **(specify other)**

5. Substructure

Incorporate the following minimum requirements into the substructure design:

- Design will utilize the existing abutments.
- Do not change the number or location of substructure units.
- Remove portions of the existing abutments as required to accommodate the proposed superstructure.
- Repair or replace any damage to the substructure beyond the removal area caused by the Contractor's operations at no cost to the Department.
- Provide new bearings. Adjust the bearing seats, as required, to accept new bearings.
- Maintain fixity and expansion configuration of the existing structure.
- Publication 15M, Design Manual Part 4 (DM-4), Policy and Procedures (PP) Section 5.5.5.2b is waived if the total proposed superstructure dead load is within **(Specify criteria +XX% -YY%)** of the **(specify “existing” or “Conceptual TS&L”)** superstructure dead load and if bearing fixities match existing.
- **(specify other)**

6. Temporary Bridges

(Specify design and construction requirements for temporary bridges or refer to the Special Provision where this information is provided. If temporary bridges are not applicable, indicate “Not Applicable”.)

7. Maintenance of Traffic During Construction

(Specify maintenance of traffic requirements related to the bridge design and construction or refer to the Special Provision where this information is provided)

8. Railroad Requirements

(If the bridge is not over or adjacent to a railroad, indicate “Not Applicable”)

Design the structure to meet the following railroad requirements:

- Minimum Vertical Clearance: *(specify value or indicate “Not Applicable”)*
- Temporary Support for Railroad Tracks: *(specify requirements, refer to the Special Provision where this information is provided, or indicate “Not Applicable”)*
- Other *(specify other requirements, as applicable, such as catenary involvement, shielding, temporary clearances, etc.)*

9. Future Redecking Requirements

In addition to the requirements in Publication 15M, Design Manual Part 4 (DM-4), incorporate the following future redecking provisions into the design: *(Specify requirements or indicate “None”. Include the following, as applicable)*

- Allow for redecking in staged construction while maintaining *(specify number)* lanes of vehicular traffic during all stages of construction.
- Minimum lane widths of *(specify value)* are required
- Design beams to carry standard design live loads at all stages of redecking.
- Allow for a maximum of *(specify number)* longitudinal construction joint(s) in the deck slab. The longitudinal construction joint must be positioned within the width of the top flange of a beam.
- Maintenance of pedestrian traffic *(is/is not)* required during future redecking. *(If pedestrian traffic is to be maintained, specify minimum travelway width and barrier protection requirements)*
- The superstructure and substructure must be designed to meet all Strength and Service Limit States for the specified future staging shown on the Conceptual TS&L *(as applicable)*.

10. Inspection and Maintenance Accessibility

Provide inspection and maintenance accessibility equivalent to that provided in the Conceptual TS&L Plans, or alternate means acceptable to the Department. In case of a disagreement on accessibility, the Chief Bridge Engineer’s decision will be binding.

11. On-Bridge Lighting

(Specify on-bridge lighting requirements. Indicate whether lighting locations shown on the Conceptual TS&L Plans may or may not be changed. If there is no on-bridge lighting, indicate “None”.)

12. Waterway Requirements

(If the bridge is not over a waterway, indicate “Not Applicable”.)

Incorporate the following waterway requirements into the bridge design and construction:

12.a. Superstructure Type Shown on the Conceptual TS&L:

(For contracts which provide an approved waterway permit for the Conceptual TS&L structure, include the following three bullets; otherwise delete the following three bullets:)

- An approved waterway permit for the Conceptual TS&L structure is provided – see *(refer to the specific permit here)*. Comply with all requirements of the approved permit(s), or obtain approval for permit modifications from the appropriate DEP office. Additional time will not be provided for permit modifications. Do not start construction work until approval for waterway permit modifications, if applicable, is obtained.
- *(Specify waterway-related design and construction requirements for the structure in which a waterway permit was obtained. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans.)*
- If the waterway permit obtained by the Department includes a causeway permit, be responsible for obtaining any causeway permit amendments necessary due to change of causeway design during final design and/or construction.

(For contracts where waterway permit acquisition is a Design-Build activity, include the following bullet(s) and 12.a1 through 12.a.5; otherwise delete through 12.a.5:)

- Obtain approved waterway permit(s) for the project. Comply with all requirements of the approved permit(s). Refer to the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. Do not start construction work until approved waterway permits are obtained.
- *(Specify waterway-related design and construction requirements for which the waterway permit materials will be prepared. Include requirements not shown on the Conceptual TS&L Plans or Erosion and Sedimentation Control Plans, such as temporary pipes, causeway, etc.)*

12.a.1. Hydraulic Analysis:

(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other)

- Hydrologic and Hydraulic documents for the Conceptual TS&L structure have been approved by the Department. Prepare and submit for approval the appropriate waterway permit(s) using the provided H&H documents and in accordance with the conditions of the permit.
- (or)*
- Hydrologic and Hydraulic documents for the Conceptual TS&L structure prepared by the Department are preliminary and for information purposes only. Prepare, submit, and obtain approval on the final Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10. Prepare and submit for approval the appropriate waterway permit(s) using the final H&H documents and in accordance with the conditions of the permit.

12.a.2. Scour Analysis: *(Include one of the following two bullets based on the level of preparation of the H&H documents. Delete the other)*

- Included in the provided H&H documents.
- (or)*
- Scour Analysis is preliminary and for information purposes only, Prepare Scour Analysis in conjunction with final H&H documents.

12.a.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

12.a.4. Permits: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

12.a.5. Other (*List any other requirements*)

12.b. Alternate Superstructure

(Specify waterway-related design and construction requirements for alternate structures. If the bridge is not over a waterway, indicate "Not Applicable")

- Obtain approved/amended waterway permit(s) for alternate structures. Comply with all requirements of the approved permit(s). Refer to the special provision titled PERMITS FOR DESIGN-BUILD PROJECTS for further details. No construction work shall start until approved waterway permits are obtained.
- Alternate Super Structures with low chord elevations less than the Conceptual TS&L structure may be permitted, dependent upon approved hydraulic analyses, and provided that the water surface elevations are less than the Conceptual TS&L.
- Do not increase the water surface elevations for the (*INSERT APPLICABLE FLOOD YEAR(S)*) year storms above those given for the Conceptual TS&L.
- If the Conceptual TS&L structure impacts wetlands, no additional wetland impacts will be permitted for alternate structure types.

12.b.1. Hydraulic Analysis

(Specify hydraulic analysis requirements for alternate superstructures. Address requirements for the completed bridge and construction conditions)

- Hydrologic and Hydraulic Report. Prepare, submit, and obtain approval on a revised Hydrologic and Hydraulic report in accordance with Publication 13M, Design Manual Part 2, Chapter 10.

12.b.2. Scour Analysis: (*Specify additional project specific scour requirements*)

12.b.3. FEMA and NEPA Coordination: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

12.b.4. Permits: In accordance with the Special Provision titled PERMITS FOR DESIGN-BUILD PROJECTS.

12.b.5. Other (*List any other requirements*)

13. Environmental

Refer to the Special Provision titled ENVIRONMENTAL COMMITMENT AND MITIGATION TRACKING SYSTEM (ECMTS) REPORT.

14. Utilities

Refer to the Conceptual TS&L Plans for general utility details and a listing of required on-bridge utility materials, and material acquisition and installation responsibilities.

Design the bridge superstructure to accommodate the following utility facilities on, under, or above the bridge:

(List the utility name and type of facility. Specify whether the utility facility is on, under, above or near the bridge. Also, specify any geometric or design restrictions - vertical clearance, clearance to footing, etc. - or refer to the Special Provision that contains this information. If there are no utilities that affect the bridge design and construction, indicate "None".)

If utility relocations are required as part of an alternate structure, obtain approvals from the affected utility companies.

15. Other

(List any other design requirements not covered in Section II(e)1 through Section II(e)14. If none, indicate "None")

(f) Submittals

1. Final TS&L Submission

Include the following information in the TS&L submission:

1. Final TS&L submission letter: In accordance with DM-4, PP Section 1.9.3.3.1, item (a).
2. Final TS&L plans: In accordance with DM-4, PP Section 1.9.3.3.1, item (b).

3. Supply the following additional information:

(a) Route and section number, index map and segment/offset of limits

(b) Name of Lead Design Engineer

(c) Design traffic data including current and projected ADTT and class of highways on relevant roads

(d) Date of line and grade approval and design speed (if changes are made to the as-designed vertical and horizontal alignments)

(e) Copy of the H&H analysis submitted to the Department of Environmental Protection if the Contractor obtains the waterway permit(s) or if an amendment to the waterway permit is necessary.

4. Completed applicable Q/A Forms D-501, D-502, D-503, and/or D-504 (refer to DM-4 Appendix A).

Approval of the Final TS&L is contingent upon approval of the waterway permit from the Department of Environmental Protection, as applicable.

2. Final Structure Plans and Computations

In accordance with DM-4, Include in the Final Structure Plans the Core Boring Logs as provided in the Conceptual Drawings in unmodified form; with the exception of superimposition of sheet numbering consistent with the Final Structure Plans and prominent designation of each sheet as "Information Provided by Others." Sign and seal each plan sheet in accordance with DM-4, PP Section 1.6.3.1, with the exception of the aforementioned Core Boring Logs. Upon completion of Quality Assurance Review, or Owner's Perspective Review, as applicable, and receipt of drawings stamped "Recommended for Construction," provide the Department with one (*Specify: "paper", "linen", drafting film", "vellum" or "electronic"*) copy for signature by the District Bridge Engineer.

3. Revisions During Construction and "As-Built" Drawings

In accordance with DM-4, PP Section 1.10.6, except that the Contractor is responsible for making changes to the contract drawings, and making and distributing necessary copies of the revised plans to all affected parties. The following shall replace DM-4, PP Section 1.10.5 : "If a design error occurs, the Contractor is fully responsible for the costs associated with providing additional design analysis and construction modifications, acceptable to the Department, to correct the problem. The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item via work order."

Maintain and submit “As-Built” drawings in accordance with Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures, Section 5.7, As-Built Plans, except include major quantity changes (such as foundation pile length changes, etc.).

“As-Built” drawings are the sole responsibility of the Contractor and must be submitted to the District within 3 months of final inspection acceptance as defined in Publication 408, Section 110.08(a).

(g) Submittal Review, Approval, and Distribution

Make all submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as follows;

- Partial Plans Submissions: *(specify partial plans submission review procedure, or indicate “None”)*
- Utilities: Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

III. MEASUREMENT AND PAYMENT—Lump Sum

Partial payment will be made for the design activity based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, utilizing the following components:

- Final TS&L Approval
- Final Plan Approval
- Final Plan – for Signature
- As-Built Drawings

Project Specific Details:

Special Provision: **D82190B - c82190 ITEM 8220-YYYY - DESIGN OF ITS DEVICES AND DMS STRUCTURES (NO AS-DESIGNED FOUNDATIONS PROVIDE**

Item(s) Associated:

Header:

ITEM 8220-YYYY - DESIGN OF INTELLIGENT TRANSPORTATION SYSTEM DEVICES AND DYNAMIC MESSAGE SIGN STRUCTURES (NO AS-DESIGNED FOUNDATIONS PROVIDED), S-xxxxxx, (add S numbers as needed)

Provision Body:

I. DESCRIPTION - This work is the design and preparation of Type, Size, and Location (TS&L) Sign Structure Submissions, Foundation Recommendation Submissions, and Final Sign Structure and Foundation Construction Plans Submissions for Dynamic

Message Sign (DMS) Support Structures, and all other related calculations and drawings for Intelligent Transportation System (ITS) devices and structures as noted below:

- DMS Support Structures and Foundations – Single and Back-to-Back Displays in the following locations: *(Identify each DMS structure by S-xxxxx and location)*
- Closed Circuit Television (CCTV) Pole and Foundation – For approved heights.
- Visibility Detection System (VDS) Pole and Foundation.
- Tag Reader Mast Arm, Pole and Foundation – for each type specified.
- CCTV, VDS, and Travel Time System – Tag Reader (TTS-TR) Attachment Details to Existing Structures.

II. DESIGN

(a) General

The approximate locations of the new ITS devices and structures are shown on the Conceptual Plans. DMS and ITS structure sites are to be designed to meet safety, geometric, environmental, right-of-way, and performance requirements for the project. Prepare a TS&L sign structure plan and a final sign structure and foundation plan for each proposed DMS structure, prepare final construction drawings for other ITS devices, and submit for review. Center-Mount DMS Support Structures are the preferred structure type, followed by 4-Post 4-Chord Overhead Truss DMS Support Structures. When approved by the Chief Bridge Engineer, Cantilever DMS Support Structures in accordance with Pub 647M may be used. Prepare each DMS structure plan in accordance with Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP) Section 1.6.

All foundation construction is to be cast-in-place concrete.

Have a Geotechnical Engineer certify the foundation material at the new ITS structure location is within the design parameters of the Department's Standard Drawings.

Publication 647M indicates spread footings as the preferred foundation type for DMS structures, however, drilled shafts (caissons) are allowed where right-of-way constraints and constructability issues exist.

The housing for the DMS controller is to be post or ground-mounted and allow easy ground level access for maintenance activities. Prepare attachment details for all connections.

The DMS design criteria (weight, dimensions, etc.) is to be established from DMS manufacturer documentation and placed on the design drawings. Prepare attachment details for all connections.

Install new ITS structures at ground level and extend to the required height.

Modification of existing bridge barrier will not be allowed.

CCTV Poles and Foundations: Any deviation from standard items will require designs in accordance with Department standards and procedures. Prepare CCTV attachment details for all connections to new poles and existing poles, bridges, and sign structures in accordance with Department standards and manufacturer recommendations.

VDS Poles and Foundations: Any deviation from standard items will require designs in accordance with Department standards and procedures. Prepare VDS attachment details for all connections to new poles and existing poles, bridges and sign structures in accordance with Department standards and manufacturer recommendations.

Tag Reader Mast Arms, Poles, and Foundations: Any deviation from standard items will require designs in accordance with Department standards and procedures. Prepare TR attachment details for all connections to new mast arms and poles and existing mast arms, poles, bridges, and sign structures in accordance with Department standards and manufacturer recommendations.

For lightweight items such as Tag Readers, CCTV cameras, VDS, and conduit to be attached directly to existing structures, submit attachment details, along with documentation that the minimum vertical clearance requirements are satisfied. Numerical analysis of the existing structure to confirm it can support these additional loadings will not be required; as long as no modifications are made to the existing structure (i.e. drilled holes, member extensions, etc.).

Protect all structures with guide rail or concrete barrier, even when located outside the clear zone as defined in Publication 10, Design Manual Part 1. Any deviation from these criteria requires approval from the Chief Bridge Engineer.

(b) Additional Designer Qualifications

*(List any additional qualifications necessary for the particular project over and above those listed in the Special Provision titled **SPECIAL BIDDING-DESIGN BUILD** or indicate "None")*

(c) Design Specifications

Develop the Final TS&L and prepare construction plans for the steel DMS Support Structures, CCTV Poles, VDS Poles, Tag Reader Mast Arms and Poles and associated foundations in accordance with the Special Provision titled **SPECIAL BIDDING – DESIGN-BUILD** Section VIII – General Design Requirements, Design Specifications, and as follows:

- AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", 2001 (including 2002 and 2003 Interim Standard Specifications) (referred as "AASHTO Sign Specs" hereafter).
- Publication 647M – ITS-1000M Series, March 2013 Edition.
- Publication 218M, Standard Drawing BD-641M for Double Strut Center-Mount/Cantilever Structures and Standard Drawing BD-645M for Overhead Truss Structures.
- Publication 219M, Standard Drawing BC-741M for Double Strut Center-Mount/Cantilever Structures and Standard Drawing BC-745M for Overhead Truss Structures.

- Use the Department's SIGN Structure Analysis program (most current version available at the PennDOT Sales Store) for the design of DMS Support Structures conforming to Publication 647M and the Standard Drawings or accepted commercially available or consultant developed software (refer to list on the PennDOT website).

Use DM-4, Publication 647M (ITS-1000M Series), Publication 218M (BD-641M / BD-645M), and Publication (BC-741M / BC-745M) for design policy and procedures, design criteria, and as follows:

- DMS Dead Load – The DMS design weight and eccentricity will be established from DMS manufacturer documentation. To account for construction tolerances, the design eccentricity is to be increased by 2 inches to design all components and connections.
- External Loads – Dead Load other than DMS, Live Load (Catwalk), Ice Load, and Wind Load
- Fatigue Loads – Use AASHTO Sign Specs Table 11-1 to determine the Fatigue Importance Factor for Galloping, Natural Wind Gusts, and Truck-Induced Gusts. The Fatigue Category is equal to I for all DMS Support Structures, unless the structure type, structure location, and roadway classification allow the use of Fatigue Category II. Design for a recommended life of 50 years.

Refer to the "Bridge/Structures Related Effective Policy Letters" for additional design policy Strike-Off Letters that are applicable to the structure design.

In the event that certain design criteria, standards, specifications, or methodology are in conflict and cannot be resolved, the Chief Bridge Engineer will be arbiter and the Chief Bridge Engineer's decision will be final.

(d) Design Requirements *(list any project specific requirements)*

1. General

(List general requirements)

2. Geometry

(include future widening provisions)

3. Maintenance and Protection of Traffic during Construction

(Specify maintenance of traffic requirements related to the structure design and construction or refer to the Special Provision where this information is provided)

4. Inspection and Maintenance Accessibility

Provide inspection and maintenance accessibility equivalent to that provided in the TS&L Plans, or alternate means acceptable to the Department. In case of a disagreement on accessibility, the Chief Bridge Engineer's decision will be binding.

5. Utilities

(Include locating existing utilities before design and providing new power and communication services for ITS devices and structures)

(e) Foundations

1. General - A *(specify "limited" or "comprehensive")* subsurface exploration investigation has been performed for this project. The subsurface exploration data, in conjunction with foundation requirements specified herein, should be used to develop the foundation design parameters. A foundation submission is required.

2. Allowable Foundation Types

Foundation types are allowed as follows:

(Specify allowable foundation types - e.g., piles, spread footing on rock micro piles, etc. - along with geotechnical design parameter limitations for each type)

2.a. Geotechnical Design Parameter Limitations

Determine the applicable resistances to be used to design the substructures, limited to the maximum Ultimate Capacities given below. Designs utilizing Ultimate Capacities exceeding the maximum values indicated below will not be accepted.

2.a.1. Spread Footings on Soil

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

2.a.2. Spread Footings on Rock

The Ultimate Bearing Capacity is limited to a maximum of *(specify value, X.X)* tsf

2.a.3. Drilled Caisson Supported Foundations

The Ultimate (Geotechnical) Unit Side Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

The Ultimate (Geotechnical) Unit Tip Capacity for rock sockets is limited to a maximum of *(specify value, X.X)* tsf.

3. Required Geotechnical Exploration

Provide and utilize the following number of borings for the foundation design, at a minimum:

(specify number and location)

Previously obtained borings as shown on the Conceptual TS&L Plans may be used as a required boring where the boring lies within the footprint of the footing.

Perform the geotechnical exploration for the bridge structure according to the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, Section VIII – General Design Requirements, Design Specifications. *(List any additional publications, and identify the publications they supersede)*

4. Laboratory Testing

(Specify required laboratory tests)

5. Foundation Submission

Prepare and submit a foundation report in accordance with the requirements of DM-4, PP Section 1.9.4.3. Cost comparisons in accordance with Section 1.9.4.3.1, item (c) are not required.

6. Construction Requirements

6.a. Settlement Monitoring

(Specify other construction requirements or indicate "Not Applicable")

6.b. Other

(Specify other construction requirements or indicate "Not Applicable")

(f) Submittals

1. Final TS&L Submission

Include the following information in the TS&L submission:

1. Final TS&L submission letter: In accordance with DM-4 PP Section 1.9.3.3.1, item (a).

2. Final TS&L plans: In accordance with DM-4 PP Section 1.9.3.3.1, item (b).

3. Supply the following additional information:

(a) Route and section number, index map and segment/offset of limits

(b) Name of Lead Design Engineer

4. Completed applicable Q/A Forms D-501 and/or D-502 (refer to DM- 4 Appendix A)

2. General

Submit all calculations and details for ITS devices and Support Structures, DMS Support Structures, and for modifications to existing structures.

Submit final construction drawings and details as required to complete the work, based on the TS&L plans.

Provide a certification letter, signed and sealed by a Professional Engineer registered in the State, certifying that the internal structure of the DMS and the connection to the sign structure meet the requirements of the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" as amended by the Department. Have the certification letter prepared by the DMS manufacturer's Professional Engineer and submitted by the contractor.

3. Foundation Submission (As Applicable)

In accordance with DM-4, PP Section 1.9.4.3.1 and Section II(e) of this Special Provision for submittal requirements.

4. Final Structure and Foundation Plans

In accordance with DM-4. Sign and seal each plan sheet in accordance with DM-4, PP Section 1.6.3.1. Upon completion of Quality Assurance Review, or Owner's Perspective Review, as applicable, of the Final Structure and Foundation Plans and receipt of drawings stamped "Released for Construction," provide the Department with one (*Specify: "paper", "linen", "tracing paper" "vellum" or "electronic"*) copy for signature by the District Bridge Engineer.

5. Revisions During Construction and "As-Built" Drawings

In accordance with DM-4, PP Section 1.10.6, except that the Contractor is responsible for making changes to the contract drawings, and making and distributing necessary copies of the revised plans to all affected parties. The following shall replace DM-4, PP Section 1.10.5: "If a design error occurs, the Contractor is fully responsible for the costs associated with providing additional design analysis and construction modifications, acceptable to the Department, to correct the problem. The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of the structure item via work order."

Maintain and submit "As-Built" Drawings in accordance with Publication 10C, Design Manual Part 1C, Transportation Engineering Procedures, Section 5.7, As-Built Plans, except include major quantity changes.

All "As-Built" drawings are the sole responsibility of the contractor and must be submitted to the District within 3 months of final inspection acceptance, as defined in Publication 408, Section 110.08(a).

(g)-Submittal Review, Approval, and Distribution

Make the following submissions in accordance with the Special Provision titled SPECIAL BIDDING – DESIGN BUILD, except as follows:

- Partial Plans Submissions: (*Specify partial plans submission review procedure, or indicate "None"*)

III. MEASUREMENT AND PAYMENT – Lump Sum. Includes the entire design for ITS devices and structures

Payment for the design activity (including coordination, design, calculations, Final Plans and specifications) based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN BUILD, utilizing the following components:

- Final TS&L Approvals
- Foundation Approvals
- Final Structure Plan and Final Construction Drawing Approvals
- Final Plans – for signature
- As-Built Drawings (Structures)

Project Specific Details:

Special Provision: **D82310B - c82310 ITEM 8XXX -YYYY CONSTRUCTION OF BRIDGE STRUCTURE, S-xxxxx**

Item(s) Associated:

Header:

ITEM 8XXX-YYYY Construction of Bridge Structure, S-xxxxx

Provision Body:

I. DESCRIPTION - This work is the construction of a bridge structure of the type bid in the corresponding specification entitled "Design of Bridge Structure" and in accordance with the approved design and structure drawings. Construction of a temporary excavation support and protection system is included, if applicable.

II. MATERIAL - As indicated and as specified for each respective item included in the bridge structure.

III. CONSTRUCTION - In accordance with Publication 408, Special Provisions for each respective item, and any additional requirements specified herein.

Prepare and submit Shop Drawings in accordance with Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP) Section 1.10.2.

Prepare and submit Pile Hammers for approval in accordance with DM-4, PP Section 1.10.3

Prepare and submit Pile Load Test Evaluations in accordance with DM-4, PP Section 1.10.4

The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item in accordance with Publication 408, Section 110.03.

Be responsible for making changes to the contract drawings, and making and distributing necessary copies of revised plans to all affected parties in accordance with DM-4, PP Section 1.10.6.

Do not start construction until structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed. Construction may start on components of the structure provided that partial structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed.

If utility relocations are required as part of an alternate structure, be responsible for the cost of the utility relocations in excess of those indicated in the contract documents. Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

(Add additional construction requirements, as applicable)

IV. MEASUREMENT AND PAYMENT - Lump Sum

(a) General

Partial payment will be made for all work indicated on the Final Structure Drawings for S-~~XXXXXX~~ based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as indicated otherwise herein.

(Include Sections IV (b), (c), (d), and (e) only when an as-designed foundation of the type(s) indicated are provided)

(b) Bearing Piles

Bearing piles furnished in accordance with the as-designed foundation parameters will be considered as included in the contract lump sum price, except adjustment to the contract lump sum price, via work order, will be made for driving bearing piles to elevations beyond the as-designed estimated pile tip elevations using the following methodology:

- Determine the average overlength or underlength for all bearing piles based on the estimated pile tip elevations. Determine the average overlength or underlength for each pile size separately.
- For designs with substructure units relocated from the positions shown on the Conceptual TS&L plans, estimated pile tip elevations at the relocated substructure unit will be computed by straight-line interpolation along the construction centerline, to the next 1 foot, using the as-designed estimated pile tip elevations at the Conceptual TS&L substructure units in back and ahead of the relocated unit. If estimated pile tip elevations are provided in the contract for locations between the Conceptual TS&L substructure unit locations, use estimated pile tip elevations that are nearest to the relocated substructure unit for interpolation. Base the average distance between Conceptual TS&L substructure units on

measurements between the centerlines of piers (or centerline of bearing at abutments) along the centerlines of exterior girders or beams. If the bridge structure is longer than the Conceptual TS&L bridge structure, estimated pile tip elevations for the relocated abutment will be computed using the pile tip elevations from the Conceptual TS&L abutment at the locations nearest to the relocated abutment.

- If one of the substructure units shown on the Conceptual TS&L plans in back or ahead of a relocated unit is wholly supported on a spread foundation, the estimated pile tip elevations for the relocated unit, to the nearest 1 foot, will be computed by a straight line interpolation, using the estimated pile tip elevation of the pile supported unit and zero length at the top of rock at the spread foundation supported unit. If spread footing data and/or estimated pile tip elevations are provided in the contract for locations between the Conceptual TS&L substructure unit locations, the foundation data closer to the relocated substructure will be used to compute the estimated pile tip elevations.
- Adjustment to the contract lump sum price will be determined as follows:

$$A = \text{"Average overlength or underlength of Bearing Piles"} \times \text{"Total Number of Bearing Piles"} \times \text{"Bid rate for Bearing Piles"} \text{ (positive value for overlength, negative value for underlength)}$$

Cost Adjustment = SUM ("A" for each pile size), except that no adjustment will be made when SUM ("A" for each pile size) is a negative value.

Test pile extensions, if necessary, will be considered as included in the contract lump sum price.

Bearing piles designed by the Contractor as an alternate to the as-designed foundation will be considered as included in the contract lump sum price.

(c) Drilled Caissons

Drilled caissons furnished in accordance with the as-designed foundation parameters will be considered as included in the contract lump sum price, except adjustment will be made to the contract lump sum price, via work order, for installing shaft sections or rock sockets to lengths beyond the as-designed lengths using the following methodology:

- Determine the average overlength or underlength for all drilled shafts based on the as-designed lengths and the actual lengths. Determine the average overlength or underlength for each caisson diameter separately for: shaft section in soil; shaft section in rock; and rock socket.
- For designs with substructure units relocated from the positions shown on the Conceptual TS&L plans, shaft and rock socket lengths at the relocated substructure unit will be computed by straight-line interpolation along the construction centerline, to the next 1 foot, using the as-designed lengths at the Conceptual TS&L substructure units in back and ahead of the relocated unit. If shaft and rock socket design data are provided in the contract for locations between the Conceptual TS&L substructure unit locations, use the shaft and rock socket design data that are nearest to the relocated substructure unit for interpolation. Base the average distance between Conceptual TS&L substructure units on measurements between the centerlines of piers (or centerline of bearing at abutments) along the centerlines of exterior girders or beams. If the bridge structure is longer than the Conceptual TS&L bridge structure, shaft and rock socket lengths for the relocated abutment will be computed using the lengths shown for the Conceptual TS&L abutment at the locations nearest to the relocated abutment.
- If one of the substructure units shown on the Conceptual TS&L plans in back or ahead of a relocated unit is wholly supported on a spread foundation, the as-designed caisson length for the relocated unit, to the nearest 1 foot, will be computed by a straight line interpolation, using the as-designed caisson length of the Conceptual TS&L caisson supported unit and zero length at the top of rock at the spread foundation supported unit. If spread footing and/or caisson data are provided in the contract for locations between the Conceptual TS&L substructure unit locations, the foundation design data closer to the relocated substructure will be used to compute the estimated shaft and rocket socket lengths.
- Adjustment to the contract lump sum price will be determined as follows:

A = "Average overlength or underlength of Shaft In Soil" x "Total Number of Caissons" x "Bid rate for Shaft in Soil"
(positive value for overlength, negative value for underlength)

B = "Average overlength or underlength of Shaft In Rock" x "Total Number of Caissons" x "Bid rate for Shaft in Rock"
(positive value for overlength, negative value for underlength)

C = "Average overlength or underlength of Rock Socket" x "Total Number of Caissons" x "Bid rate for Rock Socket"
(positive value for overlength, negative value for underlength)

Cost Adjustment = SUM [(A + B + C) for each caisson diameter], except that no adjustment will be made when SUM [(A + B + C) for each caisson diameter] is a negative value.

Caissons designed by the Contractor as an alternate to the as-designed foundation will be considered as included in the contract lump sum price.

(d) Bearing Piles and Caissons

Adjustment to the contract lump sum price for projects with both as-designed bearing piles and as-designed caissons will be computed as follows:

Cost Adjustment = [Cost Adjustment for Bearing Piles] + [Cost Adjustment for Caissons], except that no adjustment will be made when [Cost Adjustment for Bearing Piles] + [Cost Adjustment for Caissons] is a negative value.

(e) Other

(As applicable, add basis for measurement and payment for other foundation types or indicate "Not Applicable")

Project Specific Details:

Special Provision: **D82320B - c82320 ITEM 8XXX-YYYY CONSTRUCTION OF RETAINING WALL, S-xxxx**

Item(s) Associated:

Header:

ITEM 8XXX-YYYY Construction of Retaining Wall, S-xxxxx

Provision Body:

I. DESCRIPTION - This work is the construction of a retaining wall of the type bid in the corresponding specification entitled "Design of Retaining Wall" and in accordance with the approved design and structure drawings. Construction of a temporary

excavation support and protection system is included, if applicable.

II. MATERIAL - As indicated and as specified for each respective item included in the retaining wall.

III. CONSTRUCTION - In accordance with Publication 408, Special Provisions for each respective item and any additional requirements specified herein.

Prepare and submit Shop Drawings in accordance with Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP) Section 1.10.2.

Prepare and submit Pile Hammers for approval in accordance with DM-4, PP Section 1.10.3.

Prepare and submit Pile Load Test Evaluations in accordance with DM-4, PP Section 1.10.4.

The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item in accordance with Publication 408, Section 110.03.

Be responsible for making changes to the contract drawings, and making and distributing necessary copies of revised plans to all affected parties in accordance with applicable sections of DM-4, PP Section 1.10.6.

Do not start construction until structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed. Construction may start on components of the structure provided that partial structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed.

If utility relocations are required as part of an alternate retaining wall, be responsible for the cost and delay of the utility relocations in excess of those indicated in the contract documents. Additional contract time will not be considered for additional utility relocation work associated with an alternate retaining wall.

(Add additional construction requirements, as applicable)

IV. MEASUREMENT AND PAYMENT - Lump Sum

(a) General

Partial payment will be made for all work indicated on the Final Structure Drawings for S-XXXXXX based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as indicated otherwise herein.

(Include Sections IV (b), (c), (d), and (e) only when an as-designed foundation of the type(s) indicated are provided)

(b) Bearing Piles

Bearing piles furnished in accordance with the as-designed foundation parameters will be considered as included in the contract lump sum price, except adjustment to the contract lump sum price, via work order, will be made for driving bearing piles to elevations beyond the as-designed estimated pile tip elevations using the following methodology:

- Determine the average overlength or underlength for all point bearing piles based on the estimated pile tip elevations. Determine the average overlength or underlength for each pile size separately.
- Adjustment to the contract lump sum price will be determined as follows:

$$A = \text{"Average overlength or underlength of Bearing Piles"} \times \text{"Total Number of Bearing Piles"} \times \text{"Bid rate for Bearing Piles"} \text{ (positive value for overlength, negative value for underlength)}$$

Cost Adjustment = SUM ("A" for each pile size), except that no adjustment will be made when SUM ("A" for each pile size) is a negative value.

Test pile extensions, if necessary, will be considered as included in the lump sum price.

Bearing piles for relocated retaining walls and bearing piles designed by the Contractor as an alternate to the as-designed foundation will be considered as included in the contract lump sum price.

(c) Drilled Caissons

Drilled caissons furnished in accordance with the as-designed foundation parameters will be considered as included in the contract lump sum price, except adjustment will be made to the contract lump sum price, via work order, for installing shaft sections or rock sockets to lengths beyond the as-designed lengths using the following methodology:

- Determine the average overlength or underlength for all drilled shafts based on the as-designed lengths and the actual lengths. Determine the average overlength or underlength for each caisson diameter separately for: shaft section in soil; shaft section in rock; and rock socket.
- Adjustment to the contract lump sum price will be determined as follows:

$$A = \text{"Average overlength or underlength of Shaft In Soil"} \times \text{"Total Number of Caissons"} \times \text{"Bid rate for Shaft in Soil"} \text{ (positive value for overlength, negative value for underlength)}$$

B = "Average overlength or underlength of Shaft In Rock" x "Total Number of Caissons" x "Bid rate for Shaft in Rock" (positive value for overlength, negative value for underlength)

C = "Average overlength or underlength of Rock Socket" x "Total Number of Caissons" x "Bid rate for Rock Socket" (positive value for overlength, negative value for underlength)

Cost Adjustment = SUM [(A + B + C) for each caisson diameter], except that no adjustment will be made when SUM [(A + B + C) for each caisson diameter] is a negative value.

Caissons for relocated retaining walls and caissons designed by the Contractor as an alternate to the as-designed foundation will be considered as included in the contract lump sum price.

(d) Bearing Piles and Caissons

Adjustment to the contract lump sum price for projects with both as-designed bearing piles and as-designed caissons will be computed as follows:

Cost Adjustment = [Cost Adjustment for Bearing Piles] + [Cost Adjustment for Caissons], except that no adjustment will be made when [Cost Adjustment for Bearing Piles] + [Cost Adjustment for Caissons] is a negative value.

(e) Other

(As applicable, add basis for measurement and payment for other foundation types or indicate "Not Applicable")

Project Specific Details:

Special Provision: **D82330B - c82330 ITEM 8XXX-YYYY CONSTRUCTION OF CULVERT, S-xxxxx**

Item(s) Associated:

Header:

ITEM 8XXX-YYYY Construction of Culvert, S-xxxxx

Provision Body:

I. DESCRIPTION - This work is the construction of a culvert of the type bid in the corresponding specification entitled "Design of Culvert" and in accordance with the approved design and structure drawings. Construction of a temporary excavation support and protection system is included, if applicable.

II. MATERIAL - As indicated and as specified for each respective item included in the culvert.

III. CONSTRUCTION - In accordance with Publication 408; Special Provisions for each respective item; and any additional requirements specified herein.

Prepare and submit Shop Drawings in accordance with Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP) Section 1.10.2.

The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item in accordance with Publication 408, Section 110.03.

Be responsible for making changes to the contract drawings, and making and distributing necessary copies of revised plans to all affected parties in accordance with DM-4, PP Section 1.10.6.

Do not start construction until structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed. Construction may start on components of the structure provided that partial structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed.

If utility relocations are required as part of an alternate culvert, be responsible for the cost of the utility relocations in excess of those indicated in the contract documents. Additional contract time will not be considered for additional utility relocation work associated with an alternate culvert.

(Add additional construction requirements, as applicable)

IV. MEASUREMENT AND PAYMENT - Lump Sum

(a) General

Partial payment will be made for all work indicated on the Final Structure Drawings for S-XXXXXX based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as indicated otherwise herein.

(As applicable, specify payment methods for work that is not included in the lump sum price for the culvert)

(Include Sections IV (b), (c), (d), and (e) only when an as-designed foundation of the type(s) indicated are provided)

(b) Bearing Piles

Bearing piles furnished in accordance with the as-designed foundation parameters will be considered as included in the contract lump sum price, except adjustment to the contract lump sum price, via work order, will be made for driving bearing piles to elevations beyond the as-designed estimated pile tip elevations using the following methodology:

- Determine the average overlength or underlength for all point bearing piles based on the estimated pile tip elevations. Determine the average overlength or underlength for each pile size separately.
- Adjustment to the contract lump sum price will be determined as follows:

$A = \text{"Average overlength or underlength of Bearing Piles"} \times \text{"Total Number of Bearing Piles"} \times \text{"Bid rate for Bearing Piles"}$ (positive value for overlength, negative value for underlength)

Cost Adjustment = SUM ("A" for each pile size), except that no adjustment will be made when SUM ("A" for each pile size) is a negative value.

Test pile extensions, if necessary, will be considered as included in the lump sum price.

Bearing piles for relocated retaining walls and bearing piles designed by the Contractor as an alternate to the as-designed foundation will be considered as included in the contract lump sum price.

(c) Drilled Caissons

Drilled caissons furnished in accordance with the as-designed foundation parameters will be considered as included in the contract lump sum price, except adjustment will be made to the contract lump sum price, via work order, for installing shaft sections or rock sockets to lengths beyond the as-designed lengths using the following methodology:

- Determine the average overlength or underlength for all drilled shafts based on the as-designed lengths and the actual lengths. Determine the average overlength or underlength for each caisson diameter separately for: shaft section in soil; shaft section in rock; and rock socket.
- Adjustment to the contract lump sum price will be determined as follows:

$A = \text{"Average overlength or underlength of Shaft In Soil"} \times \text{"Total Number of Caissons"} \times \text{"Bid rate for Shaft in Soil"}$ (positive value for overlength, negative value for underlength)

$B = \text{"Average overlength or underlength of Shaft In Rock"} \times \text{"Total Number of Caissons"} \times \text{"Bid rate for Shaft in Rock"}$ (positive value for overlength, negative value for underlength)

C = "Average overlength or underlength of Rock Socket" x "Total Number of Caissons" x "Bid rate for Rock Socket" (positive value for overlength, negative value for underlength)

Cost Adjustment = SUM [(A + B + C) for each caisson diameter], except that no adjustment will be made when SUM [(A + B + C) for each caisson diameter] is a negative value.

Caissons for relocated retaining walls and caissons designed by the Contractor as an alternate to the as-designed foundation will be considered as included in the contract lump sum price.

(d) Bearing Piles and Caissons

Adjustment to the contract lump sum price for projects with both as-designed bearing piles and as-designed caissons will be computed as follows:

Cost Adjustment = [Cost Adjustment for Bearing Piles] + [Cost Adjustment for Caissons], except that no adjustment will be made when [Cost Adjustment for Bearing Piles] + [Cost Adjustment for Caissons] is a negative value.

(e) Other

(As applicable, add basis for measurement and payment for other foundation types or indicate "Not Applicable")

Project Specific Details:

Special Provision: **D82340B - c82340 ITEM 8XXXX -YYYY CONSTRUCTION OF SOUND BARRIER WALL SYSTEM, S-xxxxx**

Item(s) Associated:

Header:

ITEM 8XXXX -YYYY Construction of Sound Barrier Wall System, S-xxxxx

Provision Body:

I. DESCRIPTION - This work is the construction of a sound barrier of the type bid in the corresponding specification entitled "Design of Sound Barrier Wall System" and in accordance with the approved design and structure drawings. Construction of a temporary excavation support and protection system is included, if applicable.

II. MATERIAL - As indicated and as specified for each respective item included in the sound barrier.

III. CONSTRUCTION - In accordance with Publication 408, Special Provisions for each respective item, and any additional requirements specified herein.

Prepare and submit Shop Drawings in accordance with Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP) Section 1.10.2. Include the following in the Shop Drawings:

- Beginning and ending stations of the sound wall section
- Horizontal and vertical alignments of the sound wall section
- Elevations of the top of panel, bottom of panel, and panel joints (if applicable)
- Panel locations by station and offset
- Post locations by station and offset
- Existing and proposed ground locations
- Special post and panel details
- Post, panel, and foundation connection details
- Lifting devices
- Fire hose and access door locations and details
- Special drainage details associated with the sound barrier system
- Utility locations
- Certification by the Contractor's acoustical expert that the barrier system design represented by the shop drawings meets all of the project's acoustical requirements.

The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item in accordance with Publication 408, Section 110.03.

Be responsible for making changes to the contract drawings, and making and distributing necessary copies of revised plans to all affected parties in accordance with applicable sections of DM-4, PP Section 1.10.6.

Do not start construction until structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed. Construction may start on components of the structure provided that partial structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed.

Before starting construction of the project sound barrier systems, erect one full size test panel with cap, and two full size test posts for inspection and approval by the Department. Such inspection will be performed by the Department at the location(s) of fabrication of the post and panels. This inspection will be solely for the purpose of approving the aesthetic appearance of the post and panels and will not replace any structural and/or material requirements of this contract. The post and panels will be inspected in their ultimate aesthetic condition with all surfaces finished and treatments applied. If approved, the post and panels may be used as part of the permanent sound barrier system, provided that the post and panels meet all of the structural and material requirements of this contract. Panel and posts not incorporated into the Contract work will be incidental to the cost of the sound barrier.

Before starting construction of the project sound barrier system on the project site, erect a test wall section on the project site composed of a minimum of 4 posts and 3 panels at a location directed by The Department. This section, if approved, will become a portion of the permanent sound barrier system. The Department will use the erection of this test wall section to determine if the

methods and equipment are sufficient to produce a sound barrier system that meets the requirements of the contract documents. Methods and equipment may be revised at any time during the positioning of the test section in order to meet the contract requirements. If the test wall section does not meet the construction tolerances or the aesthetic and/or acoustical requirements of the contract, remove and dispose of the test wall section or portions thereof at no additional cost to the Department. Reconstruct the test wall section until determined by the Department to meet the contract requirements. The test wall section will be incidental to the cost of the sound barrier.

If utility relocations are required as part of a sound barrier, be responsible for the cost of the utility relocations in excess of those indicated in the contract documents. Additional contract time will not be considered for additional utility relocation work associated with an alternate sound barrier.

(Add additional construction requirements, as applicable)

IV. MEASUREMENT AND PAYMENT - Lump Sum

(a) General

Partial payment will be made for all work indicated on the Final Structure Drawings for S-XXXXX based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as indicated otherwise herein.

(As applicable, specify payment methods for work that is not included in the lump sum price for the sound barrier)

Project Specific Details:

Special Provision: **D82350B - c82350 ITEM 8260-YYYY CONSTRUCTION OF REHABILITATION AND/OR WIDENING OF BRIDGE STRUCTURE, S-xxxxx**

Item(s) Associated:

Header:

ITEM 8260-YYYY Construction of Rehabilitation and/or Widening of Bridge Structure

Provision Body:

I. DESCRIPTION -This work is the construction for bridge work of the type bid in the corresponding specification entitled "Design for Rehabilitation and/or Widening of Bridge Structure" and in accordance with the approved design and structure drawings. Construction of a temporary excavation support and protection system is included, if applicable.

II. MATERIAL - As indicated and as specified for each respective item included in the bridge structure.

III. CONSTRUCTION - In accordance with Publication 408, Special Provisions for each respective item and any additional requirements specified herein.

Prepare and submit Shop Drawings in accordance with Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP) Section 1.10.2.

Prepare and submit Pile Hammers for approval in accordance with DM-4, PP Section 1.10.3. *(Delete if not required)*

Prepare and submit Pile Load Test Evaluations in accordance with DM-4, PP Section 1.10.4. *(Delete if not required)*

The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item in accordance with Publication 408, Section 110.03.

Be responsible for making changes to the contract drawings, and making and distributing necessary copies of revised plans to all affected parties in accordance with DM-4, PP Section 1.10.6.

Do not start construction until structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed. Construction may start on components of the structure provided that partial structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed.

If utility relocations are required as part of an alternate structure, be responsible for the cost of the utility relocations in excess of those indicated in the contract documents. Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

(Add additional construction requirements, as applicable)

IV. MEASUREMENT AND PAYMENT - Lump Sum

(a) General

Partial payment will be made for all work indicated on the Final Structure Drawings for S-XXXXXX based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as indicated otherwise herein.

(Include Sections IV (b), (c), (d), and (e) only when an as-designed foundation of the type(s) indicated are provided)

(b) Bearing Piles

Bearing piles furnished in accordance with the as-designed foundation parameters will be considered as included in the contract lump sum price, except adjustment to the contract lump sum price, via work order, will be made for driving bearing piles to elevations beyond the as-designed estimated pile tip elevations using the following methodology:

- Determine the average overlength or underlength for all bearing piles based on the estimated pile tip elevations. Determine the average overlength or underlength for each pile size separately.
- Adjustment to the contract lump sum price will be determined as follows:

$A = \text{"Average overlength or underlength of Bearing Piles"} \times \text{"Total Number of Bearing Piles"} \times \text{"Bid rate for Bearing Piles"}$ (positive value for overlength, negative value for underlength)

Cost Adjustment = SUM ("A" for each pile size), except that no adjustment will be made when SUM ("A" for each pile size) is a negative value.

Test pile extensions, if necessary, will be considered as included in the contract lump sum price.

Bearing piles designed by the Contactor as an alternate to the as-designed foundation will be considered as included in the contract lump sum price.

(c) Drilled Caissons

Drilled caissons furnished in accordance with the as-designed foundation parameters will be considered as included in the contract lump sum price, except adjustment will be made to the contract lump sum price, via work order, for installing shaft sections or rock sockets to lengths beyond the as-designed lengths using the following methodology:

- Determine the average overlength or underlength for all drilled shafts based on the as-designed lengths and the actual lengths. Determine the average overlength or underlength for each caisson diameter separately for: shaft section in soil; shaft section in rock; and rock socket.
- Adjustment to the contract lump sum price will be determined as follows:

$A = \text{"Average overlength or underlength of Shaft In Soil"} \times \text{"Total Number of Caissons"} \times \text{"Bid rate for Shaft in Soil"}$ (positive value for overlength, negative value for underlength)

$B = \text{"Average overlength or underlength of Shaft In Rock"} \times \text{"Total Number of Caissons"} \times \text{"Bid rate for Shaft in Rock"}$ (positive value for overlength, negative value for underlength)

$C = \text{"Average overlength or underlength of Rock Socket"} \times \text{"Total Number of Caissons"} \times \text{"Bid rate for Rock Socket"} \text{ (positive value for overlength, negative value for underlength)}$

Cost Adjustment = SUM [(A + B + C) for each caisson diameter], except that no adjustment will be made when SUM [(A + B + C) for each caisson diameter] is a negative value.

Caissons designed by the Contactor as an alternate to the as-designed foundation will be considered as included in the contract lump sum price.

(d) Bearing Piles and Caissons

Adjustment to the contract lump sum price for projects with both as-designed bearing piles and as-designed caissons will be computed as follows:

Cost Adjustment = [Cost Adjustment for Bearing Piles] + [Cost Adjustment for Caissons], except that no adjustment will be made when [Cost Adjustment for Bearing Piles] + [Cost Adjustment for Caissons] is a negative value.

(e) Other

(As applicable, add basis for measurement and payment for other foundation types or indicate "Not Applicable")

Project Specific Details:

Special Provision: **D82360B - c82360 ITEM 8XXX-YYYY CONSTRUCTION OF SUPERSTRUCTURE REPLACEMENT, S-xxxxx**

Item(s) Associated:

Header:

ITEM 8XXX-YYYY Construction of Superstructure Replacement, S-xxxxx

Provision Body:

I. DESCRIPTION - This work is the construction of a new bridge superstructure of the type bid in the corresponding specification entitled "Design for Superstructure Replacement" and in accordance with the approved design and structure drawings.

II. MATERIAL - As indicated and as specified for each respective item included in the bridge structure.

III. CONSTRUCTION - In accordance with Publication 408, Special Provisions for each respective item, and any additional requirements specified herein.

Prepare and submit Shop Drawings in accordance with Publication 15M, Design Manual Part 4 (DM-4), Policies and Procedures (PP) 1.10.2.

The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item in accordance with Publication 408, Section 110.03.

Be responsible for making changes to the contract drawings, and making and distributing necessary copies of revised plans to all affected parties in accordance with DM-4, PP Section 1.10.6.

Do not start construction until structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed. Construction may start on components of the structure provided that partial structure plans stamped "Released for Construction" are transmitted by a letter indicating which work can proceed.

If utility relocations are required as part of an alternate structure, be responsible for the cost of the utility relocations in excess of those indicated in the contract documents. Additional contract time will not be considered for additional utility relocation work associated with an alternate structure.

(Add additional construction requirements, as applicable)

IV. MEASUREMENT AND PAYMENT - Lump Sum

(a) General

Partial payment will be made for all work indicated on the Final Structure Drawings for S-XXXXX based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN-BUILD, except as indicated otherwise herein.

(As applicable, specify payment methods for work that is not included in the lump sum price for the superstructure replacement)

Project Specific Details:

Special Provision: **D82370C - c82370 ITEM 8237-YYYY - CONSTRUCTION OF ITS DEVICES AND DMS STRUCTURES (NO AS-DESIGNED FOUND**

Item(s) Associated:

Header:

ITEM 8237-YYYY - CONSTRUCTION OF INTELLIGENT TRANSPORTATION SYSTEM DEVICES AND DYNAMIC MESSAGE SIGN STRUCTURES (NO AS-DESIGNED FOUNDATIONS PROVIDED), S-xxxxx (add S numbers as needed)

Provision Body:

I. DESCRIPTION - This work is the construction of Intelligent Transportation System (ITS) devices and Dynamic Message Sign Structures of the type bid in the corresponding Special Provision titled DESIGN OF INTELLIGENT TRANSPORTATION SYSTEM DEVICES AND DYNAMIC MESSAGE SIGN STRUCTURES and in accordance with the approved design and structure drawings.

II. MATERIAL - As indicated and as specified for each respective item included in the ITS devices and the dynamic message sign structures (and its components).

III. CONSTRUCTION – In accordance with Publication 408; the Special Provisions included in the Contact; Publication 647 M (ITS-1000M) Civil and Structural Standards for Intelligent Transportation Systems; in accordance with applicable details of Publication 647M (ITS-1003M) and Publication 219M (BC-741M for Double Strut Center-Mount/Cantilever Structures and BC-745M for Overhead Truss Structures); and any additional requirements specified herein.

Prepare and submit shop drawings in accordance with Publication 15M, Design Manual Part 4 (DM-4) based on details from the approved Final Sign Structures Plans and Standard Drawing BC-741M for Double Strut Center-Mount/Cantilever Structures and Standard Drawing BC-745M for Overhead Truss Structures.

Hot-dip galvanize the inside and outside surfaces of all support structure components as specified in Publication 408, Section 1105.02(s) (ASTM A 123/A 123 M) after fabrication and before shipment.

The Department will require reimbursement for design errors to cover engineering review costs. This amount will be deducted from the lump sum cost for the construction of structure item in accordance with Publication 408, Section 110.03.

Be responsible for making changes to the contract drawings and making and distributing necessary copies of revised plans to all affected parties in accordance with applicable sections of DM-4, Policies and Procedures (PP) Section 1.10.6.

Do not start construction until structure plans stamped “Released for Construction” are transmitted by a letter indicating which work can proceed. Construction may start on components of the structure provided that partial structure plans stamped “Released for Construction” are transmitted by a letter indicating which work can proceed.

If utility relocations are required as part of each Dynamic Message Sign Structure, be responsible for the cost of utility relocations in excess of those indicated in the contract documents. Additional contract time will not be considered for additional utility relocation work associated with the Dynamic Message Sign Structure.

Have a Geotechnical Engineer certify the foundation material at each new ITS structure location is within the design parameters of the Department’s Standard Drawings.

(Add additional construction requirements, as applicable)

IV. MEASUREMENT AND PAYMENT – Lump Sum

Partial payment will be made for all work indicated on the Final Structure and Foundation Plans for S-XXXXXX *(add S numbers as needed)* and **Final Construction Drawings** based on the approved Schedule of Values in accordance with Section IX of the Special Provision titled SPECIAL BIDDING – DESIGN BUILD, except as indicated otherwise herein.

(As applicable, specify payment methods for work that is not included in the lump sum price for the DMS structure)

Project Specific Details:

ITEM 8000-_____**SPECIFICATIONS FOR MASS CONCRETE – CONTROL OF HEAT OF HYDRATION**

In accordance with Sections 110, 701, 703, 704, 724, 1001.

Revise and supplement Sections as follows, in case of a conflict, these specifications govern only for mass concrete:

I. DESCRIPTION

Produce a structure free of visible thermal cracks and Delayed Ettringite Formation (DEF) that would be the result of heat of hydration during the curing of large concrete pours. Accomplish this through appropriate concrete mix design and management of maximum concrete internal temperature and maximum temperature differential. Structural mass concrete is defined as any concrete pour with a least dimension greater than or equal to 6' including drilled shafts and caissons. Department accepted Thermal Control Plan (always required for mass concrete) and Temperature Monitoring Plan (only required when least dimension >9') are required.

II. MIX DESIGN FOR REDUCED HEAT GENERATION - LEAST DIMENSION 6' OR MORE

- A. Provide Portland Cement of Type I, II, IP, or IS.
- B. Use any combination of Ground Granulated Blast Furnace Slag (25% to 60%) and Class F fly ash (15% to 25%). Lower replacement quantities of SCM's may be approved provided all other requirements are met, including ASR remediation if potentially reactive aggregates are used. The maximum total Supplementary Cementitious Materials (SCMs) substitution of Portland cement shall not exceed 60%, including blended cement.
- C. Provide a Cement Factor of a minimum of 400 pounds per cubic yard, including pozzolans/SCMs, with 250 pcy minimum of Portland Cement.
- D. Maximum water to cementitious ratio shall be 0.50.
- E. Provide air entrainment for elements above frost line. To improve workability and aid in air entrainment, water reducing or retarding admixtures may be used. If water reducing admixtures are used the slump may be increased as permitted in Publication 408.
- F. Develop the mix design to limit the maximum internal temperature of the placement does not exceed 160°F.
- G. Develop the mix design to limit the maximum temperature differential between internal and surface temperature of concrete to be 36°F or less.
- H. Coarse aggregate may include Nos. 3 and 467 per 703, Table-C.
- I. Perform initial trial mix design compressive strength and production compressive strength testing for acceptance at 56-days.

III. Thermal Control Plan Design**A. Thermal Control Plan – Least Dimension is 6' to 9'**

Submit a written Thermal Control Plan, signed and sealed by a Registered Professional Engineer in Pennsylvania describing the procedures that will be used during the period of heat dissipation following concrete placement to limit the predicted temperature differential between the interior of the section and the outside surface of the section does not exceed 36°F and the predicted maximum internal temperature of the concrete does not exceed 160°F. Submit the Thermal Control Plan at least 30 calendar days before the first intended structural mass concrete placement.

Provide in the Thermal Control Plan:

- Procedures to control maximum concrete temperature at time of placement
- Calculated temperature rise at the center of the placement
- Calculated temperature rise at each concrete surface
- The calculated temperature differential between adjoining faces and opposite faces
- Heat flow analysis for each concrete placement. Perform separate analyses at 40 degrees,

65 degrees and 90 degrees - expected minimum ambient air temperatures and maximum ambient air temperatures at time of placement.

- Include mix design heat generation analysis to demonstrate the computed maximum temperature at placement + rise °F <160°F)
- Provide calculation based on computing the maximum computed temperature rise computed shall not exceed 160°F based on 0.14 x equivalent cement content, LB/CY, (except consider GGBFS at 0.90 LB/CY & Class-F fly ash at 0.50 LB/CY of Portland Cement) plus the concrete installation temperature. (i.e. initial concrete placement temperature + computed temperature rise < 160°F)
- Methods to limit the maximum internal concrete temperature and to control the concrete temperature differential through concrete mix design and construction practices for engineered temperature control to prevent thermal cracking.
- Based on the theoretical concrete mix design, confirm the adiabatic heat generation signature for the concrete mix to be used by CCRL accredited lab testing.

Compliance with this specification may result in extended cooling and curing times. Consider options to control heat of hydration that are compatible with the construction schedule.

Do not place concrete covered by this specification until the Thermal Control Plan has received acceptance by the Representative, and equipment and materials necessary to implement the plan are on site and ready for use.

For mass concrete placements with a least dimension of 6' to 9', the Thermal Control Plan procedures must include methods to control the maximum temperature and differential temperature, which may include but are not limited to, the following:

- Cool concrete with portable liquid nitrogen cooling system prior to placement to reduce the placement temperature of the concrete, (45°F to 75°F).
- Add ice to the mix water.
- Wet the aggregate stockpile with cold water
- Insulate the forms and the surface of the concrete to reduce temperature differential to below 36°F.
- Place concrete at times of day when the ambient temperature is lowest (in summer) or highest (in winter).
- Other acceptable methods that are submitted by the Contractor and accepted writing by the Representative.

IV. Thermal Control Plan and Temperature Monitoring Report – Least Dimension is >9'

Qualifications. For mass concrete placements with a least dimension of greater than 9', retain a Professional Engineer, licensed in the State of Pennsylvania, to develop, sign and seal the detailed Thermal Control Plan and Thermal Monitoring Report. The Professional Engineer meeting the following qualifications:

- Demonstrated experience in the modeling, design, monitoring and construction of mass concrete structural elements.
- Submit a list containing at least three mass concrete projects, of similar dimension and thermal control requirements completed in the last five years. Include a brief description of each project and the name and phone number of owner's representatives knowledgeable in each project listed.
- Submit documentation of qualifications to the Representative and allow at least 21 calendar days for acceptance.

In the development of the Thermal Control Plan conform to the procedure outlined in Section 207.4R-05 of the ACI Manual of Cooling and Insulating Systems for Mass Concrete to formulate, implement, administer, and monitor a temperature control plan, making adjustments as necessary to ensure compliance with these Contract Documents.

Included in the Thermal Control Plan, but not be limited to the following:

1. Procedures to control maximum concrete temperature at time of placement.
2. Calculated temperature rise at the center of the placement vs time.
3. Calculated temperature rise at each concrete surface vs time.
4. Summarize all modeling assumptions and parameters used in the analysis.
5. The calculated temperature differential between adjoining faces and opposite faces vs time.
6. Heat flow analysis for each concrete placement and governing element.
7. Include mix design heat generation analysis to demonstrate the computed maximum temperature at placement + rise °F <160°F).
8. Provide calculation based on computing the maximum computed temperature rise computed must not exceed 160 °F based on 0.14 x equivalent cement content, LB/CY, (except consider GGBFS at 0.90 LB/CY & Class-F fly ash at 0.50 LB/CY of Portland Cement) plus the concrete installation temperature. (i.e. initial concrete placement temperature + computed temperature rise < 160°F).
9. Based on the theoretical concrete mix design, confirm the adiabatic heat generation signature for the concrete mix to be used by CCRL accredited lab testing.
10. Methods to limit the maximum internal concrete temperature and to control the concrete temperature differential through concrete mix design and construction practices for engineered temperature control to prevent thermal cracking.
11. Design of a cooling system consisting of non-corrosive piping to be embedded in the structural mass concrete for all mass concrete placements that are below water level within the limits of the river (if required).
12. Provide information on the temperature sensing and recording equipment to be used and details of installation locations of the temperature probes for each planned mass concrete placement.
13. Mass concrete placement plan to ensure prevention of concrete cold joints.
14. Temperature Monitoring Plan to document the recorded ambient temperature, maximum internal temperature and maximum temperature gradient.
15. Provide a section called "corrective measures" to be used control temperature rise should the peak recorded temperature exceed 150°F.
16. If predicted temperatures are not tracking as predicted, notify the Representative and take immediate corrective measures as necessary to control the temperatures adequately.

V. Thermal Control Plan Implementation

1. Ensure maximum concrete temperature at time of placement does not exceed 75°F and not be less than 45°F. Ensure the maximum concrete temperature during the period of heat dissipation does not exceed 160°F.

2. Temperature Differential Restrictions. Do not exceed the temperature differential between the interior of the section and the outside surface of the section limit in the following table:

Hours after placement vs Maximum Temperature Differential	
Hours	Max Temp Differential
0-48	36°F
48-72	40°F
>72	50°F

Maintain thermal control of each placement until the temperature of the interior is within 50°F of the average outside air temperature. The average outside air temperature should be determined by averaging the daily high and low temperatures over the preceding seven calendar days.

3. Temperature Sensing and Recording for each placement of structural mass concrete, install two temperature sensors at each of the following locations (for a total of twelve temperature sensors):

- Center of the placement, minimizing the influence of cooling pipes if present.
- Midpoint of the side which is the shortest distance from the center (minimum 2 inch cover),
- Midpoint of the top surface (minimum 2 inch cover),
- Corner of the placement which is furthest distance from the center (minimum 2 inch cover),
- Midpoint of the bottom surface (minimum 2 inch cover),
- And ambient air temperature.

The purpose for two sensors at each location is to provide a primary and secondary backup.

Record temperatures both automatically and electronically by an approved recorder furnished by the Contractor and be capable of continuously recording a minimum of one reading per hour for the duration of the mass concrete temperature monitoring period, and making a hardcopy for filing. Provide sensors and recorder to accuracy within +/- 2°F in the temperature range of 32°F to 212°F. Provide a backup temperature sensing system, which includes both backup temperature sensors and backup temperature recorder/readout device. Back-up system is intended to be used to complete the monitoring of a placement should the primary system fail. Repair or replace the primary system before the commencement of the next placement. Provide a backup power supply source capable of powering the temperature recording system.

Submit preliminary thermal monitoring results for each placement to the Representative within 24-hours after the 72-hour mark has passed (after the peak temperatures passed), and at the end of the monitoring period. Include a summary of the collected data and graphical representations, both hardcopy and in Microsoft Excel formats.

VI. Concrete Placement

1. Have the Professional Engineer inspect and approve the installation of monitoring devices and verify the process for recording temperature data is effective for the first placement of each size and type mass component. Submit qualifications of all technicians employed to inspect or monitor mass concrete placements to the Representative for acceptance. For placements other than the first, an employee, accepted by the Representative as qualified to inspect monitor device installation, shall be designated to:

- a) Continuously monitor the temperature data as it is collected to ensure continuous system performance,
- b) Be in contact at all times with the Representative if adjustments must be made as a result of the temperature differential or 150°F being exceeded,
- c) Immediately implement adjustments to temperature control measures as directed by the Professional Engineer.

Review recorded temperature data at intervals of no greater than 4 hours. Initiate recording of temperature data when the mass concrete placement is complete and continue until the maximum temperature differential (not maximum temperature) is reached and a decreasing temperature differential is confirmed as defined in the accepted Thermal Control Plan. If conditions change, such as a drop in the ambient temperature or a change in insulation which would result in an increase in the temperature differential, resume the recording of temperature data.

Furnish a copy of all recorded temperature data to the Representative as they are determined, and

submit a final Thermal Monitoring report within 3 days of completion of monitoring of each element.

Only use the accepted specific mix for mass concrete pours.

Concrete Acceptance

2. If the temperature differential within any structural mass concrete placement exceeds the limits above, perform immediate corrective action, future placement of structural mass concrete will be suspended until a revised Thermal Control Plan is submitted to and accepted by the Representative. Do not resume placement of mass concrete without acceptance from the Representative. When mass concrete temperature differentials are exceeded, provide all analyses and test results deemed requested by the Representative for determining the structural integrity and durability of the mass concrete element, to the satisfaction of the Representative. Provide the analyses and/or test results at no cost to the Department and without additional time to be granted.

The placement(s) will be accepted if the measured temperature differential values do not exceed the limits for the mass concrete placement or unacceptable defects (cracking or cold joints) are not evident. Where the temperature differential limits are exceeded or unacceptable defects are found, corrective or remedial action will be required by the Department Representative which may include, but not be limited to:

- a) Temperature limits were exceeded and where cracking greater than 0.005" in width exists.
 - 1. Submit a brief report to the Structural Control Engineer in a scaled elevation drawing showing the locations of the cracks greater than 0.005" along with a repair plan to perform epoxy injection of thermal cracks. The Department will make a final determination based on the extent and scope of cracking whether to accept the repairs in lieu of replacement.
 - 2. Submit a brief report to the Structural Control Engineer in a scaled elevation drawing showing the size(s) and locations of visible cracks less than 0.005" in width, including a repair plan to surface seal the cracks.
- b) Total removal and replacement of the non-complying element concrete, at no cost to the Department if maximum internal temperature exceeded 170°F, unless core samples at no cost to the Department, taken not sooner than 30-days after placement show that the concrete is uncracked and without voids, per Department acceptance criteria.
- c) Where the maximum temperature differential(s) are exceeded requiring either repair or replacement, do not place concrete for a similar placement until a report from the Professional Engineer is submitted explaining the reasons for exceeding the temperature differential limit and a revised Thermal Control Plan to the satisfaction of the Structural Control Engineer.

BASIS OF PAYMENT-

(a) Design and Implement Thermal Control Plan for Mass Concrete.

Lump Sum -- Design & Implementation of Thermal Control Plan, which also requires a Temperature Monitoring Plan if the least dimension of the element exceeds 9'.

Thermal Monitoring – Lump Sum includes mix design, instrumentation, and report

Attachment 23

Existing Right of Way

The following six cover letters that the PDA Entity submitted through e-Builder Process, 327 – *Additional ROW Needs*, for each Bridge set forth that the PDA Entity reviewed the Existing Right of Way lines (including any to-be-acquired parcels) included in the RIDs, and described in the table below, and determined (subject to the terms of the Project Agreement) that no additional ROW beyond such Existing Right of Way lines is required for the construction of each Bridge.

Bridge	ROW Plan File Name	Upload Date
I-81 Susquehanna	I81SQ-ROW-00003 Reference Information Document Only SR81-511_FINAL ROW_PLAN (APPROVED)_2021-05-17	9/30/2021
I-80 Nescopeck	I80NP-ExistPl-00002 Reference Information Document Only Existing I-80 over Nescopeck Creek ROW Plans	9/30/2021
I-78 Lenhartsville	I78LV-ROW-00001R1 Reference Information Document Only _ECMS97274.SR0078-LBR.Final_ROW_Revised_Recorded	2/16/2022
I-80 Lehigh River	I80LR-ROW-00002 Reference Information Document Only 99552 I-80 08B Prelim RW Plan_20211015	12/14/2021
I-80 Canoe Creek	I80CC-ROW-00001R1 Reference Information Document Only 2021-05-10-ROW_Signed 2021-05-11(R2-12-02-21)	12/10/2021
I-80 North Fork	I80NF-ROW-00014 Reference Information Document Only 2021-11-29 I-80 North Fork Bridges - Final ROW Plan	12/12/2021



Making Our Client's Vision a Reality

October 5, 2022

**Cover Letter for Components of Package Proposal Design Submission,
PDA, Exhibit 6 PDA Work Requirements, Section 8.2**

Susquehanna Bridge
e-Builder Submittal Item 327
Additional ROW Needs

Per agreement between PennDOT and Bridging Pennsylvania Partners ("BPP") we are submitting this cover letter to explain changes to the design as released by PennDOT in the RID files or in subsequent releases.

Key Changes

No changes are being made to the Plans that were provided in the RIDs. No additional Right of Way (ROW) is needed for this project.

Sincerely,

Heather J. Heeter
Transportation Business Unit Leader

HJH/eow

Lehigh Valley
Pittsburgh
Wilkes-Barre

Wilkes-Barre
613 Baltimore Drive
Suite 300
Wilkes-Barre, PA 18704

P: 570.821.1999
F: 570.821.1990

September 29, 2022

**Cover Letter for Components of Package Proposal Design Submission,
PDA, Exhibit 6 PDA Work Requirements, Section 8.2**

I-80 Nescopeck Bridges
e-Builder Submittal Item 327
Additional ROW needs

Per agreement between PennDOT and Bridging Pennsylvania Partners (“BPP”) we are submitting this cover letter to explain any changes to the design as released by PennDOT in the RID files or in subsequent releases.

Explanation of Changes to RID Design

No changes are anticipated to the Existing Right-of-Way (ROW). ROW Acquisition is not required for this project.

Sincerely,



Elliot G. Fink, P.E., PMP
PDA Phase Design Project Manager

September 12, 2022

**Cover Letter for Components of Package Proposal Design Submission,
PDA, Exhibit 6 PDA Work Requirements, Section 8.2**

Lenhartsville Bridge
e-Builder Submittal Item 327
Additional ROW Needs

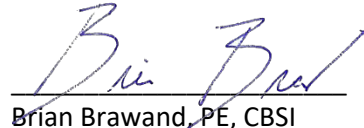
Per agreement between PennDOT and Bridging Pennsylvania Partners ("BPP") we are submitting this cover letter to explain changes to the design as released by PennDOT in the RID files or in subsequent releases.

Key Changes

No Additional ROW Needs beyond that shown in the Recorded ROW Plans provided in the RIDS are required.

The following RID files were submitted:

Sincerely,

A handwritten signature in blue ink, appearing to read "Brian Brawand", written over a horizontal line.

Brian Brawand, PE, CBSI
Senior Project Manager

September 29, 2022

**Cover Letter for Components of Package Proposal Design Submission,
PDA, Exhibit 6 PDA Work Requirements, Section 8.2**

I-80 Lehigh Bridges
e-Builder Submittal Item 327
Additional ROW needs

Per agreement between PennDOT and Bridging Pennsylvania Partners (“BPP”) we are submitting this cover letter to explain any changes to the design as released by PennDOT in the RID files or in subsequent releases.

Explanation of Changes to RID Design

No additional changes are anticipated to the ROW Acquisition Plans. See e-Builder Submittal Item 152.07 for the Preliminary ROW Plan.

Sincerely,



Elliot G. Fink, P.E., PMP
PDA Phase Design Project Manager



BPP SUBMITTAL COVER SHEET

To: Mr. Michael Bonini, Director Public-Private Transportation Partnership Office 400 North Street - 6th Floor Harrisburg, PA 17130		A From: Paul Jensen, Design Manager Bridging Pennsylvania Partners	B Date Submitted: 6-Oct-2022																		
C PennDOT e-Builder FIELDS - Choose from drop down list		BPP FIELDS - Choose from drop down list																			
LETTER/TRANSMITTAL Transmittal <u>TRAN</u>		CONTRACT SEGMENT: N/A																			
TYPE: _____		ELEMENT: N/A																			
REQUEST ACTION: For Review and Approval		TECHNICAL DISCIPLINE CODE: N/A																			
DISCIPLINE: Project Management		PACKAGE NO.: N/A																			
PCS Submittal ID #: PH1-TRAN-BPP-2022-00327		SUBCONTRACTOR ID: N/A																			
		SPECIFICATION NO.: N/A																			
		INPUT SUBMITTAL ID: <u>00327</u> See Note below																			
		BPP INTERNAL TRANSMITTAL NUMBER: N/A REV NO.: <u>00</u>																			
		RELATED TO ANOTHER SUBMITTAL: NO																			
		INPUT RELATED SUBMITTAL #: _____																			
		Note BPP SUBMITTAL ID. # above shall be provided by BPP Document Control and entered into Submittal Cover Sheet.																			
		BPP INTERNAL TRANSMITTAL NUMBER will auto generate																			
D Title of Submittal																					
Additional ROW needs																					
E Description of Submittal																					
No Additional ROW needs are anticipated based on the current RID documents.																					
Number of File Attachments in Submittal																					
#	File Name include Extension	#	File Name include Extension	#	File Name include Extension																
1	BPP Transmittal Cover Sheet_327.pdf	6		11																	
2	Canoe_327_I80CC-ROW-00001 RID 2021-05-10-ROW_Signed 2021-05-11.pdf	7		12																	
3		8		13																	
4		9		14																	
5		10		15																	
F																					
<table border="1"><tr><td>TYPE OF DISTRIBUTION:</td><td>SHA</td><td>3rd Party Entity</td><td>Utility Owner</td></tr><tr><td>x Information</td><td></td><td></td><td></td></tr><tr><td>Review & Comment</td><td></td><td></td><td></td></tr><tr><td>Review & Approval</td><td></td><td></td><td></td></tr></table>						TYPE OF DISTRIBUTION:	SHA	3rd Party Entity	Utility Owner	x Information				Review & Comment				Review & Approval			
TYPE OF DISTRIBUTION:	SHA	3rd Party Entity	Utility Owner																		
x Information																					
Review & Comment																					
Review & Approval																					
G VARIANCE																					
NO <input checked="" type="checkbox"/> YES <input type="checkbox"/> If yes, please provide list and references. _____																					
H																					
DISCIPLINE LEAD SUBMITTED BY:		Paul Jensen		DATE: 6-Oct-2022																	
DISCIPLINE LEAD SIGNATURE																					
I LEAVE THIS AREA EMPTY (For Internal Use Only)																					

September 23, 2022

**Cover Letter for Components of Package Proposal Design Submission,
PDA, Exhibit 6 PDA Work Requirements, Section 8.2**

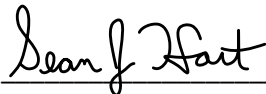
I-80 North Fork Bridges
e-Builder Submittal Item 327
Additional ROW Needs

Per agreement between PennDOT and Bridging Pennsylvania Partners (“BPP”) we are submitting this cover letter to explain any changes to the design as released by PennDOT in the RID files or in subsequent releases.

Explanation of Changes to RID Design

No additional Right-of-Way is required for the project.

Sincerely,



Sean J. Hart, P.E., C.B.S.I.
PDA Phase Design Project Manager

Attachment 24

[Reserved]

Attachment 25

Utility Contacts

Utility	Address	Contact
I-78 LENHARTSVILLE		
Met-Ed (Electric – Aerial)	2800 Pottsville Pike Reading, PA 19605	Al Nerino Phone: 610-921-6757
Verizon (Telephone – Aerial)	409 Washington Street Reading, PA 19601	Jeff Kramer Phone: 610-858-8715
I-79 BRIDGEVILLE		
Alcosan (Sewer)	3300 Preble Avenue Pittsburgh, PA 15233	Shawn McWilliams Phone: 412-732-8053 Email: shawn.mcwilliams@alcosan.org
Bridgeville Borough (Sewer)	425 Bower Hill Road Bridgeville, PA 15017	Joe Kauer Phone: 412-221-6012 Email: jkauer@bridgevilleboro.com
Collier Township (Sewer)	2418 Hilltop Road Presto, PA 15142	Kyle Thauvette Phone: 412-279-2525 Email: kthauvette@colliertwp.net
Columbia Gas of Pennsylvania, Inc. (Gas)	150 Arentzen Boulevard Charleroi, PA 15022	Christine Dujmic Phone: 724-814-8961 Email: cdujmic@nisource.com
Comcast Communication Cable (Cable TV – Aerial)	1530 Chartiers Avenue Pittsburgh, PA 15204	Tim Gazda Phone: 412-327-1628 Email: tim_gazda@comcast.com
Crown Castle (Fiber Optic)	2000 Corporate Drive Canonsburg, PA 15317	Wesley Payne Phone: 724-416-2681 Email: Wesley.payne@crowncastle.com
DQE Communications, LLC (Fiber Optics – Aerial)	424 South 27 th Street, Suite 220 Pittsburgh, PA 15203	Adam Nulph Phone: 724-919-7258 Email: acnulph@dqe.com
Equitrans Midstream (Gas)	4131 Finleyville-Elrama Road Finleyville, PA 15332	Kevin Lewis Phone: 412-395-5527 Email: klewis@equitransmidstream.com
Pennsylvania American Water Co. (Water)	300 Galley Road, PO Box 1290 McMurray, PA 15317	Rachael Beam Phone: 724-743-3104 Email: Rachael.beam@amwater.com
Lennon, Smith, Souleret Engineering on Behalf of Peoples Natural Gas Company (Gas)	4536 Route 136, Suite 1 Greensburg, PA 15601	Gary Baird Phone: 724-743-3104 Email: gbaird@lsse.com
South Fayette Twp Municipal Authority (Sewer)	900 Presto Sygan Road Bridgeville, PA 15017	Jerry Brown Phone: 412-257-5100 Ext. 5 Email: jbrown@sftwp.com
Upper Saint Clair Township (Sewer)	1820 McLaughlin Run Road Upper Saint Clair, PA 15241	Daniel Flatz Phone: 412-831-9882 Email: flatz@twpusc.org
Verizon Pennsylvania LLC (Telephone – Aerial)	41 East Beau Street Washington, PA 15301	Keith Fowler Phone: 724-229-0695 Email: keith.a.fowler@verizon.com

Attachment 25. Utility Contacts

Utility	Address	Contact
West Penn Power Company (Electric – Aerial)	800 Cabin Hill Drive Greensburg, PA 15601	Dan Oswald Phone: 724-942-5239 Email: doswald@firstenergycorp.com
Zayo Bandwidth (Fiber Optics – Aerial)	800 Cabin Hill Drive Greensburg, PA 15601	John Lynch Phone: 724-838-6999 Email: john.lynch@zayo.com
I-80 CANOE CREEK		
Dan Stover, Inc. (Gas)	PO Box 810 Know, PA 16232	Curt Stover Phone: 814-221-5080 Email: cdstover@windstream.net
Columbia Gas of Pennsylvania (Gas)	2021 West State Street New Castle, PA 16101	Hunter Jackovitz Phone: 724-636-9960 Email: hjackovitz@nisource.com
Deitz Gas and Oil, Inc. (Gas)	2729 Gourley Road Sligo, PA 16255	Jeff Deitz Phone: 814-229-2296 Email: jwdshell@windstream.net
Central Electric Corporation (Electric – Aerial, Electric – Underground)	716 Route 368 PO Box 329 Parker, PA 16049-0329	Chad Master Email: chmaster@central.coop
Windstream Kinetic by Windstream (Telephone – Aerial, Fiber Optics – Aerial)	98 Industrial Park Road Brookville, PA 15825	Brian Cook Phone: 814-849-3558 Email: brian.a.cook@windstream.com
I-80 NESCOPECK		
PPL Electric Utilities Corporation (Electric – Aerial)	2 North Ninth Street Allentown, PA 18101-1179	Charlotte Krupa Phone: 610-774-6287 Mobile: 610-554-4062 Email: cakrupa@pplweb.com
First Light	4568 Willow Lane Nazereth, PA 18604	Steve Charney Phone: 484-408-1968 scharney@firstlight.net
Frontier Communications of PA Incorporated (Telephone – Aerial, Fiber Optics – Aerial)	93 Old Berwick Road Drums, PA 18222	Robert Januszko Phone: 570-788-1200 Mobil: 579-417-7759 Email: Robert.januszko@ftr.com
I-80 NORTH FORK		
Windstream Communications (Telephone – Underground, Telephone – Aerial, Fiber Optics – Aerial)	98 Industrial Park Road Brookville, PA 15825	Robert Collins Phone: 610-819-2626 Email: Robert.collins@windstream.com
United Electric Cooperative (Electric)	29 United Road PO Box 688 Dubois, PA 15801	Michael Flock Phone: 814-503-8513 Email: mflock@unitedpa.com
Pennsylvania Electric Company (Electric)	820 South 4 th Street Clearfield, PA 16830	Michael Kephart Phone: 814-421-1531 Email: mkephart@firstenergycorp.com
Zito Media, LP (Communications)	102 South Main Street, Third Floor Coudersport, PA 16915	Todd McNamus Phone: 814-260-9373 Email: todd.mcmanus@zitomedia.com

Attachment 25. Utility Contacts

Utility	Address	Contact
Brookville Municipal Authority (Sewer, Water)	30 Darrah Street Brookville PA, 15825	Clyde Bullers Phone: 814-849-7941 Email: cbullers@brookevilleborough.org
National Fuel Gas (Gas)	1100 State Street PO Box 2081 Erie, PA 16512	Jason Fleek Phone: 814-871-8662 Email: fleekj@natfuel.com
Comcast Cable Corporation (Cable TV – Aerial)	1 Comcast Drive Blairsville, PA 15717	Doug Olszewski Phone: 724-675-8799 Email: douglas_olszewski@cable.comcast.com
I-80 WHITE HAVEN		
Aqua Pennsylvania Wastewater, Inc. (Sewer, Water)	1 Aqua Way White Haven, PA 18661	Joshua Shoff Phone: 570-443-7099 Email: jpshoff@aquaamerica.com
Atlantic Broadband (Cable TV – Aerial, Cable TV – Underground)	911 N Market Street Berwick, PA 18603	David Richards Phone: 570-802-5642 Email: drichards@atlanticbb.com
PPL Electric Utilities Corporation (Electric – Aerial, Electric – Underground)	2 N 9 th Street Allentown, PA 18101-1179	Charlotte Krupa Phone: 610-774-6287 Email: cakrupa@pplweb.com
UGI Utilities Inc. (Gas)	2121 City Line Road Bethlehem, PA 18017	Brandon Haydt Phone: 610-807-3157, 570-450-2612 Email: bhaydt@ugi.com
Verizon Pennsylvania LLC (Telephone – Aerial, Telephone – Underground)	20 S 7 th Street Stroudsburg, PA 18360	Joe Snyder Phone: 570-424-0902 Email: j.anthony.snyder@verizon.com
I-81 SUSQUEHANNA		
Hallstead/Great Bend Joint Sewer Authority (Sewer)	249 Spring Street PO Box 747 Great Bend, PA 18821-0747	Corey Rudock Phone: 570-879-2994 Email: hgbjsa@epix.net
Claverack Rural Electric Cooperative, Inc. (Electric – Aerial)	32750 Route 6 Wysox, PA 18854	Nathan Stoddard Phone: 800-326-9799 Email: nathans@ctenterprises.org
Williams (Gas)	Northeast Gathering & Processing, Susquehanna Supply Hub 310 State Route 29 North Tunkhannock, PA 18657	Ken Foster Phone: 570-205-0761
New Milford Municipal Authority (Sewer)	948 Main Street, Suite 3 New Milford, PA 18834-1112	Sheila Shibley Phone: 570-2465-7089 Email: munauth@nep.net
PA American Water Co. (Water)	2699 Stafford Ave Scranton, PA 18505	Jeremy Nelson Phone: 570-351-0138 Mobil: 570-266-2031 Email: Jeremy.nelson2amwater.com
Northeastern PA Telephone Co. (Telephone – Aerial)	720 Main Street PO Box D Forest City, PA 18421	Scott Fuller Phone: 570-785-2280 Email: sfuller@nep.net

Attachment 25. Utility Contacts

Utility	Address	Contact
PA Elec. Co. (Firstenergy) Penelec (Electric – Aerial)	88 Plaza Drive Towanda, PA 18848	Steve Beers Phone: 570-265-1237 Mobil: 607-738-3120 Email: sbeers@firstenergycorp.com
Spring Communications Co. LP (Telephone – Aerial)	6550 Sprint Parkway MS: KSOPHR0312 Overland Park, KS 66251-6109	Jessica Revelle Phone: 800-829-8009
Frontier Communications Solutions (Cable TV – Aerial)	110 CTE Drive Dallas PA, 18612	Jeff Bolton Phone: 570-406-5319 Email: jeff.bolton@ftr.com
Adams Cable TV (Cable TV – Aerial)	19 North Main Street Carbondale, PA 18407	Dave Chludzinski Phone: 570-282-6121 ext. 203 Email: davec@echoes.net
AT&T (Telephone – Aerial)	One AT&T Way Bedminster NJ 07921	Michael Diederich Phone: 216-705-0135 Email: md41452att.com
Great Bend Township	33253 SR 171 PO Box 781 Great Bend, PA 18821-0781	Sheila Guinan Email: greatbendtw@epix.net
Chesapeake Operating Inc	6100 N Western Ave Oklahoma City, OK 73118	David Ferguson Email: David.ferguson@chk.com
I-83 SOUTH BRIDGE		
Capital Region Water (Water, Sewer)	212 Locust Street, Suite 500 Harrisburg, PA 17101	Jeff Bowra Phone: 717-216-5255 Email: jeff.bowra@capitalregionwater.com
Centurylink (Fiber Optics – Underground)	1201 Walnut Bottom Road Carlisle, PA 17015	Adam Cubbedge Phone: 717-245-6298 Email: adamcubbedge1@centurylink.com
Harrisburg City (Sewer, Telephone – Underground, Telephone – Aerial, Electric – Underground)	123 Walnut Street Harrisburg, PA 17101-1618	Wayne Martin Phone: 717-255-3178 Email: wsmartin@harrisburgpa.gov
UGI Utilities Inc. (Gas)	1301 AIP Drive Middletown, PA 17057	Geoff Ferguson Phone: 610-807-3118 Email: gferguson@ugi.com
Verizon Pennsylvania LLC (Telephone – Underground, Telephone – Aerial)	801 South 29 th Street Harrisburg, PA 17111	Rob Zimmer Phone: 717-312-1621 Email: rovert.zimmer@verizon.com
Comcast Cable Communications, Inc. (Cable TV – Aerial)	4601 Smith Street Harrisburg, PA 17109	Mike Sweigard Phone: 717-298-6947 Email: mike_sweigard@cable.comcast.com
Frontier Communications, Inc. (Telephone – Aerial)	93 Old Berwick Road Drums, PA 18222	Robert Januszko Phone: 570-788-1200 Email: robert.januszko@ftr.com
Paxtang Borough (Sewer)	3426 Derry Street Harrisburg, PA 17111	Saul Schmoltz Phone: 717-648-6448 Email: paxdot@comcast.net

Attachment 25. Utility Contacts

Utility	Address	Contact
XO Communications (Fiber Optics – Aerial)	630 Clark Ave King of Prussia, PA 19406	Scott Dreiling Phone: 610-290-4003 Email: scott.j.dreiling@xo.com
Zayo Bandwidth (Fiber Optics – Aerial)	2561 Bernville Road Reading, PA 19605	Dale Valentine Phone: 610-655-2565 Email: dale.valentine@zayo.com
PPL Electric Utilities Corp. (Electric – Underground, Electric – Aerial)	2 North 9 th Street Allentown, PA 18101	Charlotte Krupa Phone: 610-774-6287 Email: cakrupa@pplweb.com
Sprint Nextel (Fiber Optics – Underground)	87 Fetrow Lake New Cumberland, PA 17070	Steve Rodkey Phone: 717-222-8531 Email: steven.l.rodkey@sprint.com
Suez Water Pennsylvania Inc. (Water)	6310 Allentown Blvd Harrisburg, PA 17112	Brendan West Phone: 717-901-6327 Email: Brendan.west@suez.com
Swatara Township Authority (Sewer)	599 Eisenhower Blvd Harrisburg, PA 17111	Tom Wilson Phone: 717-564-2551 Email: twilson@swataratwp.com
AT&T (Telephone – Aerial)	2550 Interstate Drive Harrisburg, PA 17110	Ken Waszmer Phone: 717-979-0765 Email: kw1739@att.com
I-95 GIRARD POINT		
ASL	TBD	TBD
Colonial Pipeline	696 Mantua Grove Road West Deptford, NJ 08066	Robert Anderson Phone: 856-384-5739 Email: randerse@colpipe.com
Philadelphia Energy Solutions (PES)	1735 Market Street 10 th Floor Philadelphia, PA 19103	TBD
Philadelphia Gas Works	800 West Montgomery Ave. Planning Section – 2 nd Floor Philadelphia, PA 19122-2898	Kevin Diep Phone: 215-684-6235 Email: Kevin.Diep@pgworks.com
Philadelphia Water	1101 Market Street 5 th Floor Philadelphia, PA 19107-2994	Vahe Hovsepian Phone: 215-685-6278 Email: vahe.hovsepian@phila.gov
Verizon	900 Race Street Floor 11 Philadelphia, PA 19107	Brian Magee Phone: Email: brian.m.magee@verizon.com Anthony Portolese Phone: 215-351-6042 Email: Anthony.s.portolese@verizon.com
Buckeye Pipeline	Laurel Pipeline Co., LP Attn: Buckeye Partners, LP 9999 Hamilton Blvd 5 Tek Park Breinigsville, PA 18031	David Jones Phone: 610-904-4409 Email: dajones@buckeye.com

Attachment 25. Utility Contacts

Utility	Address	Contact
SNQ	TBD	TBD
Texas Eastern Transmission	/Enbridge 560 Pottstown Pike Chester Springs, PA 19425	Dave Leib Phone: 610-485-1712 Email: dave.leib@enbridge.com

Attachment 26

[Reserved]

Attachment 27

[Reserved]

Attachment 28

[Reserved]

Attachment 29

EDMS Plan Sheet File Naming Convention

APPENDIX A

PENNDOT EDMS Plan Sheet File Naming Convention

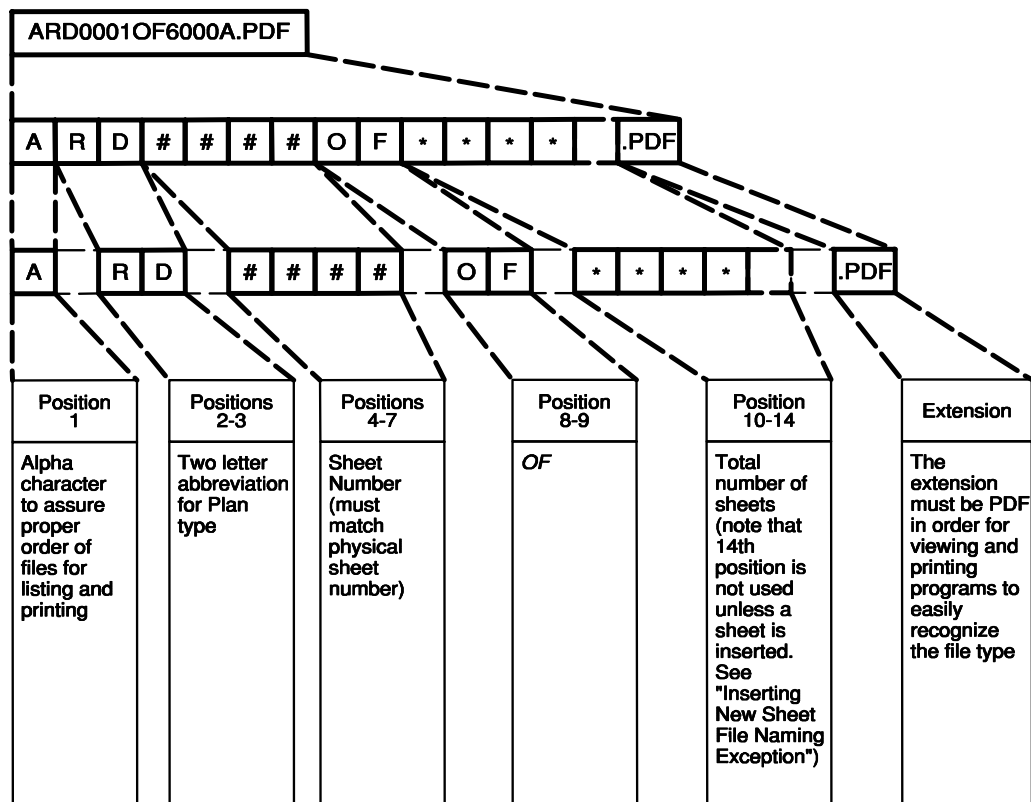
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Introduction

The purpose of this document is to describe and illustrate the file naming convention for scanned or electronically generated plan sheets. The Central Office Plans Reproduction unit is currently using this standard for files. If any plans are being scanned within PennDOT, they must follow this naming format in order to provide a uniform method of exchanging the electronic plans.

The document is divided into two sections. The first describes the standard format for naming plan sheet files. The second describes two exceptions to the naming standard.

File Naming Format



Plans file name breakdown

Position 1

This is an alpha character (A to R) that is assigned to each plan type in a project to allow for the proper order in listing and printing. The lettering always begins with 'A'. 'S' is reserved for Structures, 'X' is reserved for Cross Sections, and 'Z' is reserved for any existing structure plans that will be included.

Position 2-3

This is a two-letter abbreviation that allows for the easy visual recognition of what the plan type is. The following cross-reference matrix can be used to determine the proper alpha character and abbreviation to use for the different plan types.

Document Type	Alpha	Abbrev.
Right of Way Plan		RW
Roadway Plan		RD
Utility Relocation Plan		UR
Landscaping Plan		LP
Safety Rest Area Plan		RA
Highway Lighting Plan		HL
Railroad Plan		RR
Erosion and Sediment Pollution Control Plan		EC
Wetland Mitigation Plan		WM
Environmental Mitigation Plan		EM
Contamination and Remediation Plan		CR
Pollution Control Plan		PC
Roadway Test Boring Plan		RT
Highway Advisory Radio Plan		HA
Weather Monitoring System Plan		WS

Document Type	Alpha	Abbrev.
Pavement Sensor Plan		PS
Traffic Control Plan		TC
Signing and Pavement Marking Plan		SM
Emergency Detour Plan		ED
Traffic Signal Plan		TS
Interconnect Plan		IP
Traffic Monitoring Plan		TM
Flashing Warning Device Plan		FW
Sign Structure Plan		SS
Soil Profile Plan		SP
Structure Plan	S	*
Cross Section	X	CS
Existing Structure Plan	Z	ES
Other Plan		OP

* See Exceptions > Structure Plan File Naming Exception

Position 4-7

— This is a four-place position that contains the numeric sheet number (right justified with preceding zeros: 0001, 0002...0010,0012, etc.).

Position 8-9

This is simply the descriptive "OF" for 0001 OF 99, 0002 OF 99, etc.

Position 10-14

Position 10 to 13 denotes the total number of sheets (with no preceding zeros: 1,2,3...10,11,12...100,101,102, etc.). The fifth place (14) is used for identifying inserted sheets.

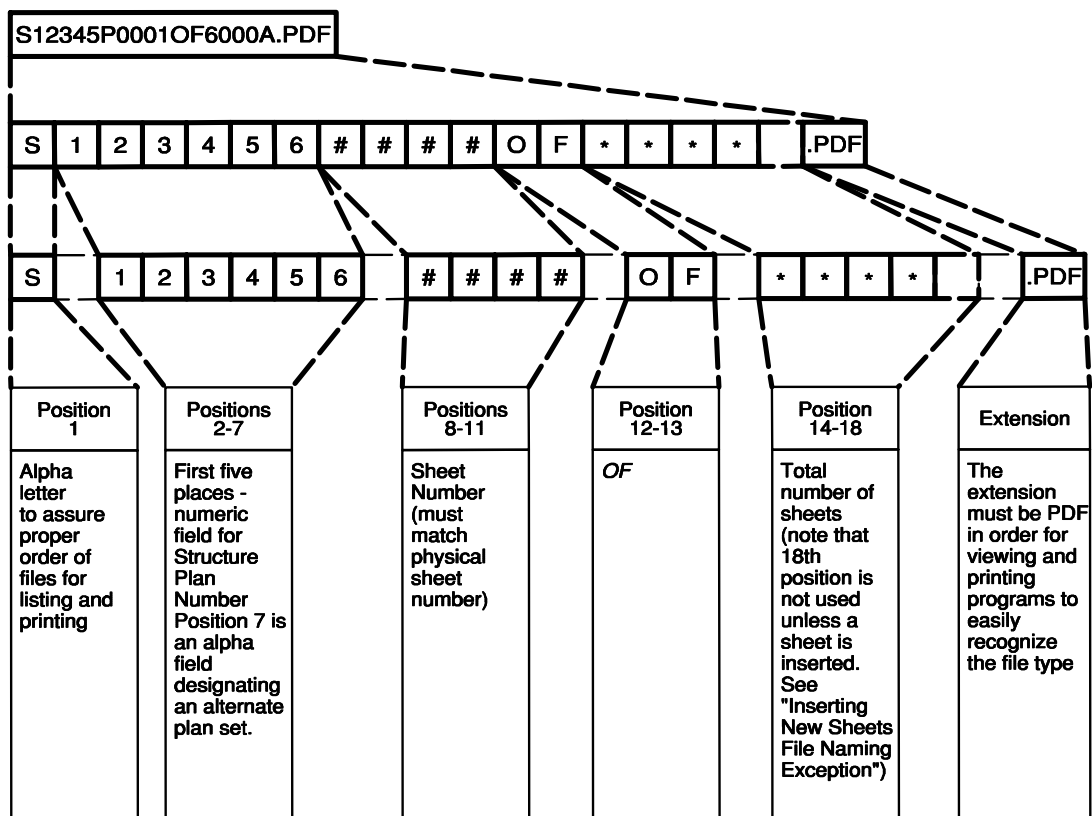
Extension

The extension of every file must be ".PDF" in order for viewers and other applications to recognize the type.

Exceptions

Structure Plan File Naming Exception

Structure plans have five numeric digits for identification instead of two, so the positions mentioned above shift to the right.



Structure Plans file name breakdown

Position 1

This is an alpha character (A to R) that is assigned to each plan type in a project to allow for the proper order in listing and printing. The lettering always begins with 'A'. 'S' is reserved for Structures, 'X' is reserved for Cross Sections, and 'Z' is reserved for any existing structure plans that will be included.

Position 2-7

This the 5-character structure number plus an alpha character.. An alpha character is used if the files represent an alternate plan (See DM Part 4 Section 1.6.2.5 for more information.).

Position 8-11

— This is a four-place position that contains the numeric sheet number (right justified with preceding zeros: 0001, 0002...0010,0012, etc.).

Position 12-13

This is simply the descriptive "OF" for 0001 OF 99, 0002 OF 99, etc.

Position 14-18

Position 14 to 17 denotes the total number of sheets (with no preceding zeros: 1,2,3...10,11,12...100,101,102, etc.). The fifth place (18) is used for identifying inserted sheets.

Extension

The extension of every file must be ".PDF" in order for viewers and other applications to recognize the type.

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Attachment 30

IQF Inspection Qualification Charts

Table A30-1. Construction Inspector Qualifications

Inspector Level ↓	Minimum Experience and Training →	OR	OR	OR	OR	OR	P.E.	Bachelor's Degree in Civil Engineering	Associate Degree in Engineering
TCM-2	One (1) Year Minimum PennDOT Experience as TCM-1; and must have all three (3) Certs: PennDOT Concrete Tech.; and NECEPT Field Tech.; and NICET Level IV Certification in Highway Construction	Three (3) year minimum PennDOT experience as TCM-1 and has two (2) of the following three (3) Certs: PennDOT Concrete Tech.; or NECEPT Field Tech.; or NICET Level IV Cert. in Highway Construction	Ten (10) year minimum transportation, highway or bridge construction inspection supervision/management experience and must have all three (3) Certs: PennDOT Concrete Tech.; and NECEPT Field Tech.; and NICET Level IV Cert. in Highway Construction	-	Sixteen (16) years minimum transportation, highway or bridge construction inspection supervision/management experience acceptable to the Department	-	Active P.E. License may be substituted for four (4) years of experience and all NICET Levels	Bachelor's Degree of Science in Civil Engineering or closely related engineering field may be substituted for four (4) years of experience	Associate Degree in Civil Engineering or closely related engineering field may be substituted for two (2) years of experience
TCM-1	One (1) year minimum PennDOT experience as TCIS-2 and must have all three (3) Certs: PennDOT Concrete Tech.; and; NECEPT Field Tech.; and; NICET Level III Certification in Highway Construction	One (1) year minimum PennDOT experience as TCIS-2; and NICET Level IV Certification in Highway Construction and either PennDOT Concrete Tech. or NECEPT Field Tech.	Three (3) years minimum PennDOT experience as TCIS-1 and has two (2) of the following three (3) Certs: PennDOT Concrete Tech., or NECEPT Field Tech., or NICET Level III Cert. in Highway Construction.	Is qualified and has performed at a higher classification for a minimum of one (1) year	Eight (8) years Minimum transportation, highway or bridge construction inspection supervision/management experience and PennDOT Concrete Tech., and either NECEPT Field Tech., or NICET Level IV Cert. in Highway Construction.	Twelve (12) years Minimum Transportation, highway or bridge construction inspection supervision/management experience acceptable to the Department	Active P.E. License may be substituted for four (4) years of experience and all NICET Levels	Bachelor's Degree in Civil Engineering may be substituted for four (4) years of experience	Associate Degree in Civil Engineering or closely related engineering field may be substituted for two (2) years of experience
TCIS-2	One (1) year minimum PennDOT experience as TCIS-1 and must have all three (3) Certs: PennDOT Concrete Tech., and NECEPT Field Tech., and NICET Level III Certification in Highway Construction	One (1) year minimum PennDOT experience as TCIS-1 and NICET Level IV Certification in Highway Construction and either PennDOT Concrete Tech. or NECEPT Field Tech.	Six (6) years minimum PennDOT experience as TCI and must have all Three (3) Certs: PennDOT Concrete Tech., and NECEPT Field Tech. and NICET Level III Cert. in Highway Construction.	Is qualified and has performed at a higher classification for a minimum of one (1) year	Six (6) years minimum transportation, highway or bridge construction inspection experience and NICET Level IV Certification in Highway Construction and either PennDOT Concrete Tech. or NECEPT Field Tech.	-	Active P.E. License may be substituted for all experience	Bachelor's Degree in Civil Engineering or closely related Engineering field may be substituted for four (4) years of experience	Associate Degree in Civil Engineering or closely related Engineering field may be substituted for two (2) years of experience

Inspector Level ↓	Minimum Experience and Training →	OR	OR	OR	OR	OR	P.E.	Bachelor's Degree in Civil Engineering	Associate Degree in Engineering
TCIS-1	One (1) year minimum PennDOT experience as TCI-3 and must have all three (3) Certs: PennDOT Concrete Tech. and NECEPT Field Tech. and NICET Level II Certification in Highway Construction	One (1) year minimum PennDOT experience as TCI-3 and NICET Level III or IV Cert. Highway Construction and either PennDOT Concrete Tech. or NECEPT Field Tech.	Three (3) years minimum PennDOT experience as TCI-2 and has two (2) of the following Three (3) Certs: PennDOT Concrete Tech. or NECEPT Field Tech. or NICET Level II Cert. in Highway Construction.	Is qualified and has performed at a higher classification for a minimum of one (1) year	Five (5) years minimum transportation, highway or bridge construction inspection experience and must have all Three (3) Certs: PennDOT Concrete Tech., and NECEPT Field Tech. and NICET Level III Cert. in Highway Construction.	Five (5) years minimum transportation, highway or bridge construction inspection experience and NICET Level IV Certification in Highway Construction	Active P.E. License may be substituted for all experience	Bachelor's Degree in Civil Engineering or closely related Engineering field may be substituted for four (4) years of experience	Associate Degree in Civil Engineering or closely related Engineering field may be substituted for two (2) years of experience
TCI-1	One (1) year minimum PennDOT experience as TCI-2 and must have all three (3) Certs: PennDOT Concrete Tech. and NECEPT Field Tech. and NICET Level II Certification in Highway Construction	One (1) year minimum PennDOT experience as TCI-2 and NICET Level III or NICET Level IV Certification in Highway Construction	Four (4) years minimum transportation, highway or bridge construction inspection experience and must have all Three (3) Certs: PennDOT Concrete Tech. and NECEPT Field Tech., and NICET Level II Cert. in Highway Construction.	Is qualified and has performed at a higher classification for a minimum of one (1) year	Four (4) years minimum transportation, highway or bridge construction inspection experience and NICET Level III or IV Certification in Highway Construction	-	Active P.E. License may be substituted for all experience	Bachelor's Degree in Civil Engineering or closely related Engineering field may be substituted for four (4) years of experience	Associate Degree in Civil Engineering or closely related Engineering field may be substituted for two (2) years of experience
TCI-2	One (1) year minimum PennDOT experience as TCI-1 and one (1) of the following three (3) Certs: PennDOT Concrete Tech. or NECEPT Field Tech., or NICET Level II Certification in Highway Construction	Three (3) years minimum PennDOT transportation, highway or bridge construction inspection experience and one (1) of the following three (3) Certs: PennDOT Concrete Tech. or NECEPT Field Tech., or NICET Level II Certification in Highway Construction	Five (5) years highway or bridge construction, or highway or bridge design experience	Is qualified and has performed at a higher classification for a minimum of one (1) year	-	-	Active P.E. License may be substituted for all experience	Bachelor's Degree in Civil Engineering or closely related Engineering field	Associate Degree in Civil Engineering or closely related Engineering field may be substituted for one (2) year of experience
TCI-3	One (1) year minimum PennDOT experience as a TA-2	Two (2) years Transportation, highway or bridge construction inspection experience	Four (4) years highway or bridge construction, non-highway or bridge inspection, or highway or bridge design experience	Is qualified and has performed at a higher classification for a minimum of one (1) year	Possess a Transportation Technology Construction Inspection Certification received through an accredited Technology program approved by the Department	-	N/A	N/A	Associate Degree in Civil Engineering or closely related Engineering field

Inspector Level ↓	Minimum Experience and Training →	OR	OR	OR	OR	OR	P.E.	Bachelor's Degree in Civil Engineering	Associate Degree in Engineering
TA-2	One (1) year minimum PennDOT experience as a TA-1	One (1) year transportation industry experience in highway/bridge or construction inspection and has a High School Diploma, GED or postsecondary education and has abilities to read, write, and communicate in English and do basic math computations for length, area, and volume	Two (2) years of non-transportation related design, construction, inspection experience and has High School Diploma, GED or postsecondary education and has abilities to read, write, and communicate in English and do basic math computations for length, area, and volume	Is qualified and has performed at a higher classification for a minimum of one (1) year	-	-	N/A	N/A	N/A
TA-1	High School Diploma, GED or postsecondary education and has abilities to read, write, and communicate in English and do basic math computations for length, area, and volume	-	-	-	-	-	N/A	N/A	N/A

Table A30-2. Coating Inspector Qualifications

Coating Inspector Level	Minimum Experience and Training	Notes
Coatings Inspector 3	Four (4) years minimum experience is structural steel coating application inspection, which includes one (1) year of coatings inspection experience on bridges and be a NACE Certified Coating Inspector - Level 3 Peer Review certified. Each NACE Certified Coating Inspector - Level 3 Peer Review certified individual must also have lead abatement training (SSPC-C3) prior to the job assignment	SSPC Bridge Coating Inspection Program (BCI) Level 1 may be substituted for one (1) year of experience in structural steel coating application inspection
Coatings Inspector 2	Three (3) years minimum experience is structural steel coating application inspection, which includes six (6) months of coatings inspection experience on bridges and be a NACE Coating Inspector - Level 1 Certified or higher. Each NACE Coating Inspection Level 1 - certified or higher individual must also have lead abatement training (SSPC-C3) prior to the job assignment	SSPC Bridge Coating Inspection Program (BCI) Level 1 may be substituted for one (1) year of experience in structural steel coating application inspection
Coatings Inspector 1	High School Diploma or GED and six (6) months minimum experience in structural steel coating application inspecting and be knowledgeable in applicable OSHA guidelines governing proper respirator usage and lead exposure.	A Coatings Inspector 1 must be under the direction of a Coatings Inspector 2 or 3 assigned to the Project

Table A30-3. Fabrication Inspector Qualifications

Inspector Level	Inspector Title	Example of Work	Required Knowledge, Skills and Abilities	Minimum Experience and Training
PLANT INSPECTION AND SUPERVISION				
TCM-2	Structural Steel Inspection Supervisor	<p>This is a technical position involving supervision of inspection personnel assigned to structural steel, aluminum fabrication plants and coating facilities.</p> <p>The supervisor conducts regular reviews at the structural steel and aluminum fabrication plants and coating facilities to assure that the required inspection duties are fulfilled, and products which are accepted meet contract requirements and Department specifications.</p> <p>The supervisor may, on occasion be required to represent the Department at prefabrication meetings and other meetings.</p> <p>Conducts regular supervisory reviews at fabrication steel plants and coating facilities, reviews inspection reports for assigned locations and attends meetings when directed by the Department.</p>	<p>Knowledge of the principles and methods applied in inspecting the fabrication of fabricated structural steel items and Coating application.</p> <p>Knowledge of the characteristics and properties of materials used in fabrication.</p> <p>Knowledge of coating systems and their applications.</p> <p>Knowledge of applying and witnessing the following non-destructive testing methods used in the fabrication of structural steel – VT, UT, MT and RT and PT.</p> <p>Ability to interpret shop drawings, standards and specifications and to enforce these requirements.</p> <p>Ability to establish and maintain effective working relationships.</p> <p>Ability to effectively communicate in English, both speaking and writing.</p> <p>Ability to effectively direct, supervise and coordinate an inspection force to accommodate varying fabrication schedules.</p> <p>Proficiency in using a personal portable computer, Microsoft Word and Excel.</p> <p>Ability to operate a digital camera (including attachment of photographs, documents, etc. to e-mail) and the internet.</p>	<p>High school graduate or equivalent high school (GED) certificate.</p> <p>Minimum of five (5) years of experience in inspection and/or quality assurance/quality control in structural steel and aluminum fabrication produced for transportation related projects, including three (3) years as a supervisor or lead inspector.</p> <p>Certified as an NDT Level II technician in the appropriate methods of NDT used in the shops which are to be supervised.</p> <p>Valid welding inspector (CWI) certificate issued by the American Welding Society. A Canadian Welding Bureau level II or level III certification (certified to the requirements of the Canadian Standard Association standard CSA W 178.2) may be accepted with the approval of the Chief Structural Materials Engineer.</p>
TCM-2	Structural Concrete Inspection Supervisor	<p>This is technical work involving overall supervision and oversight of inspection personnel assigned to prestressed and precast concrete plants and concrete grate and frame fabrication.</p> <p>The inspection supervisor conducts regular reviews at the prestressed and precast concrete plants to assure that the required inspection duties are fulfilled in accordance with the Department specifications and the contract agreement.</p> <p>The inspection supervisor may, on occasion, be required to represent the Department at prefabrication meetings and other meetings.</p> <p>Maintains both handwritten and electronic records of inspection and test data using the Departments EQMS application. Ensures consistent inspection is maintained through uniform specification and policy enforcement.</p> <p>Acts as a troubleshooter for Structural Materials Engineering staff by correcting routine problems. Attends prefabrication or other meetings when directed by the Chief Structural Materials Engineer or designee. Performs</p>	<p>Ability to effectively communicate in English, both speaking and writing.</p> <p>Ability to interpret shop drawings, standards and specifications and to enforce these requirements.</p> <p>Effectively operate a personal computer, M.S. Word and Excel.</p> <p>Ability to operate a digital camera.</p> <p>Ability to compose, send and receive email, including the use of attachments with emails.</p> <p>Ability to establish and maintain effective working relationships.</p> <p>Knowledge of the principles and methods applied in inspecting the fabrication of prestressed concrete bridge beams, precast concrete and concrete pipe and concrete grate and frame.</p> <p>Knowledge of concrete materials and their use in transportation construction.</p>	<p>High school graduate or equivalent high school (GED) certificate.</p> <p>Minimum of five (5) years of experience in precast and prestressed concrete inspection.</p> <p>Valid ACI Field Testing Technician – Grade 1 Certification.</p> <p>Valid PCI Level II - Certified Technician Certification issued by the Precast/Prestressed Concrete Institute (PCI).</p>

<div> <div>Technical Provisions for the Design-Build-Finance-Maintain Agreement</div> <div>Attachment 30. IQF Construction Inspection Qualification Charts</div> </div>				
Inspector Level	Inspector Title	Example of Work	Required Knowledge, Skills and Abilities	Minimum Experience and Training
		plant audits to evaluate the ability of plants to meet the Departments requirements for Bulletin 15 approval, when directed.	<p>Knowledge of the characteristics and properties of natural and manufactured materials used in precast and prestressed concrete construction.</p> <p>Skill in performing sampling and testing of concrete and constituent materials, including Self Consolidating Concrete.</p> <p>Ability to effectively direct and supervise an inspection force including the coordination of the inspection force to accommodate varying fabrication schedules.</p>	
CI-3	Coating Inspector Supervisor	<p>Provides advanced inspection and/or consultation for a wide variety of coatings applications, including traditional three coat painting systems, powder coatings, hot dipped and mechanical galvanizing and metallizing.</p> <p>Reviews and handles difficult problems related to coating applications, including assessment of coating performance and failure mechanisms.</p> <p>Performs as a trouble shooting specialist when problems arise.</p>	<p>Ability to interpret shop drawings, standards and specifications.</p> <p>Ability to effectively communicate in English, both speaking and writing.</p> <p>Ability to establish and maintain effective working relationships.</p> <p>Effectively use a personal portable computer, Microsoft Word and Excel.</p> <p>Ability to operate a digital camera, utilize e-mail, (including attachment of photographs, documents, etc.) and the internet.</p>	<p>High school graduate or equivalent high school (GED) certificate.</p> <p>Minimum of five (5) years of experience in structural steel coating application inspection, which includes three (3) years of coatings inspection experience on bridges, or experience in inspection and/or quality assurance/quality control in structural steel and aluminum fabrication produced for transportation related projects, including three (3) years as a supervisor or lead inspector.</p> <p>Certified as either a NACE Certified Coatings Inspector Level III or Protective Coatings Inspector (PCI) Level 3.</p>
CI-2	Coatings Inspector	<p>Provides advanced inspection and/or consultation for a wide variety of coatings applications, including traditional three coat painting systems, powder coatings, hot dipped and mechanical galvanizing and metallizing.</p> <p>Reviews and handles difficult problems related to coating applications, including assessment of coating performance and failure mechanisms.</p> <p>Performs as a trouble shooting specialist when problems arise.</p>	<p>Ability to interpret shop drawings, standards and specifications.</p> <p>Ability to effectively communicate in English, both speaking and writing.</p> <p>Ability to establish and maintain effective working relationships.</p> <p>Effectively operate a personal portable computer, Microsoft Word and Excel.</p> <p>Ability to operate a digital camera, utilize e-mail (including attachment of photographs, documents, etc.) and the internet.</p>	<p>High school diploma.</p> <p>Minimum of four (4) years of experience in structural steel coating application inspection, which includes one (1) year of coatings inspection experience on bridges.</p> <p>Certified as either a NACE Certified Coatings Inspector Level II, SSPC Protective Coatings Inspector (PCI) Level 2 or SSPC Bridge Coatings Inspector (BCI) Level II.</p>
TCIS-2	Certified Welding Inspector	<p>Provides quality assurance inspection for welded fabricated structural steel and aluminum.</p> <p>Work may involve outlining procedures for subordinate inspectors, reviewing and monitoring work and test results, interpreting specifications and determining procedures where standard operations cannot be used.</p> <p>Reviews regular shop fabrication practices including fit-up, welding, and use of approved welding procedures, surface preparation and application of coatings, member assembly, bolting and non-destructive testing. Ensures fabrication is performed in accordance with the fabricator's Quality Control plan, contract requirements and Department specifications.</p> <p>Monitors subordinate inspectors to ensure conformance to contract requirements.</p> <p>Maintains both handwritten and electronic records of inspection and test data and forwards this information to the Structural Materials Section.</p>	<p>Knowledge of the standards, codes and specifications required in the field of structural steel and aluminum fabrication to meet current PA Department of Transportation Specifications.</p> <p>Ability to read and interpret shop drawings, specifications and other technical information.</p> <p>Ability to understand and follow oral and written instructions.</p> <p>Ability to effectively communicate in English, both speaking and writing.</p> <p>Effectively operate a personal portable computer, Microsoft Word and Excel.</p> <p>Ability to operate a digital camera, utilize e-mail (including attachment of photographs, documents, etc.) and the internet.</p>	<p>High school graduate or equivalent high school (GED) certificate.</p> <p>Minimum of three (3) years of experience in inspection and/or quality assurance/quality control in structural steel and aluminum fabrication.</p> <p>Valid welding inspector (CWI) certificate issued by the American Welding Society. A Canadian Welding Bureau level II or level III certification (certified to the requirements of the Canadian Standard Association standard CSA W 178.2) may be accepted with the approval of the Chief Structural Materials Engineer.</p> <p>Inspectors assigned to witness non-destructive testing must be, at a minimum, qualified to a level comparable to that of ASNT SNT-TC-1a 2016 Level I for experience with training hours of Level I & II combined in the appropriate methods of NDT (including but not limited to PT, MT,UT and RT Interpretation) for the shops which they are assigned.</p>

Inspector Level	Inspector Title	Example of Work	Required Knowledge, Skills and Abilities	Minimum Experience and Training
			Ability to establish and maintain fair and harmonious working relationship with shop personnel while diligently attending to the required inspection activities.	
TCI-3	Non-Certified Welding Inspector	<p>Provides quality assurance inspection for fabricated structural steel and aluminum. This position is typically not qualified to oversee fabrication when welding is being performed. Exceptions for the use of this position may be permitted on a case-by-case basis, for example, when in the Departments opinion (based on previous certification and/or experience) the inspector is qualified to oversee fabrication, including welding and non-destructive testing, for a limited period of time until the inspector can (re)obtain the required certifications.</p> <p>Inspection is performed with considerable independence but is reviewed, managed and/or overseen by a Certified Welding Inspector, Supervisor, or the Civil Engineer.</p> <p>Reviews regular shop fabrication practices including cutting, drilling, machining, surface preparation and application of coatings, member assembly, bolting and non-destructive testing. Ensures fabrication is performed in accordance with the fabricator's Quality Control plan, contract requirements and Department specifications.</p> <p>Maintains both handwritten and electronic records of inspection and test data and forwards this information to the Structural Materials Section.</p>	<p>Sufficient knowledge of standards and specifications required in the field of structural steel and aluminum fabrication to meet current PA Department of Transportation Specifications.</p> <p>Ability to understand and follow oral and written instructions.</p> <p>Ability to effectively communicate in English, both speaking and writing.</p> <p>Ability to read and interpret shop drawings.</p> <p>Effectively operate a personal portable computer, Microsoft Word and Excel.</p> <p>Ability to operate a digital camera, utilize e-mail (including attachment of photographs, documents, etc.) and the internet.</p> <p>Ability to establish and maintain a fair and harmonious working relationship with shop personnel while diligently attending to the required inspection activities.</p>	<p>High school graduate or equivalent high school (GED) certificate.</p> <p>Minimum of two (2) years of experience in an occupational function related to structural steel and/or aluminum fabrication.</p> <p>Inspectors assigned to witness non-destructive testing must be, at a minimum, qualified to a level comparable to that of ASNT SNT-TC-1a 2016 Level I for experience with training hours of Level I & II combined in the appropriate methods of NDT (including but not limited to PT, MT, UT and RT Interpretation) for the shop that are assigned.</p>
TCI-3	FRP Inspector	Provides quality assurance inspection during the fabrication of FRP bridge decks or other related FRP transportation structures.	<p>Effectively operate a personal portable computer, Microsoft Word and Excel.</p> <p>Ability to operate a digital camera, utilize e-mail (including attachment of photographs, documents, etc.) and the internet.</p> <p>Ability to interpret shop drawings, standards and specifications.</p> <p>Ability to effectively communicate in English, both speaking and writing.</p>	<p>High school graduate or equivalent high school (GED) certificate.</p> <p>Minimum of two (2) years of experience in the inspection of FRP fabrication or three (3) years of experience in associated work and functions in the fabrication of FRP products.</p>
TCIS-2	Prestressed Concrete Inspector	<p>This is technical work in the fabrication of prestressed concrete bridge beams.</p> <p>Performs independent technical work associated with the quality assurance inspection of prestressed concrete.</p> <p>Reviews and monitors fabrication; reviews/performs concrete tests; and interprets specifications and approved drawings. Work is reviewed by an inspection supervisor, material technicians and Structural Material Section civil engineers.</p> <p>Serves as an inspector-in-charge of prestressed fabrication; reviews plant quality control activities and enforces the approved quality control plan; assures conformance to the shop drawings, special provisions and specifications; reviews material certifications; records test results and maintains inspection documentation using the Department EQMS application. Perform QA testing as required by Publication 145.</p>	<p>Ability to effectively communicate in English, both speaking and writing.</p> <p>Ability to interpret shop drawings, standards and specifications and to enforce these requirements.</p> <p>Effectively operate a personal computer, M.S. Word and Excel.</p> <p>Ability to operate a digital camera.</p> <p>Ability to compose, send and receive email, including the use of attachments with emails.</p> <p>Ability to establish and maintain effective working relationships.</p> <p>Knowledge of the principles and methods applied in inspecting the fabrication of prestressed concrete bridge beams, precast concrete, concrete pipe and grate and frame.</p>	<p>High school graduate or equivalent high school (GED) certificate.</p> <p>Minimum of three (3) years of experience in prestressed concrete inspection.</p> <p>Valid ACI Field Testing Technician – Grade 1 Certification.</p> <p>Valid PCI Level II - Certified Technician Certification issued by the Precast/ Prestressed Concrete Institute (PCI)</p>

Inspector Level	Inspector Title	Example of Work	Required Knowledge, Skills and Abilities	Minimum Experience and Training
			Knowledge of concrete materials and their use in transportation construction. Knowledge of the characteristics and properties of natural and manufactured materials used in precast and prestressed concrete construction. Skill in performing sampling and testing of concrete and constituent materials, including Self Consolidating Concrete.	
TCI-3	Precast Concrete Inspector	<p>This is technical work, primarily in the fabrication of precast concrete and reinforced concrete pipe.</p> <p>Performs independent technical work associated with the quality assurance of these materials. The inspector reviews and monitors fabrication; reviews/performs concrete tests; and interprets specifications and approved drawings. Assignments require independent review by an agency supervisor, material technicians and civil engineers.</p> <p>Serves as an inspector of precast concrete products or reinforced concrete pipe. Serves as a secondary inspector at prestressed concrete facilities under the direction of a Lead prestressed concrete inspector, reviews plant quality control activities and enforces the approved quality control plan; assures conformance to the shop drawings, special provisions and specifications; reviews material certifications; records test results and maintains documentation using the Department’s EQMS application. Perform QA testing as required by Publication 145.</p>	<p>Ability to effectively communicate in English, both speaking and writing.</p> <p>Ability to interpret shop drawings, standards and specifications and to enforce these requirements.</p> <p>Effectively operate a personal computer, M.S. Word and Excel. Ability to operate a digital camera.</p> <p>Ability to compose, send and receive email, including the use of attachments with emails.</p> <p>Ability to establish and maintain effective working relationships.</p> <p>Knowledge of the principles and methods applied in inspecting the fabrication of precast concrete, concrete pipe and concrete grate and frame.</p> <p>Knowledge of concrete materials and their use in transportation construction.</p> <p>Knowledge of the characteristics and properties of natural and manufactured materials used in precast and prestressed concrete construction.</p> <p>Skill in performing sampling and testing of concrete and constituent materials, including Self Consolidating Concrete.</p>	<p>High school graduate or equivalent high school (GED) certificate.</p> <p>Minimum of one (1) year of experience in precast concrete inspection.</p> <p>Valid ACI Field Testing Technician – Grade 1 Certification.</p>
SUPPORT STAFF				
N/A ¹	Project Manager – Steel	<p>This is a professional and managerial position in the field of Civil, Metallurgy and Welding Engineering responsible for the overall implementation of the inspection program.</p> <p>Ensures coordination with the CSME when required.</p> <p>Responsible for enforcing the standards for the quality of work and the requirements of the contract, special provisions and applicable specifications in the fabrication of simple and complex welded structures and timber structures.</p> <p>Maintains overall responsibility for the performance of shop inspectors while fabrication is in progress to ensure conformance to contract requirements, and the firm’s approved Management Plan.</p>	<p>Thorough knowledge of the engineering principles and practices relating to bridge construction, inspection and testing of materials, material properties, plans and specifications.</p>	<p>Professional Engineer registered in the Commonwealth of Pennsylvania.</p> <p>Bachelor of Science degree in Civil Engineering or a related field.</p> <p>Minimum of five (5) years of structural steel and aluminum welding related experience.</p>

¹ Submit actual wage rates to the Department for review and approval. The Department reserves the right to negotiate these wage rates based on certifications, experience and other relevant factors.

Inspector Level	Inspector Title	Example of Work	Required Knowledge, Skills and Abilities	Minimum Experience and Training
		<p>Reviews, evaluates and provides consultation to the Department for difficult problems related to weldment design, production, construction, inspection and repairs. Provides expert interpretation of applicable codes and special provisions of contracts to plant engineers and inspection agency staff.</p> <p>Reviews current fabrication and material specifications as promulgated by the Department, including the American Welding Society (AWS), the American Association of State Highway and Transportation Officials (AASHTO), the American Society for Testing and Materials (ASTM), and the American Institute for Timber Construction (AITC).</p> <p>Reviews/develops Department standards and specifications related to construction and fabrication of structural steel and aluminum.</p>		
N/A ¹	Project Manager – Precast and Prestressed Concrete	<p>This is a managerial position in the field of Precast and Prestressed Concrete fabrication/construction and is responsible for the overall quality and implementation of the inspection program.</p> <p>Responsible for enforcing the standards of good workmanship and the requirements of the contract, special provisions, and applicable specifications in the fabrication of precast and prestressed concrete products.</p> <p>Maintains overall responsibility for the performance of shop inspectors while fabrication is in progress to ensure conformance to contract requirements and the firm's approved Management Plan.</p> <p>Reviews, evaluates, and provides consultation to the Department for difficult problems related to production, construction, inspection, and repairs. Ensures documentation and reports are clear, concise, and technically correct meeting the contract requirements and as appropriate recommendations to resolve issues. Provides expert interpretation of applicable codes and special provisions of contracts to inspection agency staff, reviews current fabrication and material specifications as promulgated by the Department, including the American Association of State Highway and Transportation Officials (AASHTO), the American Society for Testing and Materials (ASTM), the American Concrete Institute (ACI) and the Prestressed Concrete Institute (PCI), The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE).</p> <p>Aids in the review and development (when required) of Department standards and specifications related to construction and fabrication of precast and prestressed concrete products. Ensures coordination with the Chief Structural Materials Engineer when required.</p>	Thorough knowledge of the principles and practices relating to precast and prestressed concrete fabrication, construction, inspection and testing of materials, material properties, plans and specifications.	<p>Professional Engineer registered in the Commonwealth of Pennsylvania.</p> <p>Bachelor of Science degree in Civil Engineering or valid PCI Level III - Certified Technician Certification issued by the Precast/Prestressed Concrete Institute (PCI).</p> <p>Minimum of ten (10) years of experience in precast and prestressed concrete inspection /construction.</p>

Inspector Level	Inspector Title	Example of Work	Required Knowledge, Skills and Abilities	Minimum Experience and Training
N/A ¹	Civil Engineer	<p>This is a technical and managerial position in the field of Civil, Metallurgy and Welding Engineering and Precast and Prestressed Concrete Engineering.</p> <p>Serves as the primary point of contact of day-to-day operations for the IQF when questions arise.</p> <p>Assists the Project Manager in enforcing the standards for the quality of work and the requirements of the contract, special provisions and applicable specifications in the fabrication of welded structures.</p> <p>Reviews shop fabrication practices including welding procedures, repair procedures, non-destructive testing and preparation and painting/coating of steel and aluminum structures.</p> <p>Reviews and handles daily problems arising at the plants. Coordinates with the Structural Materials unit on issues related to welding procedures, specification enforcement, inspection and repairs. Advises the CSME on alternative actions for resolving problems.</p> <p>Reviews Procedure Qualification Records and approves/disapproves Welding Procedure Specifications for the Department. Provides written reports when required.</p> <p>Provides expert interpretation of applicable codes and special provisions of contracts to plant engineers and inspection agency staff.</p>		<p>Professional Engineer registered in the Commonwealth of Pennsylvania.</p> <p>Bachelor of Science degree in Civil Engineering or Welding Engineering.</p> <p>Minimum of five (5) years of structural steel and aluminum welding related experience.</p> <p>Minimum of five (5) years of experience in precast and prestressed concrete inspection /construction.</p> <p>Valid American Welding Society, Certified Welding Inspector (CWI) certification.</p> <p>Valid PCI Level III - Certified Technician Certification issued by the Precast/Prestressed Concrete Institute (PCI).</p>
N/A ¹	Metallurgical Engineer	<p>This is professional and managerial position in the field of metallurgy and welding engineering.</p> <p>Reviews and handles difficult problems in the field of metallurgy and performs as a trouble-shooting engineer, when problems arise.</p>	<p>Thorough knowledge of the behavior, structure, properties and composition of metals, applicable to the field of welding and fabrication. The engineer should be familiar with all metals, including aluminum used in the fabrication of bridges, and other items incidental to highway construction at steel fabrication shops.</p> <p>Areas of expertise should include carbon steels, high-strength low-alloy steels, tempered alloy steels, weathering steels, stainless steels and aluminum including their weldability, chemical, mechanical, tensile and toughness requirements.</p> <p>Working knowledge of the principles and practices involving visual inspection and non-destructive testing as per AWS, AASHTO and ASNT specifications.</p> <p>Ability to effectively communicate in English, both speaking and writing.</p>	<p>Bachelor of Science degree in Metallurgical or Welding Engineering or a closely related engineering discipline.</p> <p>Minimum of five (5) years of metallurgical experience.</p>

Inspector Level	Inspector Title	Example of Work	Required Knowledge, Skills and Abilities	Minimum Experience and Training
N/A ¹	Forensics Engineer	<p>This is a professional technical position in the field of metal, timber and concrete technology.</p> <p>Provides both field and laboratory analysis of metal, timber and concrete to determine the cause(s) of premature material deterioration or failures, including but not limited to, concrete materials and constituent materials, coatings, wood chips, mold, and other materials as required by the Chief Structural Materials Engineer or designated representative.</p> <p>Prepares detailed reports and/or presentations for Department engineers to describe the probable causes of the material deterioration or failure and to recommend remedial measures or repairs, when necessary.</p>	<p>Thorough knowledge in the assessment of metal, timber and concrete durability, deterioration and failure mechanisms.</p> <p>Thorough knowledge in the various test methods available, ASTM, AASHTO and Pennsylvania Test Methods, including non- destructive methods, to diagnose material conditions.</p> <p>Comprehensive background in material examination per the ASTM, AASHTO and AWS.</p>	<p>Professional Engineer registered in the Commonwealth of Pennsylvania.</p> <p>Bachelor of Science degree in Civil Engineering.</p> <p>Minimum of ten (10) years of experience in the field of concrete and metals forensic engineering directly related to failure mechanisms, durability, and deterioration.</p>
TCM-2	ASNT Level III	<p>This position provides expertise and consultation to the Department in the areas of non-destructive testing of both ferrous and non-ferrous metals.</p> <p>Acts as an expert consultant to the Department to review and approve/disapprove fabricator written practices. Assesses non-destructive testing procedures related to welding and repairs.</p> <p>Evaluates, tests and certifies inspectors to oversee non-destructive testing at fabricator and field locations. Provides non-destructive testing inspection training to Department field personnel, when required.</p> <p>Performs other related duties when required.</p>		<p>Valid ASNT Level III certification (by ASNT exam) for the various disciplines of nondestructive testing, including RT, UT, MT and PT.</p>
TCM-1	ASNT Level II Technician	<p>This position performs non-destructive testing at fabrication shops and field locations when required.</p> <p>Provides testing equipment for inspection in the shop or at the project site as required by CSME.</p>		<p>Certified as Level II in accordance with the employers Written Practice in the appropriate method/technique of NDT (including but not limited to PT, MT and UT).</p>
PHASED ARRAY ULTRASONIC TESTING SERVICES				
TCM-2	ASNT Level III Advanced Ultrasonic Testing	<p>This position is an advanced career NDT Level III in Ultrasonic Testing.</p> <p>Acts as an expert consultant to the Department to review and approve/disapprove Phased Array Ultrasonic Testing procedures and data when directed.</p> <p>Evaluates, tests and certifies inspectors to perform Phased Array Ultrasonic Testing at fabrication shops and field locations in accordance with the applicable codes and ASNT SNT-TC-1a document. Provides non-destructive testing inspection training to Department field personnel, when required. Performs other related duties when required.</p>		<p>Minimum of three (3) years of experience, five (5) years preferred, in Phased Array Ultrasonic Testing applications.</p> <p>Valid UT Level III certificate from ASNT as either an NDT Level III or ACCP Level III.</p>
TCM-1	ASNT Level II Phased Array Ultrasonic Testing Technician	<p>This position performs Phased Array Ultrasonic Testing at fabrication shops and field locations when required.</p>		<p>Minimum of three (3) years of experience, five (5) years preferred as Phased Array Ultrasonic Testing Level II</p> <p>Certified as a Phased Array Ultrasonic Testing Level II.</p> <p>Phased Array Ultrasonic Testing equipment and certification must be maintained at all times by the certifying agency and provided when required to perform testing at the fabrication shop or field locations.</p>

Attachment 31

Maintenance Responsibilities

Table A31-1. Construction Period Maintenance Responsibilities

	Legend A = Primary Responsibility B = Support Responsibility (share resources & personnel) C = Coordination Responsibility Only D = No Responsibility	PennDOT P3 MBI - Maintenance Responsibility Matrix Construction Period		
		Development Entity	PennDOT Districts	
Item	Element - Task	Responsibility	Responsibility	Comments/ Other Responsibility/ Information
D1	Bridge - Approach slabs	A	C	
D2	Bridge - Deck Cleaning	A	C	
D3	Bridge - Drain Cleaning (including scuppers, downspouts and underground systems)	A	C	
D4	Bridge - Graffiti removal	A	C	
D5	Bridge - Emergency/first response	B	A	
D6	Bridge - Inspection, damage assessment, and identification/performance of repairs for safe reopening, if any. (post emergency/first response)	A	C	
D7	Bridge - Inspection (NBIS Underwater)	A	C	PennDOT will do Oversight and Quality audits
D8	Bridge - Inspection (NBIS)	A	C	PennDOT will do Oversight and Quality audits
D9	Bridge - Lighting maintenance/replacement	A	B	
D10	Bridge - Navigation Lighting maintenance	A	C	
D11	Bridge - Rail, Parapet, Fencing	A	C	
D12	Bridge - Maintenance and Preservation	A	C	All preventative and corrective maintenance or rehabilitation of all bridge elements
D13	Bridge - Sign/VMS/ITS (structural) inspection	A	C	
D14	Bridge - Sign/VMS/ITS (structural) maintenance	A	C	
D15	Bridge - Signage repair/replacement	A	C	Cyclic replacement
D16	Bridge - Slope and embankment maintenance	A	C	Includes erosion, control growth of woody vegetation, etc.
D17	Bridge - Substructure & Superstructure Cleaning	A	C	PennDOT outsources
D18	Bridge - Waterway Debris removal	A	C	

Attachment 31. Maintenance Responsibilities

	Legend A = Primary Responsibility B = Support Responsibility (share resources & personnel) C = Coordination Responsibility Only D = No Responsibility	PennDOT P3 MBI - Maintenance Responsibility Matrix Construction Period		
		Development Entity	PennDOT Districts	
Item	Element - Task	Responsibility	Responsibility	Comments/ Other Responsibility/ Information
D19	Other structures - Inspection, damage assessment, and identification/performance of repairs for safe reopening, if any. (post emergency/first response)	A	C	Includes retaining walls, noise walls, and sign structures
D20	Other structures – Routine Condition Inspection and Maintenance	A	C	
D21	Other structures - Graffiti removal	A	C	
D22	Other Structures – Retaining/noise walls, MSE walls and Fences	A	C	
D23	Right of way - litter removal	A	C	
D24	Right of way - Mowing, veg. removal, maintenance	A	C	
D25	Right of Way - Sidewalk maintenance	A*	C	agreement(s) with local entities
D26	Right of way - Stormwater Management and Drainage Systems	A	C	Department will be applicant on environmental permitting for construction. Afterward maintenance responsibility transfers to DE.
D27	Right of way - Traffic cameras, ITS (non-tolling related)	A	B	includes VMS
D28	Local roadways	A*	C	
D29	Roadway - Type A and smaller Signage inspection	A	B	e.g., Types A though E
D30	Roadway - Type A and smaller Signage maintenance/repair	A	B	e.g., Types A though E
D31	Roadway - Sign, signal, and lighting support structures	A	C	
D32	Roadway - Traffic signals and signs	A	C	
D33	Roadway – Larger than Type A Signage/VMS/ITS (structural) inspection	A	C	
D34	Roadway – Larger than Type A Signage/VMS/ITS (structural) maintenance/repair	A	C	
D35	Roadway - Carcass Removal	A	C	
D36	Roadway - Debris Removal	A	C	
D37	Roadway - Guardrail/Barrier and transitions	A	C	

Attachment 31. Maintenance Responsibilities

	Legend A = Primary Responsibility B = Support Responsibility (share resources & personnel) C = Coordination Responsibility Only D = No Responsibility	PennDOT P3 MBI - Maintenance Responsibility Matrix Construction Period		
		Development Entity	PennDOT Districts	
Item	Element - Task	Responsibility	Responsibility	Comments/ Other Responsibility/ Information
D38	Roadway - Emergency/first response	B	A	
D39	Roadway - Inspection, damage assessment, and identification/performance of repairs for safe reopening, if any. (post emergency/first response)	A	C	
D40	Roadway - Inspection	A	C	
D41	Roadway - Light poles (electrical) maintenance	A	C	
D42	Roadway - Light poles (structural) inspection	A	C	except high-mast lighting, which will be DE responsibility
D43	Roadway - Light poles (structural) maintenance/repair	A	C	
D44	Roadway - Line Striping	A	C	
D45	Roadway - Pothole/surface remediation	A	C	
D46	Roadway - Shoulder & Drainage Maintenance	A	C	
D47	Roadway - Slope and embankment maintenance	A	C	
D48	Roadway - Winter Maintenance	C	A	

* Ultimate maintenance falls to municipality under maintenance agreement.

† To be installed, owned, operated, and maintained by Turnpike or its designees.

Table A31-2. Maintenance Period Maintenance Responsibilities

	Legend A = Primary Responsibility B = Support Responsibility (share resources/personnel) C = Coordination Responsibility Only D = No Responsibility	PennDOT P3 MBI - Maintenance Period Maintenance Responsibility Matrix		
		Development Entity	PennDOT Districts	
Item	Element - Task	Responsibility	Responsibility	Comments/ Other Responsibility/ Information
M1	Bridge - Approach slabs	A	C	
M2	Bridge - Deck Cleaning	A	C	
M3	Bridge - Drain Cleaning	A	C	
M4	Bridge - Graffiti removal	A	C	
M5	Bridge - Emergency/first response	B	A	
M6	Bridge - Inspection, damage assessment, and identification/performance of repairs for safe reopening, if any. (post emergency/first response)	A	C	
M7	Bridge - Inspection (NBIS Underwater)	A	C	PennDOT will do Oversight and Quality audits
M8	Bridge - Inspection (NBIS)	A	C	PennDOT will do Oversight and Quality audits
M9	Bridge - Lighting maintenance/replacement	A	C	
M10	Bridge - Navigation Lighting maintenance	A	C	
M11	Bridge - Rail, Parapet, Fencing	A	C	Includes the entirety of the length of guiderail and barrier on structure. Guiderail connected to and off structure shall be covered by M37.
M12	Bridge - Maintenance and Preservation	A	C	All preventative and corrective maintenance and rehabilitation of all bridge elements
M13	Bridge - Sign/VMS/ITS (structural) inspection	A	C	
M14	Bridge - Sign/VMS/ITS (structural) maintenance	A	C	
M15	Bridge - Signage repair/replacement	A	C	Cyclic replacement
M16	Bridge - Slope and embankment maintenance	A	C	Includes erosion, control growth of woody vegetation, etc.
M17	Bridge - Substructure & Superstructure Cleaning	A	C	PennDOT outsources

Attachment 31. Maintenance Responsibilities

	Legend A = Primary Responsibility B = Support Responsibility (share resources/personnel) C = Coordination Responsibility Only D = No Responsibility	PennDOT P3 MBI - Maintenance Period Maintenance Responsibility Matrix		
		Development Entity	PennDOT Districts	
Item	Element - Task	Responsibility	Responsibility	Comments/ Other Responsibility/ Information
M18	Bridge - Waterway Debris removal	A	C	
M19	Other structures - Inspection, damage assessment, and identification/performance of repairs for safe reopening, if any. (post emergency/first response)	A	C	Includes retaining walls, noise walls, and sign structures
M20	Other structures – Routine Condition Inspection and Maintenance	A	C	
M21	Other structures - Graffiti removal	A	C	
M22	Other Structures - Retaining/noise walls, MSE walls and Fences	A	C	
M23	Right of way - litter removal	C	A	
M24	Right of way - Mowing, veg. removal, maintenance	C	A	
M25	Right of Way - Sidewalk maintenance	A*	D*	agreement(s) with local entities
M26	Right of way - Stormwater Management and Drainage Systems	A	C	Dept will be applicant on environmental permitting for construction. Afterward, maintenance responsibility transferred to DE.
M27	Right of way - Traffic cameras, ITS (non-tolling related)	C	A	includes VMS
M28	Roadway – Local roadways	D*	D*	agreement(s) with local entities
M29	Roadway - Type A or smaller Signage inspection	C	A	
M30	Roadway - Type A or smaller Signage maintenance/repair	C	A	
M31	Roadway - Sign, signal, and lighting support structures	C	A	
M32	Roadway - Traffic signals and signs	C	A	
M33	Roadway - Larger than Type A (“BD’s”) Signage/VMS/ITS (structural) inspection	C	A	

Attachment 31. Maintenance Responsibilities

	Legend A = Primary Responsibility B = Support Responsibility (share resources/personnel) C = Coordination Responsibility Only D = No Responsibility	PennDOT P3 MBI - Maintenance Period Maintenance Responsibility Matrix		
		Development Entity	PennDOT Districts	
Item	Element - Task	Responsibility	Responsibility	Comments/ Other Responsibility/ Information
M34	Roadway - Larger than Type A (“BD’s”) Signage/VMS/ITS (structural) maintenance/repair	C	A	
M35	Roadway - Carcass Removal	C	A	
M36	Roadway - Debris Removal	C	A	
M37	Roadway - Guardrail/Barrier and transitions	A	C	Maintenance Limit Drawings will designate responsibility of Development Entity.
M38	Roadway - Emergency/first response	B	A	
M39	Roadway - Inspection, damage assessment, and identification/performance of repairs for safe reopening, if any. (post emergency/first response)	C	A	STAMPP
M40	Roadway – Inspection	C	A	
M41	Roadway - Light poles (electrical) maintenance	C	A	
M42	Roadway - Light poles (structural) inspection	C	A	
M43	Roadway - Light poles (structural) maintenance/repair	C	A	
M44	Roadway - Line Striping	C	A	
M45	Roadway - Pothole/surface remediation	C	A**	
M46	Roadway - Shoulder & Drainage Maintenance	C	A**	
M47	Roadway - Slope and embankment maintenance	C	A	Maintenance Limit Drawings will designate responsibility of Development Entity.
M48	Roadway - Winter Maintenance	C	A	

* Ultimate maintenance falls to municipality under maintenance agreement.

† To be installed, owned, operated, and maintained by Turnpike or its designees.

** To be discussed during PDA Phase with PDA Entity. Would like to clarify the pavement warranties.

Attachment 32

Noncompliance Events and Performance Requirements

Table A32-1. D&C Period Noncompliance Events

Noncompliance Event Category	Noncompliance Event ID	Each instance of these events shall constitute a Noncompliance Event:	Noncompliance Points	Cure Period	Interval of Recurrence
Project Delivery Protocol	1	Breach of or failure to comply with the requirements stated in Project Management Plan in accordance with Section 3 (Work management and Administration) of the Technical Provisions and other applicable Sections of the Technical Provisions	3	20 Business Days	10 Business Days
Approvals and Oversight	2	Failure to carry out internal audits of the Project Management Plan at the times and in the manner prescribed in the Project Management Plan and in accordance with Section 3 (Work management and Administration) of the Technical Provisions.	2	30 Business Days	10 Business Days
Reporting, Submittals, and Document Management	3	Failure to establish, maintain, and update the Project Management Plan in accordance with Section 3 (Work management and Administration) of the Technical Provisions.	2	30 Business Days	30 Business Day
Project Delivery Protocol	4	Failure to address work not in compliance with Department Construction Specifications and the contract drawings/ contract documents for physical work performed on and materials incorporated into the project, unless otherwise approved by the Department.	3	1 Business Day	1 Business Day
Approvals and Oversight	5	Breach of or failure to comply with the requirements of the Project Documents with respect to Environmental Approvals and permits and comply with the requirements and mitigation of such Environmental Approvals and permits.	2	24 hours	24 hours

Technical Provisions for the Design-Build-Finance-Maintain Agreement
Attachment 32. Noncompliance Events and Performance Requirements

Noncompliance Event Category	Noncompliance Event ID	Each instance of these events shall constitute a Noncompliance Event:	Noncompliance Points	Cure Period	Interval of Recurrence
Project Delivery Protocols	6	Breach of or failure to comply in any aspect of the maintenance and protection of traffic requirements with respect to traffic control devices for short term operations or the requirements for three or more consecutive channelizing devices, stop and yield signs, temporary signals, or arrow panels in accordance with Section 20 (Maintenance and Protection of Traffic) of the Technical Provisions.	1	2 hours	2 hours
Project Delivery Protocols	7	Breach of or failure to comply in any aspect of the maintenance and protection of traffic requirements with respect to traffic control devices for long term operations in accordance with Section 20 (Maintenance and Protection of Traffic) of the Technical Provisions.	3	24 hours	24 hours
Project Delivery Protocols	8	Failure to obtain the approval of the Department for the closure of any lane or roadway in accordance with the requirements of Section 20 (Maintenance and Protection of Traffic) of the Technical Provisions.	5	1 hour	30 minutes
Performance Standards	9	Failure to maintain a fully operational utility service except as specifically permitted by the Utility Owner and by any affected third party except when at no fault of the Development Entity.	3	24 hours	24 hours

Attachment 32. Noncompliance Events and Performance Requirements

Noncompliance Event Category	Noncompliance Event ID	Each instance of these events shall constitute a Noncompliance Event:	Noncompliance Points	Cure Period	Interval of Recurrence
Performance Standards	10	Failure to avoid encroaching on third party property without prior, proper authorization.	5	None	24 hours
Performance Standards	11	Breach of or failure to comply with the requirements in of Attachment 32, Table A32-2 (Maintenance Performance Requirements During the D&C Period) of the Technical Provisions.	Per Attachment 32, Table A32-2 (Maintenance Performance Requirements During the D&C Period) of the Technical Provisions	Per Attachment 32, Table A32-2 (Maintenance Performance Requirements During the D&C Period) of the Technical Provisions	Per Attachment 32, Table A32-2 (Maintenance Performance Requirements During the D&C Period) of the Technical Provisions

Table A32-2. Maintenance Performance Requirements During the Construction Period

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
BRIDGES AND STRUCTURES					
D1 BRIDGE – APPROACH SLABS					
D1.1 Rigid/concrete approach slabs	Maintain concrete/approach slab at acceptable level of performance and safety for Users	Maintain approach slab free of edge drop-off greater than 1.5 inches (compared to adjacent pavement, shoulder, approach slab or bridge deck surface). For assessing edge drop-offs, follow <i>Department Pub 23, Maintenance Manual</i> ; and other Department publications as applicable.	3	60 Days	30 Days
D1.2 Rigid/concrete approach slabs	Maintain concrete/approach slab at acceptable level of performance and safety for Users	Maintain safe skid resistance level in accordance with <i>Department Pub 242, Pavement Policy Manual</i> . Respond to the Department notification when low skid resistance is detected, perform a site investigation, and perform Maintenance Work to eliminate unsafe condition.	3	60 Days	30 Days
D1.3 Rigid/concrete approach slabs	Maintain concrete/approach slab at acceptable level of performance and safety for Users	Maintain ride quality with no discontinuities greater than 3/16 inch for every 12-foot straight edge. For assessing ride quality, follow <i>Department Pub 408, Specifications, Section 501.3(k)1</i> and <i>Section 501.3(o)</i> . As a minimum cure, remove high points by means of grinding or cutting tools.	3	60 Days	30 Days
D1.4 Rigid/concrete approach slabs	Maintain concrete/approach slab at acceptable level of performance and safety for Users	Maintain approach slab free of potholes, spalling, or scaling exceeding 3/4 inch depth OR measuring less than ¾ inch with a cumulative area (over the approach slab) of 1.0 square feet. Maintain approach slab free of potholes and spalling greater than 1.0 square feet in area or 1.0 inch deep including any single area in the wheel path exceeding 3 inches in width measured longitudinally and 12 inches in length measured transversely. For assessing potholes and spalling, follow <i>Department Pub 336, Automated Pavement Condition Surveying Field Manual</i> ; <i>Department Pub 242, Pavement Policy Manual</i> ; <i>Department Pub 23, Maintenance Manual</i> ; <i>Department Pub 72M, Roadway Construction Standards, RC-26</i> ; and other Department publications as applicable.	3	60 Days	30 Days
D1.5 Rigid/concrete approach slabs	Maintain concrete/ approach slab at acceptable level of performance and safety for Users	Maintain concrete approach slab free of medium or greater severity cracking. For assessing cracking in concrete, follow <i>Department Pub 336, Automated Pavement Condition Survey Field Manual</i> ; <i>Department Pub 242, Pavement Policy Manual</i> ; <i>Department Pub 23, Maintenance Manual</i> ; <i>Department Pub 72M, Roadway Construction Standards, RC-26M</i> ; and other Department publications as applicable.	3	60 Days	30 Days
D1.6 Approach Slab Joints	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain ride quality at approach slab joints (between both bridge deck and approach slab and between approach slab and approach pavement) with no vertical discontinuity greater than 3/8 inch. Measurement to be based on 2-foot straightedge placed one foot on approach slab and one foot on deck or approach pavement and measurement taken at end of straightedge.	3	60 Days	30 Days
D1.7 Approach Slab Joints	Maintain concrete/ approach slab at acceptable level of performance and safety for Users	Maintain approach slab joints sealed and in proper alignment. No failing joint seals. No longitudinal joint separations. For assessing deficiencies in concrete joints, follow <i>Department Pub 242, Pavement Policy Manual</i> ; <i>Department Pub 23, Maintenance Manual</i> ; <i>Department Pub 72M, Roadway Construction Standards, RC-26M</i> ; and other Department publications as applicable.	3	60 Days	30 Days
D2 BRIDGE – DECK CLEANING					
D2.1 Bridge cleaning	Wash, clean and flush bridges	Wash, clean and flush (i) bridge decks, drains, scuppers, downspouts, expansion dam troughs, etc. at a minimum of once between March 1st to June 30th of each year and (ii) bearings and substructures a minimum of once every five years per <i>Department Pub 23, Maintenance Manual</i> and <i>Department Pub 55, Bridge Maintenance Manual</i> ; in accordance with the schedule in the MMP.	3	60 Days	30 Days
D3 BRIDGE – DRAIN CLEANING					
D3.1 Elements of the drainage system	Maintain Elements of the drainage system to preserve their functionality, reliability, and the safety for Users	Maintain full functionality and reliability of inlets, scuppers, troughs, downspouts, drain pipes, and other Elements of the bridge drainage system. At a minimum, maintain all Elements of drainage system clean and clear of obstructions (at a minimum, 90 percent of the opening of drainage Elements should be clear of obstructions) and without obstruction to inlet or outlet flow. For assessment of drainage Elements, follow <i>Department Pub 23, Maintenance Manual</i> ; <i>Department Pub 73, Drainage Condition Survey Field Manual</i> ; and other Department publications as applicable.	3	60 Days	30 Days
D4 BRIDGE – GRAFFITI REMOVAL					
D4.1 Element appearance	Maintain Elements free of graffiti.	Maintain Elements within the Maintenance Limits free of graffiti and damage resulting from vandalism.	2	60 Days	30 Days

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
D5 BRIDGE – EMERGENCY/FIRST RESPONSE (<i>DEPARTMENT RESPONSIBILITY</i>)					
D6 BRIDGE – INCIDENT/EMERGENCY INSPECTION					
D6.1 Emergency or Incident Response	Conduct visual inspection and damage assessment	Conduct visual inspections and damage assessments following severe weather events or other Emergency or Incident per <i>Section 22.6.6, Unplanned Maintenance Activities</i> .	5	4 hours	1 hour
D6.2 Damage assessment	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Evaluate and complete assessment of all Elements, including structural evaluation and evaluation of safety conditions, and liaise with the Department regarding any potential hazards to the general public. Propose and implement temporary measures or permanent repairs of any damage arising from the Emergency, Incident, or severe weather events. Ensure the structural safety of structures affected by Emergency, Incident, or severe weather events. Notify Department Bridge Engineer and District Emergency Management Coordinator that it is safe to open the bridge.	3	7 Days	7 Days
D6.3 Temporary remedy	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Coordinate with the Department, submit a temporary remedy repair plan if required, and conduct repairs in accordance with <i>Section 22, Maintenance</i> .	3	7 Days	7 Days
D6.4 Permanent repair	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Develop a permanent repair plan and provide to Department for review and approval. Coordinate with the Department and conduct repairs in accordance with <i>Section 22, Maintenance</i> .	3	30 Days	30 Days
D7 BRIDGE – INSPECTION (NBIS UNDERWATER)					
D7.1 Structures and Major Bridge structural Elements (with length 8 feet and greater) (See Note 2)	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Failure to comply with the requirements of the Project Documents relating to inspections and inspection reporting including without limitation the requirements of <i>Section 22.9, Inspections</i> of these Technical Provisions.	5	24 hours	24 hours
D8 Bridge – INSPECTION (NBIS)					
D8.1 Structures and Major Bridge structural Elements (with length 8 feet and greater) (See Note 2)	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Failure to comply with the requirements of the Project Documents relating to inspections and inspection reporting including without limitation the requirements of <i>Section 22.9, Inspections</i> of these Technical Provisions.	5	24 hours	24 hours
D9 BRIDGE – LIGHTING MAINTENANCE/REPLACEMENT					
D9.1 Signal and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain structural safety and functionality of signal and lighting support structures and foundations, free of: loose nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, and debris/vegetation on pedestals and anchorages.	3	30 Days	30 Days
D9.2 Lighting, luminaires, and sign illumination	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain lighting systems in an operating condition in accordance with <i>Department Pub 408, Specifications</i> .	3	14 Days	30 Days
D9.3 Signals	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain signals in an operating condition in accordance with <i>Department Pub 408, Specifications</i> and <i>Department Pub 191, Traffic Signal Maintenance Manual</i> .	3	7 Days	7 Days
D10 BRIDGE – NAVIGATION LIGHTING MAINTENANCE					
D10.1 Lighting and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain functionality of navigation lighting systems. Notify Department when work is complete.	2	48 hours	24 hours
D10.2 Lighting and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain structural safety navigation lighting support structures and foundations, free of: loose nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, and debris/vegetation on pedestals and anchorages.	2	14 Days	7 Days
D11 BRIDGE – RAIL, PARAPET, FENCING					
D11.1 Bridge Barrier and Railing	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain functionality and reliability of barriers and railing on a bridge as intended in the Design Documents and free of displacement and deterioration including corrosion of rebar, steel corrosion, unsound concrete, delaminated concrete, spalled concrete, paint system failure, rust, loose nuts and bolts, corrosion, cracks, loss of section, debris and vegetation on pedestals and anchorages, blockages of hollow section drain holes, and impact damage. For inspection and assessment follow NBIS, <i>Bridge Inspector’s Reference Manual</i> , <i>FHWA NHI 03-001</i> , <i>FHWA 2006</i> ; <i>Department Pub 238, Bridge Safety Inspection Manual</i> ; and other Department publications as applicable.	3	14 Days	30 Days

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
D11.2 Fencing	Maintain fence in acceptable condition and level of safety for Users	Maintain fences in fully functional condition and free of damage. Repair or replace fences no longer providing access control and/or a physical barrier. For assessing fence, follow <i>Department Pub 72M, Roadway Construction Standards, RC-60M</i> ; and <i>Department Pub 72M, Roadway Construction Standards, RC-61M</i> ; and other Department publications as applicable.	2	60 Days	30 Days
D12 BRIDGE – MAINTENANCE AND PRESERVATION					
D12.1 Structures and Major Bridge structural Elements (with length 8 feet and greater) (See Note 2)	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain structures and structure Elements safe and fully functional as intended in the Design Documents and free of: deterioration and damages including scour damages, corrosion of rebar, steel corrosion, unsound concrete, failure, or delamination of the overlay greater than 1.0 square feet in area, excessive cracking, delaminated concrete, spalled concrete or potholes, loss of section, settlement or movement beyond tolerable movement design criteria or affecting performance of structure. For inspection, assessment, and maintenance follow NBIS, <i>Bridge Inspector’s Reference Manual, FHWA NHI 03-001, FHWA 2006; Department Pub 55, Bridge Maintenance Manual; Department Pub 238, Bridge Safety Inspection Manual; Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual</i> ; and Department publications as applicable.	5	30 Days	14 Days
D12.2 Bridge Deck Wearing Surface	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain bridge deck wearing surface in good serviceable condition; apply or replace overlay when the ride quality or the integrity of the bridge deck wearing surface begins to deteriorate, defined as item 6B40 Deck Wearing Surface Condition Rating of 6 or lower per <i>Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual</i> .	2	90 Days	30 Days
D12.3 Bridge joints	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain expansion joints so joints do not leak; maintain full functionality and reliability of expansion joints as intended and maintain free of dirt, debris, vegetation, loose nuts and bolts, and any other deficiencies. For inspection and assessment follow NBIS, <i>Bridge Inspector’s Reference Manual, FHWA NHI 03-001, FHWA 2006; Department Pub 238, Bridge Safety Inspection Manual</i> ; and Department publications as applicable.	3	30 Days	14 Days
D12.4 Bearings	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain bearing Elements (including bearings, bearing shelves, sliding and roller surfaces) clean, free of debris and vegetation, fully functional and reliable as intended in the Design Documents. Comply with the manufacturers’ instructions.	3	60 Days	30 Days
D12.5 Structural Steel Elements	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain structural steel Elements free of paint system failure, rust, loose nuts and bolts, corrosion, cracks, and loss of section. For assessing Maintenance Performance Requirements of steel Elements, follow <i>Department Pub 55, Bridge Maintenance Manual</i> ; and other Department publications as applicable.	5	30 Days	14 Days
D13 BRIDGE – SIGN/VMS/ITS (STRUCTURAL) INSPECTION					
D13.1 Sign/VMS/ITS support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Failure to comply with the requirements of the Project Documents relating to inspections and inspection reporting including without limitation the requirements of <i>Section 22.9, Inspections</i> of these Technical Provisions.	4	30 Days	30 Days
D14 BRIDGE – SIGN/VMS/ITS (STRUCTURAL) MAINTENANCE					
D14.1 Sign/VMS/ITS support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain structural safety and functionality of sign/VMS/ITS support structures and foundations, free of: loose or rusting nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, and debris/vegetation on pedestals and anchorages.	3	30 Days	30 Days
D15 BRIDGE – SIGNAGE REPAIR/REPLACEMENT					
D15.1 Signage	Maintain at acceptable levels of safety and proper functioning conditions for Users	Repair or replace signage based on current Department standards and other applicable requirements; and maintain structural safety and functionality of sign, signal and lighting support structures and foundations, free of: loose or rusting nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, and debris/vegetation on pedestals and anchorages. A sign or post must be replaced when the sign or post has been damaged or when the legibility of the sign is impaired by fading of the sign face or by loss of retroreflectivity. Signs are to be replaced at or before the sign reaches age 18 in accordance with Department Pub 23, Chapter 11.	2	60 Days	30 Days
D16 BRIDGE – SLOPE AND EMBANKMENT MAINTENANCE					
D16.1 Slopes and embankments	Ensure slope stability	Allow no slope failure, undercut slopes or embankments, and no slumped areas. Maintain slopes and embankments in general conformance to the original graded cross-sections in the Design Documents. Replace landscaping materials and reseed as necessary for erosion control. Remove and dispose of all eroded materials and keep roadways, shoulders, and bridges clear of eroded material. All structural or natural failures of embankments and cut slopes are to be repaired and maintained according to their original grades; landscaping materials (including reseeded and re-vegetation for erosion control purposes) are to be replaced, and eroded materials are to be removed and disposed. For assessing slopes, follow <i>Department Pub 72M, Roadway Construction Standards, RC-40M</i> ; and <i>Department Pub 23, Maintenance Manual</i> ; and Department publications as applicable.	2	60 Days	30 Days

Attachment 32. Noncompliance Events and Performance Requirements

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
D17 BRIDGE – SUBSTRUCTURE & SUPERSTRUCTURE CLEANING					
D17.1 Bridge cleaning	Wash, clean and flush bridges	Wash, clean and flush bridge decks (and drains) at a minimum once per year and bearings and substructures a minimum of once every five years per <i>Department Pub 55, Bridge Maintenance Manual</i> ; in accordance with the schedule in the MMP.	3	60 Days	30 Days
D18 BRIDGE – WATERWAY DEBRIS REMOVAL					
D18.1 Stream channel	Maintain stream channel clear of debris	Maintain stream channel and embankments clear of debris, deposits, and vegetation obstructing the normal flow of the stream in accordance with <i>Department Pub 100A, Bridge Management System (BMS2) Coding Manual</i> ; and in compliance with PADEP permit requirements.	2	90 Days	30 Days
D19 OTHER STRUCTURES – INCIDENT/EMERGENCY INSPECTION					
D19.1 Emergency or Incident Response	Conduct visual inspection and damage assessment	Conduct visual inspections and damage assessments following severe weather events or other Emergency or Incident per <i>Section 22.6.6, Unplanned Maintenance Activities</i> .	5	4 hours	1 hour
D19.2 Damage assessment	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Evaluate and complete assessment of all Elements, including structural evaluation and evaluation of safety conditions, and liaise with the Department regarding any potential hazards to the general public. Propose and implement temporary measures or permanent repairs of any damage arising from the Emergency, Incident, or severe weather events. Ensure the structural safety of structures affected by Emergency, Incident, or severe weather events. Notify Department Bridge Engineer and District Emergency Management Coordinator that it is safe to open the bridge.	3	7 Days	7 Days
D19.3 Temporary remedy	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Coordinate with the Department, submit a temporary remedy repair plan if required, and conduct repairs in accordance with <i>Section 22, Maintenance</i> .	3	7 Days	7 Days
D19.4 Permanent repair	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Develop a permanent repair plan and provide to Department for review and approval. Coordinate with the Department and conduct repairs in accordance with <i>Section 22, Maintenance</i> .	3	30 Days	30 Days
D20 OTHER STRUCTURES – ROUTINE CONDITION INSPECTION AND MAINTENANCE					
D20.1 Structures (with length less than 8 feet) (See Note 2)	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Failure to comply with the requirements of the Project Documents relating to inspections and inspection reporting including without limitation the requirements of <i>Section 22.9, Inspections</i> of the Technical Provisions.	3	60 Days	30 Days
D20.2 Structures (with length less than 8 feet) (See Note 2)	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain structures and structure Elements safe and fully functional as intended in the Design Documents and free of: deterioration and damages including scour damages, corrosion of rebar, steel corrosion, unsound concrete, failure, or delamination of the overlay greater than 1.0 square feet in area, excessive cracking, delaminated concrete, spalled concrete or potholes, loss of section, settlement or movement beyond tolerable movement design criteria or affecting performance of structure. For inspection, assessment, and maintenance follow NBIS, <i>Bridge Inspector’s Reference Manual, FHWA NHI 03-001, FHWA 2006; Department Pub 55, Bridge Maintenance Manual; Department Pub 238, Bridge Safety Inspection Manual; Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual</i> ; and Department publications as applicable.	3	60 Days	30 Days
D21 OTHER STRUCTURES – GRAFFITI REMOVAL					
D21.1 Element appearance	Maintain Elements free of graffiti.	Maintain Elements within the Maintenance Limits free of graffiti and damage resulting from vandalism. (Graffiti of an obscene nature are Noncompliance.)	2	60 Days	30 Days
D22 OTHER STRUCTURES – RETAINING/NOISE WALLS, MSE WALLS AND FENCING					
D22.1 Retaining walls, noise walls, engineered slopes, and MSE wall	Maintain retaining walls and abutments at acceptable level of safety for Users	Maintain structural safety and integrity of retaining walls and keep free of: any damage and hazards, including blocked weep holes, undesirable vegetation, separation of wall panels exceeding 1 inch, Defects in joint sealants, Defects in pedestrian protection, scour damage, corrosion of reinforcing bars, cracked masonry, cracked, loose or missing mortar, efflorescence, paint system failure, concrete spalling, impact damage, loss of backfill, and settlement or movement beyond tolerable movement design criteria or affecting performance. Maintain walls in the vertical and horizontal position accounting for tolerable movements per <i>Department Pub 15M, Design Manual Part 4 – Structures (DM-4), Section 11.6.2</i> . For inspection and assessment follow NBIS, <i>Bridge Inspector’s Reference Manual, FHWA NHI 03-001, FHWA 2006; Department Pub 55, Bridge Maintenance Manual; Department Pub 238, Bridge Safety Inspection Manual; Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual</i> ; and other Department publications as applicable. Maintain retaining walls at GCR ≥ 6.	3	60 Days	30 Days

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
D22.2 Fencing	Maintain fence in acceptable condition and level of safety for Users	Maintain fences in fully functional condition and free of damage. Repair or replace fences no longer providing access control and/or a physical barrier. For assessing fence, follow <i>Department Pub 72M, Roadway Construction Standards, RC-60M</i> ; and <i>Department Pub 72M, Roadway Construction Standards, RC-61M</i> ; and other Department publications as applicable.	2	60 Days	30 Days
RIGHT OF WAY					
D23 RIGHT OF WAY – LITTER REMOVAL					
D23.1 Litter Removal	Maintain right of way to an acceptable level of appearance and safety relative to debris and litter.	Perform litter removal, including rocks, branches, articles from vehicles, rubbish, and junk a minimum of every 6 months. Removal of items which present safety issues (for instance, rocks and trees along lanes and shoulders) are to be removed immediately. Perform litter removal per <i>Department Pub 23, Maintenance Manual, Chapter 13</i> .	2	60 Days	30 Days
D24 RIGHT OF WAY – MOWING, VEGETATION REMOVAL, AND MAINTENANCE					
D24.1 Vegetation control	Maintain bridges and roadways free of vegetation.	Maintain and control vegetation per the requirements of <i>Section 22.6.8, Landscape Management, Vegetation Control and Use of Herbicides and Pesticides</i> and per <i>Department Pub 23, Maintenance Manual, Chapter 13</i> . Mowing shall be completed within 14 Days preceding Memorial Day, July 4th, and Labor Day.	1	24 hours	24 hours
D25 RIGHT OF WAY – SIDEWALK MAINTENANCE					
D25.1 Curb, Sidewalk, and pedestrian protection measures	Ensure state of good condition and the safety of Users, and in particular pedestrians	Maintain sidewalks, curbs, and pedestrian protection measures free of damages. Maintain sidewalks and curbs free of misalignment greater than ½ inch, sidewalk edge vertical misalignments greater than ¼ inch, cracks greater than ½ inch. Maintain sidewalks and curbs free of exposed steel, free of vegetation, and free of safety hazards. Maintain sidewalks and curb ramps to ensure continued compliance with ADA requirements.	2	60 Days	30 Days
D26 RIGHT OF WAY – STORMWATER MANAGEMENT AND DRAINAGE SYSTEMS					
D26.1 Elements of the Drainage Systems	Maintain Elements of the Drainage Systems to preserve their functionality, reliability, and the safety for Users	Maintain full functionality and reliability of Elements of the Drainage Systems as intended in the Design Documents. Maintain all ditches and swales so they convey runoffs from the roadway. At a minimum, maintain all Elements of drainage system clean and clear of obstructions (at a minimum, 90 percent of the opening of drainage Elements should be clear of obstructions) and without obstruction to inlet or outlet flow. Maintain non-bridge-class culverts free of deterioration in sealant to movement joints, scour damage, corrosion, and loss of section. For assessment of drainage Elements, follow <i>Department Pub 23, Maintenance Manual</i> ; <i>Department Pub 73, Drainage Condition Survey Field Manual</i> ; and other Department publications as applicable.	3	90 Days	30 Days
D26.2 Discharge systems	Maintain Elements of the drainage system to preserve their functionality, reliability, and the safety for Users	Maintain full functionality and reliability of discharge systems in accordance with Governmental Approvals, including Soil Conservation District and Pennsylvania Department of Environmental Protection (PADEP)–issued permit. Ensure surface water discharge systems are properly performing and any discharge to groundwater and waterways complies with Applicable Law and Governmental Approvals.	3	90 Days	30 Days
D27 RIGHT OF WAY – TRAFFIC CAMERAS, ITS (NON-TOLLING RELATED)					
D27.1 Intelligent Transportation System (ITS) Devices	Maintain ITS devices in functioning condition	Maintain ITS in accordance with Department Pub 408, Specifications	2	30 Days	7 Days
ROADWAY					
D28 ROADWAY – LOCAL ROADWAYS					
D28.1 Local Roadway Maintenance	Maintain open travel lanes in sites temporarily open to traffic, temporary Work, and local and state roads used as detour routes	Maintain open travel lanes free of hazards, debris, and encumbrances and generally in compliance with the requirements of <i>Section 20, Maintenance and Protection of Traffic (MPT)</i>	3	24 hours	24 hours
D29 ROADWAY – TYPE A AND SMALLER SIGNAGE INSPECTION					
D30 ROADWAY – TYPE A AND SMALLER SIGNAGE MAINTENANCE/REPAIR					
D30.1 Type A and smaller maintenance	Ensure state of good condition and visibility for road Users	Maintain signs, visible, clear of obstructions and graffiti, clean, with acceptable reflectivity levels, correctly aligned, fully functional and free from damage in accordance with <i>Department Pub 23, Chapter 11</i> .	1	30 Days	14 Days
D31 ROADWAY – SIGN, SIGNAL, AND LIGHTING SUPPORT STRUCTURES					
D31.1 Sign, Signal, and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain structural safety and functionality of sign, signal and lighting support structures and foundations, free of: loose nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, and debris/vegetation on pedestals and anchorages.	2	60 Days	30 Days

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
D32 ROADWAY – TRAFFIC SIGNALS AND SIGNS					
D32.1 Traffic signals and signs	Ensure state of good condition and visibility for road Users	Maintain signs and traffic signal Elements, including vehicle and pedestrian detectors, (which are not otherwise the responsibility of the Department per Section 22.9.11, Department’s Inspections, Planned Maintenance, and Closures) visible, clear of obstructions and graffiti, clean and visible, with acceptable reflectivity levels, correctly aligned, fully functional and free from damage. Keep signal timing correct. Develop and keep in place contingency plans to rectify defects not immediately repairable and to ensure alternative traffic control during a failure period. For assessing signals, follow to Department Pub 191, Traffic Signal Maintenance Manual; and other Department publications as applicable.	2	30 Days	14 Days
D33 ROADWAY – LARGER THAN TYPE A SIGNAGE/VMS/ITS (STRUCTURAL) INSPECTION					
D33.1 Sign, signal, and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Failure to comply with the requirements of the Project Documents relating to inspections and inspection reporting including without limitation the requirements of <i>Section 22.9, Inspections</i> of the Technical Provisions. Perform inspections in accordance with <i>Department Pub 238, Bridge Inspection Manual</i> , applying requirements of <i>Department Pub 100A</i> VS and IS criteria.	4	30 Days	30 Days
D34 ROADWAY – LARGER THAN TYPE A SIGNAGE/VMS/ITS (STRUCTURAL) MAINTENANCE/REPAIR					
D34.1 Sign, signal, and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain structural safety and functionality of sign, signal and lighting support structures and foundations, free of: loose nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, and debris/vegetation on pedestals and anchorages. Sign structures catalogued in BMS2 that have assigned BRKEY (typically of types BD-641M, BD-643M, BD-644M, BD-645M, BD-647M, BD-649M, and BD-650M per <i>Department Pub 218M, Standards for Bridge Design</i>) must be maintained at $GCR \geq 6$ per <i>Department Pub 100A</i> VS and IS criteria.	2	60 Days	30 Days
D34.2 Traffic signals and signs	Ensure state of good condition and visibility for road Users	Maintain signs and traffic signal Elements, including vehicle and pedestrian detectors, visible, clear of obstructions and graffiti, clean and visible, with acceptable reflectivity levels, correctly aligned, fully functional and free from damage. Keep signal timing correct. Develop and keep in place contingency plans to rectify defects not immediately repairable and to ensure alternative traffic control during a failure period. For assessing signals, follow to <i>Department Pub 191, Traffic Signal Maintenance Manual</i> ; and other Department publications as applicable. A sign or post must be replaced when the sign or post has been damaged or when the legibility of the sign is impaired by fading of the sign face or by loss of retroreflectivity. Signs are to be replaced at or before the sign reaches age 18 in accordance with Department Pub 23, Chapter 11.	2	60 Days	30 Days
D35 ROADWAY – CARCASS REMOVAL					
D35.1 Carcass removal	Maintain roadway to an acceptable level of appearance and safety relative to animal carcasses.	Remove deer or other animal carcasses from roadway or shoulders in accordance with <i>Department Pub 23, Section 13.10</i> .	1	24 hours	24 hours
D36 ROADWAY – DEBRIS REMOVAL					
D36.1 Litter and Debris removal	Maintain right of way to an acceptable level of appearance and safety relative to debris and litter.	Remove litter and debris from roadway or shoulders in accordance with <i>Department Pub 23, Section 13.10</i> .	2	60 Days	30 Days
D37 ROADWAY – GUIDERAIL/BARRIER AND TRANSITIONS					
D37.1 Guiderrails and safety devices	Ensure state of good condition and safety for road Users	Maintain structural safety, reliability and functionality of guiderails, guiderail end treatments, impact attenuators, safety barriers, concrete barriers, and other safety devices leading up to a bridge. Ensure safety devices are free of damages and vehicular impact damages and are appropriately placed and correctly installed at the correct height and distance from roadway or obstacles and foundations/anchors are sound. For inspection and assessments, follow Department Pub 33, Shoulder & Guiderail Condition Survey Field Manual; Department Pub 23, Maintenance Manual; Department Pub 13M, Design Manual Part 2 – Highway Design; and other Department publications as applicable.	3	30 Days	7 Days
D38 ROADWAY – EMERGENCY/FIRST RESPONSE (<i>DEPARTMENT RESPONSIBILITY</i>)					
D39 ROADWAY – INSPECTION, DAMAGE ASSESSMENT, AND IDENTIFICATION/PERFORMANCE OF REPAIRS FOR SAFE REOPENING, IF ANY. (POST EMERGENCY/FIRST RESPONSE)					
D39.1 Damage assessment	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Evaluate and complete assessment of all Elements, including structural evaluation and evaluation of safety conditions, and liaise with the Department regarding any potential hazards to the general public. Propose and implement temporary measures or permanent repairs of any damage arising from the Emergency, Incident, or severe weather events. Ensure the structural safety of structures affected by Emergency, Incident, or severe weather events.	3	7 Days	7 Days

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
D40 ROADWAY – INSPECTION					
D41 ROADWAY – LIGHT POLES (ELECTRICAL) MAINTENANCE					
D41.1 Sign, signal, and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain electrical safety and functionality of sign, signal and lighting systems, free of: loose nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, and vandalism.	3	14 Days	30 Days
D41.2 Lighting, luminaires, sign illumination and signals	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain lights and signals in an operating condition. Perform preventative, response, and operational maintenance of signals in accordance with <i>Department Pub 191, Traffic Signal Maintenance Manual</i> .	3	14 Days	30 Days
D42 ROADWAY – LIGHT POLES (STRUCTURAL) INSPECTION					
D42.1 Sign, signal, and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Failure to comply with the requirements of the Project Documents relating to inspections and inspection reporting including without limitation the requirements of <i>Section 22.9, Inspections</i> of the Technical Provisions. Perform inspections of High-mast Lighting in accordance with <i>Department Pub 786</i> . Perform inspection of signal structures in accordance with <i>Department Pub 191, Traffic Signal Maintenance Manual</i> .	4	30 Days	30 Days
D43 ROADWAY – LIGHT POLES (STRUCTURAL) MAINTENANCE/REPAIR					
D43.1 Sign, signal, and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain structural safety and functionality of sign, signal and lighting support structures and foundations, free of: loose nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, and debris/vegetation on pedestals and anchorages. High-mast lighting structures must be maintained at $GCR \geq 7$. Perform preventative, response, and operational maintenance of signals in accordance with Department Pub 191, Traffic Signal Maintenance Manual.	3	30 Days	30 Days
D44 ROADWAY – LINE STRIPING					
D44.1 Pavement Marking	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain pavement markings in accordance with <i>Section 18.8.4, Pavement Marking</i> of these Technical Provisions.	2	30 Days	30 Days
D45 ROADWAY – POTHOLE/SURFACE REMEDIATION (PERFORMANCE REQUIREMENTS MUST BE MET AT FINAL ACCEPTANCE)					
D45.1 Flexible Pavement (new/rehabilitated)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain flexible pavement free of fatigue, transverse, longitudinal, and miscellaneous cracking equal to or in excess of 0.25" in width in any location. As a minimum cure, remove and replace distressed layers full lane width to a depth necessary to correct observed distress and length not less than 10 feet longitudinally beyond the distressed area.	2	90 Days	30 Days
D45.2 Flexible Pavement (new/rehabilitated)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain flexible pavement free fatigue, transverse, longitudinal, and miscellaneous cracking from hairline to less than 0.25" in width in any location. As a minimum cure, seal cracks as specified in Department Pub 408, Highway Construction Specifications, Section 469.	1	90 Days	30 Days
D45.3 Flexible Pavement (new/rehabilitated)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain flexible pavement free of medium or greater severity raveling and/or weathering (as defined in Department Pub 336, Automated Pavement Condition Surveying Field Manual) in any location. As a minimum cure, remove and replace distressed layers full lane width to a depth necessary to correct observed distress but not to exceed warranted pavement and length not less than 10 feet longitudinally beyond the distressed area.	1	90 Days	30 Days
D45.4 Flexible Pavement (new/rehabilitated)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain flexible pavement free of rutting equal to or greater than 1/4 inch in any location. Rut depth is measured by laying a string line or straight edge between the middle of the lane and either lane edge, depending on the wheel path measured. The distance from the bottom of the string line or straight edge to the pavement surface is the measured rut depth for that wheel path. Remove and replace distressed layers full lane width to a depth necessary to correct observed distress but not less than 10 feet longitudinally beyond the distressed area.	2	90 Days	30 Days
D45.5 Flexible Pavement (new/rehabilitated)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain flexible pavement free of potholes (defined as layer or partial layer loss of 0.5" depth or greater), pavement slippage/debonding areas, and pavement structure failures in any location. As a minimum cure, remove and replace distressed layers full lane width to a depth necessary to correct observed distress not less than 10 feet longitudinally beyond the distressed area.	2	60 Days	30 Days
D45.6 Flexible Pavement (new/rehabilitated)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain flexible pavement free of low severity longitudinal joint (shoulder and lane joints) and edge deterioration in any location as defined in Department Pub 336, Automated Pavement Condition Surveying Field Manual. As a minimum cure, seal cracks as specified in Department Pub 408, Highway Construction Specifications, Section 469.	1	90 Days	30 Days
D45.7 Flexible Pavement (new/rehabilitated)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain flexible pavement free of medium or high severity longitudinal joint (shoulder and lane joints) and edge deterioration in any location as defined in Department Pub 336, Automated Pavement Condition Survey Field Manual. As a minimum cure, remove and replace distressed layer one foot on either side of the deteriorated joint transversely and a minimum of 24 inches beyond distressed pavement in all longitudinal directions.	2	90 Days	30 Days
D45.8 Flexible Pavement (new/rehabilitated)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain flexible pavement free of flushing in any location. As a minimum cure, remove and replace distressed layers full lane width to a depth necessary to correct observed distress not less than 10 feet longitudinally beyond the distressed area.	1	90 Days	30 Days

Attachment 32. Noncompliance Events and Performance Requirements

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
D45.9 Flexible Pavement (new/rehabilitated)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain ride quality (surface tolerance) with no discontinuities greater than 3/16 inch for every 12-foot straight edge. For assessing ride quality, follow Department Pub 408, Section 413.3(l).	1	90 Days	30 Days
D45.10 Flexible Pavement (new/rehabilitated)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain flexible pavement free of edge drop-off greater than 1.0 inch (compared to adjacent pavement, shoulder, approach slab or bridge deck surface) in any location. As a minimum cure, place shoulder back-up material consisting of 2RC stone.	2	60 Days	30 Days
D45.11 Flexible Pavement (new/rehabilitated)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain safe skid resistance level. Respond to the Department notification when low skid resistance is detected, perform a site investigation, and perform Maintenance Work to eliminate unsafe condition.	2	90 Days	30 Days
D45.12 Rigid Pavement (new/rehabilitated)	Maintain concrete/ rigid pavement at acceptable level of performance and safety for Users	Maintain rigid pavement free of transverse, longitudinal, or miscellaneous cracking in any location. As a minimum cure, follow repair procedures in Department Pub 408, Section 501.3(i), Table A.	1	90 Days	30 Days
D45.13 Rigid Pavement (new/rehabilitated)	Maintain concrete/ rigid pavement at acceptable level of performance and safety for Users	Maintain rigid pavement free of any broken slabs as defined in Department Pub 336, Automated Pavement Condition Survey Field Manual. As a minimum cure, completely replace broken slab.	2	90 Days	30 Days
D45.14 Rigid Pavement (new/rehabilitated)	Maintain concrete/rigid pavement at acceptable level of performance and safety for Users	Maintain rigid pavement free of base failures in any location.	2	90 Days	30 Days
D45.15 Rigid Pavement (new/rehabilitated)	Maintain concrete/rigid pavement at acceptable level of performance and safety for Users	Maintain ride quality with no discontinuities greater than 3/16 inch for every 12-foot straight edge. For assessing ride quality, follow Department Pub 408, Section 501.3(k)1 and Section 501.3(o). As a minimum cure, remove high points by means of grinding or cutting tools.	1	90 Days	30 Days
D45.16 Rigid Pavement (new/rehabilitated)	Maintain concrete/rigid pavement at acceptable level of performance and safety for Users	Maintain rigid pavement free of spalling, potholes, and debonded areas in any location. As a minimum cure, follow repair procedures in Department Pub 408, Section 501.3(i), Table A.	2	60 Days	30 Days
D45.17 Rigid Pavement (new/rehabilitated)	Maintain concrete/ rigid pavement at acceptable level of performance and safety for Users	Maintain all rigid paving joints sealed and in proper alignment. No faulting (elevation difference across joints) of 0.25 inch or greater. No failing joint seals. No longitudinal joint separations.	2	90 Days	30 Days
D45.18 Rigid Pavement (new/rehabilitated)	Maintain concrete/ rigid pavement at acceptable level of performance and safety for Users	Maintain all rigid paving free of medium or high transverse joint spalling (as defined in Department Pub 336, Automated Pavement Condition Surveying Field Manual) in any location.	1	90 Days	30 Days
D45.19 Rigid Pavement (new/rehabilitated)	Maintain concrete/rigid pavement at acceptable level of performance and safety for Users	Maintain rigid pavement free of edge drop-off greater than 1.5 inches (compared to adjacent pavement, shoulder, approach slab or bridge deck surface) in any location. As a minimum cure, place shoulder back-up material consisting of 2RC stone.	2	60 Days	30 Days
D45.20 Rigid Pavement (new/rehabilitated)	Maintain concrete/rigid pavement at acceptable level of performance and safety for Users	Maintain safe skid resistance level. Respond to the Department notification when low skid resistance is detected, perform a site investigation, and perform Maintenance Work to eliminate unsafe condition.	2	90 Days	30 Days
D45.21 Flexible Pavement (existing)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain pavement in Fair or better condition in accordance with Department Pub 242, Section 13.	2	90 Days	30 Days
D45.22 Flexible Pavement (existing)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain flexible pavement free of potholes (defined as layer or partial layer loss of 0.5" depth or greater), pavement slippage/ debonding areas, and pavement structure failures in any location. As a minimum cure, remove and replace distressed layers full lane width to a depth necessary to correct observed distress not less than 10 feet longitudinally beyond the distressed area.	2	60 Days	30 Days
D45.23 Flexible Pavement (existing)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain flexible pavement free of edge drop-off greater than 1.5 inches (compared to adjacent pavement, shoulder, approach slab or bridge deck surface) in any location. As a minimum cure, place shoulder back-up material consisting of 2RC stone.	2	60 Days	30 Days
D45.24 Rigid Pavement (existing)	Maintain flexible pavement at acceptable level of performance and safety for Users	Maintain pavement in Fair or better condition in accordance with Department Pub 242, Section 13.	2	90 Days	30 Days
D45.25 Rigid Pavement (existing)	Maintain concrete/rigid pavement at acceptable level of performance and safety for Users	Maintain rigid pavement free of spalling, potholes, and debonded areas in any location. As a minimum cure, follow repair procedures in Department Pub 408, Section 501.3(i), Table A.	2	60 Days	30 Days
D45.26 Rigid Pavement (existing)	Maintain concrete/rigid pavement at acceptable level of performance and safety for Users	Maintain rigid pavement free of edge drop-off greater than 1.5 inches (compared to adjacent pavement, shoulder, approach slab or bridge deck surface) in any location. As a minimum cure, place shoulder back-up material consisting of 2RC stone.	2	60 Days	30 Days

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
D46 ROADWAY – SHOULDER & DRAINAGE MAINTENANCE					
D47 ROADWAY – SLOPE AND EMBANKMENT MAINTENANCE					
D47.1 Slopes and embankments	Ensure slope stability	For slopes and embankments constructed or modified during the D&C Period, allow no slope failure, undercut slopes or embankments, and no slumped areas. Maintain slopes and embankments in general conformance to the original graded cross-sections in the Design Documents. Replace landscaping materials and reseeding as necessary for erosion control. Remove and dispose of all eroded materials and keep roadways, shoulders, and bridges clear of eroded material. All structural or natural failures of embankments and cut slopes are to be repaired and maintained according to their original grades; landscaping materials (including reseeding and re-vegetation for erosion control purposes) are to be replaced, and eroded materials are to be removed and disposed. For assessing slopes, follow <i>Department Pub 72M, Roadway Construction Standards, RC-40M</i> ; and <i>Department Pub 23, Maintenance Manual</i> ; and Department publications as applicable.	2	60 Days	30 Days
D48 ROADWAY – WINTER MAINTENANCE (<i>DEPARTMENT RESPONSIBILITY</i>)					

Notes:

1. Rehabilitation Work for rigid pavement shall include removal and replacement of the entire approach pavement when there is a deviation beyond the threshold levels indicated in Table A32-4, Maintenance Performance Requirements, which total a remedial action area greater than 20% of the surface area of any approach pavement. Also, a medium severity crack will be considered to be a deviation affecting 6 inches on either side of the crack for the entire length of the crack. All Rehabilitation Work must meet the surface tolerance as specified in Department Pub 408, Highway Construction Specifications, Section 409.3 (l).
2. As measured along the centerline of roadway from paving notch to paving notch or back-to-back of backwalls of abutments, if present. Otherwise, structure length is measured from end-to-end of bridge deck, but in no case less than the bridge opening length and supporting structural Elements.

Table A32-3. Maintenance Period Noncompliance Events

Noncompliance Event Category	Noncompliance Event ID	Each instance of these events shall constitute a Noncompliance Event:	Noncompliance Points	Cure Period	Interval of Recurrence
Project Delivery Protocol	1	Breach of or failure to comply with the requirements stated in Project Management Plan in accordance with Section 3 (Work management and Administration) of the Technical Provisions and other applicable Sections of the Technical Provisions.	3	20 Business Days	10 Business Days
Approvals and Oversight	2	Failure to carry out internal audits of the Project Management Plan at the times and in the manner prescribed in the Project Management Plan and in accordance with Section 3 (Work management and Administration) of the Technical Provisions.	2	30 Business Days	10 Business Days
Reporting, Submittals, and Document Management	3	Failure to establish, maintain, and update the Project Management Plan in accordance with Section 3 (Work management and Administration) of the Technical Provisions.	2	30 Business Days	30 Business Day
Notification	4	Failure to notify the Department immediately if any field observations performed by the Development Entity reveal deficiencies sufficiently critical to warrant immediate actions, traffic restrictions, or Closure.	3	2 hours	2 hours
Approvals and Oversight	5	Breach of or failure to comply with the requirements of the Project Documents with respect to Environmental Approvals and permits and comply with the requirements and mitigation of such Environmental Approvals and permits.	2	24 hours	24 hours

Noncompliance Event Category	Noncompliance Event ID	Each instance of these events shall constitute a Noncompliance Event:	Noncompliance Points	Cure Period	Interval of Recurrence
Project Delivery Protocols	6	Breach of or failure to comply in any aspect of the maintenance and protection of traffic requirements with respect to traffic control devices for short term operations or the requirements for three or more consecutive channelizing devices, stop and yield signs, temporary signals, or arrow panels in accordance with Section 20 (Maintenance and Protection of Traffic) of the Technical Provisions.	1	2 hours	2 hours
Project Delivery Protocols	7	Breach of or failure to comply in any aspect of the maintenance and protection of traffic requirements with respect to traffic control devices for long term operations in accordance with Section 20 (Maintenance and Protection of Traffic) of the Technical Provisions.	3	24 hours	24 hours
Project Delivery Protocols	8	Failure to obtain the approval of the Department for the closure or any lane or roadway in accordance with the requirements of Section 20 (Maintenance and Protection of Traffic) of the Technical Provisions.	5	1 hour	30 minutes
Performance Standards	9	Failure to maintain a fully operational utility service except as specifically permitted by the Utility Owner and by any affected third party except when at no fault of the Development Entity.	3	24 hours	24 hours
Performance Standards	10	Failure to avoid encroaching on third party property without prior, proper authorization.	5	None	24 hours
Project Delivery Protocols	11	Breach of or failure to comply with the requirements of the Project Documents relating to inspections and inspection reporting including, without limitation, the requirements of Section 22 (Maintenance Work) of the Technical Provisions.	3	None	1 Business Day

Attachment 32. Noncompliance Events and Performance Requirements

Noncompliance Event Category	Noncompliance Event ID	Each instance of these events shall constitute a Noncompliance Event:	Noncompliance Points	Cure Period	Interval of Recurrence
Reporting, Submittals, and Document Management	12	Breach of or failure to comply with the reporting requirements (other than inspection) of the Project Documents including, without limitation, the requirements of Section 22 (Maintenance Work) of the Technical Provisions.	2	20 Business Days	10 Business Days
Performance Standards	13	Breach of or failure to comply with the requirements of Attachment 32, Table A32-4 (Maintenance Performance Requirements During the Maintenance Period) of the Technical Provisions.	Per Attachment 32, Table A32-4 (Maintenance Performance Requirements During the Maintenance Period) of the Technical Provisions.	Per Attachment 32, Table A32-4 (Maintenance Performance Requirements During the Maintenance Period) of the Technical Provisions.	Per Attachment 32, Table A32-4 (Maintenance Performance Requirements During the Maintenance Period) of the Technical Provisions.
Performance Standards	14	Breach of or failure to comply with Section 22 (Maintenance Work) of the Technical Provisions, and any such failure results in a bridge structure (that was designed and constructed, renewed, rehabilitated, or preserved by the Development Entity as part of the Work) achieving an NBIS Bridge Rating of four (4) or less.	15	10 Business Days	5 Business Days

Table A32-4. Maintenance Performance Requirements During the Maintenance Period

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
BRIDGES AND STRUCTURES					
M1 BRIDGE - APPROACH SLABS					
M1.1 Rigid/concrete approach slabs	Maintain concrete/approach slab at acceptable level of performance and safety for Users	Maintain approach slab free of edge drop-off greater than 1.5 inches (compared to adjacent pavement, shoulder, approach slab or bridge deck surface). For assessing edge drop-offs, follow <i>Department Pub 23, Maintenance Manual</i> ; and other Department publications as applicable.	3	60 Days	30 Days
M1.2 Rigid/concrete approach slabs	Maintain concrete/approach slab at acceptable level of performance and safety for Users	Maintain safe skid resistance level in accordance with <i>Department Pub 242, Pavement Policy Manual</i> . Respond to the Department notification when low skid resistance is detected, perform a site investigation, and perform Maintenance Work to eliminate unsafe condition.	3	60 Days	30 Days
M1.3 Rigid/concrete approach slabs	Maintain concrete/approach slab at acceptable level of performance and safety for Users	Maintain ride quality with no discontinuities greater than 3/16 inch for every 12-foot straight edge. For assessing ride quality, follow <i>Department Pub 408, Specifications</i> , Section 501.3(k)1 and Section 501.3(o). As a minimum cure, remove high points by means of grinding or cutting tools.	3	60 Days	30 Days
M1.4 Rigid/concrete approach slabs	Maintain concrete/approach slab at acceptable level of performance and safety for Users	Maintain approach slab free of potholes, spalling, or scaling exceeding 3/4 inch depth OR measuring less than 3/4 inch with a cumulative area (over the approach slab) of 1.0 square feet. Maintain approach slab free of potholes and spalling greater than 1.0 square feet in area or 1.0 inch deep including any single area in the wheel path exceeding 3 inches in width measured longitudinally and 12 inches in length measured transversely. For assessing potholes and spalling, follow <i>Department Pub 336, Automated Pavement Condition Surveying Field Manual</i> ; <i>Department Pub 242, Pavement Policy Manual</i> ; <i>Department Pub 23, Maintenance Manual</i> ; <i>Department Pub 72M, Roadway Construction Standards, RC-26M</i> ; and other Department publications as applicable.	3	60 Days	30 Days
M1.5 Rigid/concrete approach slabs	Maintain concrete/ approach slab at acceptable level of performance and safety for Users	Maintain concrete approach slab free of medium or greater severity cracking. For assessing cracking in concrete, follow <i>Department Pub 336, Automated Pavement Condition Survey Field Manual</i> ; <i>Department Pub 242, Pavement Policy Manual</i> ; <i>Department Pub 23, Maintenance Manual</i> ; <i>Department Pub 72M, Roadway Construction Standards, RC-26M</i> ; and other Department publications as applicable.	3	60 Days	30 Days
M1.6 Approach Slab Joints	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain ride quality at approach slab joints (between both bridge deck and approach slab and between approach slab and approach pavement) with no vertical discontinuity greater than 3/8 inch. Measurement to be based on 2-foot straightedge placed one foot on approach slab and one foot on deck or approach pavement and measurement taken at end of straightedge.	3	60 Days	30 Days
M1.7 Approach Slab Joints	Maintain concrete/ approach slab at acceptable level of performance and safety for Users	Maintain approach slab joints sealed and in proper alignment. No failing joint seals. No longitudinal joint separations. For assessing deficiencies in concrete joints, follow <i>Department Pub 242, Pavement Policy Manual</i> ; <i>Department Pub 23, Maintenance Manual</i> ; <i>Department Pub 72M, Roadway Construction Standards, RC-26M</i> ; and other Department publications as applicable.	3	60 Days	30 Days
M2 BRIDGE - DECK CLEANING					
M2.1 Bridge cleaning	Wash, clean and flush bridges	Wash, clean and flush (i) bridge decks, drains, scuppers, downspouts, expansion dam troughs, etc. at a minimum of once between March 1st to June 30th of each year and (ii) bearings and the horizontal surfaces of the substructure that they rest on a minimum of once every five years <i>where the bearings fall under a joint and all others once every 15 years</i> per <i>Department Pub 23, Maintenance Manual</i> and <i>Department Pub 55, Bridge Maintenance Manual</i> ; in accordance with the schedule in the MMP.	3	60 Days	30 Days
M3 BRIDGE - DRAIN CLEANING					
M3.1 Elements of the drainage system	Maintain Elements of the drainage system to preserve their functionality, reliability, and the safety for Users	Maintain full functionality and reliability of inlets, scuppers, troughs, downspouts, drain pipes, and other Elements of the bridge drainage system. At a minimum, maintain all Elements of drainage system clean and clear of obstructions (at a minimum, 90 percent of the opening of drainage Elements should be clear of obstructions) and without obstruction to inlet or outlet flow. For assessment of drainage Elements, follow <i>Department Pub 23, Maintenance Manual</i> ; <i>Department Pub 73, Drainage Condition Survey Field Manual</i> ; and other Department publications as applicable.	3	60 Days	30 Days
M4 BRIDGE - GRAFFITI REMOVAL					
M4.1 Element appearance	Maintain Elements free of graffiti.	Maintain Elements within the Maintenance Limits free of graffiti and damage resulting from vandalism.	2	60 Days	30 Days

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
M5 BRIDGE - EMERGENCY/FIRST RESPONSE (<i>DEPARTMENT RESPONSIBILITY</i>)					
M6 BRIDGE - INCIDENT/EMERGENCY INSPECTION					
M6.1 Emergency or Incident Response	Conduct visual inspection and damage assessment	Conduct visual inspections and damage assessments following severe weather events or other Emergency or Incident per <i>Section 22.6.6, Unplanned Maintenance Activities</i> of these Technical Provisions.	5	4 hours	1 hour
M6.2 Damage assessment	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Evaluate and complete assessment of all Elements, including structural evaluation and evaluation of safety conditions, and liaise with the Department regarding any potential hazards to the general public. Propose and implement temporary measures or permanent repairs of any damage arising from the Emergency, Incident, or severe weather events. Ensure the structural safety of structures affected by Emergency, Incident, or severe weather events. Notify Department Bridge Engineer and District Emergency Management Coordinator that it is safe to open the bridge.	3	7 Days	7 Days
M6.3 Temporary remedy	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Coordinate with the Department, submit a temporary remedy repair plan if required, and conduct repairs in accordance with <i>Section 22, Maintenance</i> of these Technical Provisions.	3	7 Days	7 Days
M6.4 Permanent repair	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Develop a permanent repair plan and provide to Department for review and approval. Coordinate with the Department and conduct repairs in accordance with <i>Section 22, Maintenance</i> of these Technical Provisions.	3	30 Days	30 Days
M7 BRIDGE - INSPECTION (NBIS UNDERWATER)					
M7.1 Structures and Major Bridge structural Elements (with length 8 feet and greater) (See Note 2)	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Failure to comply with the requirements of the Project Documents relating to inspections and inspection reporting including without limitation the requirements of <i>Section 22.9, Inspections</i> of these Technical Provisions.	5	24 hours	24 hours
M8 BRIDGE - INSPECTION (NBIS)					
M8.1 Structures and Major Bridge structural Elements (with length 8 feet and greater) (See Note 2)	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Failure to comply with the requirements of the Project Documents relating to inspections and inspection reporting including without limitation the requirements of <i>Section 22.9, Inspections</i> of these Technical Provisions.	5	24 hours	24 hours
M9 BRIDGE - LIGHTING MAINTENANCE/REPLACEMENT					
M9.1 Signal and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain structural safety and functionality of signal and lighting support structures and foundations, free of: loose nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, debris and vegetation on pedestals and anchorages.	3	30 Days	30 Days
M9.2 Lighting, luminaires, and sign illumination	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain lighting systems in an operating condition.	3	14 Days	30 Days
M9.3 Signals	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain lights in an operating condition in accordance with <i>Department Pub 191, Traffic Signal Maintenance Manual</i> .	3	14 Days	30 Days
M10 BRIDGE - NAVIGATION LIGHTING MAINTENANCE					
M10.1 Lighting and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain functionality of navigation lighting systems. Notify Department when work is complete.	2	48 hours	24 hours
M10.2 Lighting and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain structural safety navigation lighting support structures and foundations, free of: loose nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, and debris/vegetation on pedestals and anchorages.	2	14 Days	7 Days
M11 BRIDGE - RAIL, PARAPET, FENCING					
M11.1 Bridge Barrier and Railing	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain functionality and reliability of barriers and railing on a bridge as intended in the Design Documents and free of: displacement and deterioration including corrosion of rebar, steel corrosion, unsound concrete, delaminated concrete, spalled concrete, paint system failure, rust, loose nuts and bolts, corrosion, cracks, loss of section, debris and vegetation on pedestals and anchorages, blockages of hollow section drain holes, and impact damage. For inspection and assessment follow NBIS, <i>Bridge Inspector's Reference Manual</i> , FHWA NHI 03-001, FHWA 2006; <i>Department Pub 238, Bridge Safety Inspection Manual</i> ; and other Department publications as applicable.	3	14 Days	30 Days

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
M11.2 Fencing	Maintain fence in acceptable condition and level of safety for Users	Maintain fences in fully functional condition and free of damage. Repair or replace fences no longer providing access control and/or a physical barrier. For assessing fence, follow <i>Department Pub 72M, Roadway Construction Standards, RC-60M</i> ; and <i>Department Pub 72M, Roadway Construction Standards, RC-61M</i> ; and other Department publications as applicable.	2	60 Days	30 Days
M12 BRIDGE - MAINTENANCE AND PRESERVATION					
M12.1 Structures and Major Bridge structural Elements (with length 8 feet and greater) (See Note 2)	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain structures and structure Elements safe and fully functional as intended in the Design Documents and free of: deterioration and damages including scour damages, corrosion of rebar, steel corrosion, unsound concrete, failure, or delamination of the overlay greater than 1.0 square feet in area, excessive cracking, delaminated concrete, spalled concrete or potholes, loss of section, settlement or movement beyond tolerable movement design criteria or affecting performance of structure. For inspection, assessment, and maintenance follow NBIS, <i>Bridge Inspector’s Reference Manual, FHWA NHI 03-001, FHWA 2006; Department Pub 55, Bridge Maintenance Manual; Department Pub 238, Bridge Safety Inspection Manual; Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual</i> ; and Department publications as applicable.	5	30 Days	14 Days
M12.2 Bridge Deck Wearing Surface	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain bridge deck wearing surface in good serviceable condition; apply or replace overlay when the ride quality or the integrity of the bridge deck wearing surface begins to deteriorate, defined as item 6B40 Deck Wearing Surface Condition Rating of 6 or lower per <i>Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual</i> . Perform temporary repairs as needed between Nov 1 st through March 31 and follow up with permanent repairs as soon as practical after April 1 st each year.	2	90 Days	30 Days
M12.3 Bridge joints	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain expansion joints so joints do not leak; maintain full functionality and reliability of expansion joints as intended and maintain free of dirt, debris, vegetation, loose nuts and bolts, and any other deficiencies. For inspection and assessment follow NBIS, <i>Bridge Inspector’s Reference Manual, FHWA NHI 03-001, FHWA 2006; Department Pub 238, Bridge Safety Inspection Manual</i> ; and Department publications as applicable.	3	30 Days	14 Days
M12.4 Bearings	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain bearing Elements (including bearings, bearing shelves, sliding and roller surfaces) clean, free of debris and vegetation, fully functional and reliable as intended in the Design Documents. Comply with the manufacturers’ instructions.	3	60 Days	30 Days
M12.5 Structural Steel Elements	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain structural steel Elements free of paint system failure, rust, loose nuts and bolts, corrosion, cracks, and loss of section. For assessing Maintenance Performance Requirements of steel Elements, follow <i>Department Pub 55, Bridge Maintenance Manual</i> ; and other Department publications as applicable.	5	30 Days	14 Days
M13 BRIDGE - SIGN/VMS/ITS (STRUCTURAL) INSPECTION					
M13.1 Sign/VMS/ITS support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Failure to comply with the requirements of the Project Documents relating to inspections and inspection reporting including without limitation the requirements of <i>Section 22.9, Inspections</i> of these Technical Provisions.	4	30 Days	30 Days
M14 BRIDGE - SIGN/VMS/ITS (STRUCTURAL) MAINTENANCE					
M14.1 Sign/VMS/ITS support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain structural safety and functionality of sign/VMS/ITS support structures and foundations, free of: loose or rusting nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, and debris/vegetation on pedestals and anchorages.	3	30 Days	30 Days
M15 BRIDGE - SIGNAGE REPAIR/REPLACEMENT					
M15.1 Signage	Maintain at acceptable levels of safety and proper functioning conditions for Users	Repair or replace signage based on current Department standards and other applicable requirements; and maintain structural safety and functionality of sign, signal and lighting support structures and foundations, free of: loose or rusting nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, and debris/vegetation on pedestals and anchorages. A sign or post must be replaced when the sign or post has been damaged or when the legibility of the sign is impaired by fading of the sign face or by loss of retroreflectivity. Signs are to be replaced at or before the sign reaches age 18 in accordance with <i>Department Pub 23, Maintenance Manual, Chapter 11</i> .	2	60 Days	30 Days
M16 BRIDGE - SLOPE AND EMBANKMENT MAINTENANCE					
M16.1 Slopes and embankments	Ensure slope stability	Allow no slope failure, undercut slopes or embankments, and no slumped areas. Maintain slopes and embankments in general conformance to the original graded cross-sections in the Design Documents. Replace landscaping materials and reseed as necessary for erosion control. Remove and dispose of all eroded materials and keep roadways, shoulders, and bridges clear of eroded material. All structural or natural failures of embankments and cut slopes are to be repaired and maintained according to their original grades; landscaping materials (including reseeding and re-vegetation for erosion control purposes) are to be replaced, and eroded materials are to be removed and disposed. For assessing slopes, follow <i>Department Pub 72M, Roadway Construction Standards, RC-40M</i> ; and <i>Department Pub 23, Maintenance Manual</i> ; and Department publications as applicable.	2	60 Days	30 Days

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
M17 BRIDGE - SUBSTRUCTURE & SUPERSTRUCTURE CLEANING					
M17.1 Bridge cleaning	Wash, clean and flush bridges	Wash, clean and flush bridge decks (and drains) at a minimum of once per year and bearings and the horizontal surfaces of the substructure that they rest on a minimum of once every five years where the bearings fall under a joint and all others once every 15 years per <i>Department Pub 23, Maintenance Manual</i> and <i>Department Pub 55, Bridge Maintenance Manual</i> ; in accordance with the schedule in the MMP.	3	60 Days	30 Days
M18 BRIDGE - WATERWAY DEBRIS REMOVAL					
M18.1 Stream channel	Maintain stream channel clear of debris	Maintain stream channel and embankments clear of debris larger than 8 cubic feet, deposits, and vegetation obstructing the normal flow of the stream in accordance with <i>Department Pub 100A, Bridge Management System (BMS2) Coding Manual</i> ; and in compliance with PADEP permit requirements.	2	90 Days	30 Days
M19 OTHER STRUCTURES – INCIDENT/EMERGENCY INSPECTION					
M19.1 Emergency or Incident Response	Conduct visual inspection and damage assessment	Conduct visual inspections and damage assessments following severe weather events or other Emergency or Incident per <i>Section 22.6.6, Unplanned Maintenance Activities</i> .	5	4 hours	1 hour
M19.2 Damage assessment	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Evaluate and complete assessment of all Elements, including structural evaluation and evaluation of safety conditions, and liaise with the Department regarding any potential hazards to the general public. Propose and implement temporary measures or permanent repairs of any damage arising from the Emergency, Incident, or severe weather events. Ensure the structural safety of structures affected by Emergency, Incident, or severe weather events. Notify Department Bridge Engineer and District Emergency Management Coordinator that it is safe to open the bridge.	3	7 Days	7 Days
M19.3 Temporary remedy	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Coordinate with the Department, submit a temporary remedy repair plan if required, and conduct repairs in accordance with <i>Section 22, Maintenance</i> .	3	7 Days	7 Days
M19.4 Permanent repair	Ensure a diligent response upon notification and efficient completion of damage assessment and corresponding repairs.	Develop a permanent repair plan and provide to Department for review and approval. Coordinate with the Department and conduct repairs in accordance with <i>Section 22, Maintenance</i> .	3	30 Days	30 Days
M20 OTHER STRUCTURES - ROUTINE CONDITION INSPECTION AND MAINTENANCE					
M20.1 Structures (with length less than 8 feet) (See Note 2)	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Failure to comply with the requirements of the Project Documents relating to inspections and inspection reporting including without limitation the requirements of <i>Section 22.9, Inspections</i> of these Technical Provisions.	3	60 Days	30 Days
M20.2 Structures (with length less than 8 feet) (See Note 2)	Maintain integrity and soundness of all structural Elements to ensure a safe condition for Users	Maintain structures and structure Elements safe and fully functional as intended in the Design Documents and free of: deterioration and damages including scour damages, corrosion of rebar, steel corrosion, unsound concrete, failure, or delamination of the overlay greater than 1.0 square feet in area, excessive cracking, delaminated concrete, spalled concrete or potholes, loss of section, settlement or movement beyond tolerable movement design criteria or affecting performance of structure. For inspection, assessment, and maintenance follow NBIS, <i>Bridge Inspector’s Reference Manual, FHWA NHI 03-001, FHWA 2006; Department Pub 55, Bridge Maintenance Manual; Department Pub 238, Bridge Safety Inspection Manual; Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual</i> ; and Department publications as applicable.	3	60 Days	30 Days
M21 OTHER STRUCTURES - GRAFFITI REMOVAL					
M21.1 Element appearance	Maintain Elements free of graffiti.	Maintain Elements within the Maintenance Limits free of graffiti and damage resulting from vandalism. (Graffiti of an obscene nature are Noncompliance.)	2	60 Days	30 Days
M22 OTHER STRUCTURES - RETAINING/NOISE WALLS, MSE WALLS					
M22.1 Retaining walls, noise walls, engineered slopes, and MSE walls	Maintain retaining walls and abutments at acceptable level of safety for Users	Maintain structural safety and integrity of retaining walls and keep free of: any damage and hazards, including blocked weep holes, undesirable vegetation, separation of wall panels exceeding 1 inch, Defects in joint sealants, Defects in pedestrian protection, scour damage, corrosion of reinforcing bars, cracked masonry, cracked, loose or missing mortar, efflorescence, paint system failure, concrete spalling, impact damage, loss of backfill, and settlement or movement beyond tolerable movement design criteria or affecting performance. Maintain walls in the vertical and horizontal position accounting for tolerable movements per <i>Department Pub 15M, Design Manual Part 4 – Structures (DM-4), Section 11.6.2</i> . Maintain retaining walls at $GCR \geq 6$. For inspection and assessment follow NBIS, <i>Bridge Inspector’s Reference Manual, FHWA NHI 03-001, FHWA 2006; Department Pub 55, Bridge Maintenance Manual; Department Pub 238, Bridge Safety Inspection Manual; Department Pub 100A, Bridge Management System 2 (BMS2) Coding Manual</i> ; and other Department publications as applicable.	3	60 Days	30 Days

Attachment 32. Noncompliance Events and Performance Requirements

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
M22.2 Fencing	Maintain fence in acceptable condition and level of safety for Users	Maintain fences in fully functional condition and free of damage. Repair or replace fences no longer providing access control and/or a physical barrier. For assessing fence, follow <i>Department Pub 72M, Roadway Construction Standards, RC-60M</i> ; and <i>Department Pub 72M, Roadway Construction Standards, RC-61M</i> ; and other Department publications as applicable.	2	60 Days	30 Days
RIGHT OF WAY					
M24 RIGHT OF WAY - VEGETATION REMOVAL, MAINTENANCE					
M24.1 Vegetation control	Maintain bridges and roadways free of vegetation.	Maintain and control vegetation per the requirements of <i>Section 22.6.8, Landscape Management, Vegetation Control and Use of Herbicides and Pesticides</i> of these Technical Provisions and per <i>Department Pub 23, Maintenance Manual, Chapter 13</i> .	1	24 hours	24 hours
M25 RIGHT OF WAY - SIDEWALK MAINTENANCE					
M25.1 Curb, Sidewalk, and pedestrian protection measures	Ensure state of good condition and the safety of Users, and in particular pedestrians	Maintain sidewalks, curbs, and pedestrian protection measures free of damages. Maintain sidewalks and curbs free of misalignment greater than 1/2 inch, sidewalk edge vertical misalignments greater than 1/4 inch, cracks greater than 1/2 inch. Maintain sidewalks and curbs free of exposed steel, free of vegetation, and free of safety hazards. Maintain sidewalks and curb ramps to ensure continued compliance with ADA requirements.	2	60 Days	30 Days
M26 RIGHT OF WAY - DRAINAGE SYSTEMS					
M26.1 Elements of the Drainage Systems	Maintain Elements of the Drainage Systems to preserve their functionality, reliability, and the safety for Users	Maintain full functionality and reliability of Elements of the Drainage Systems as intended in the Design Documents. Maintain all ditches and swales so they convey runoffs from the roadway. At a minimum, maintain all Elements of drainage system clean and clear of obstructions (at a minimum, 90 percent of the opening of drainage Elements should be clear of obstructions) and without obstruction to inlet or outlet flow. Maintain non-bridge-class culverts free of deterioration in sealant to movement joints, scour damage, corrosion, and loss of section. For assessment of drainage Elements, follow <i>Department Pub 23, Maintenance Manual</i> ; <i>Department Pub 73, Drainage Condition Survey Field Manual</i> ; and other Department publications as applicable.	3	90 Days	30 Days
M26.2 Discharge systems	Maintain Elements of the drainage system to preserve their functionality, reliability, and the safety for Users	Maintain full functionality and reliability of discharge systems in accordance with Governmental Approvals, including Soil Conservation District and Pennsylvania Department of Environmental Protection (PADEP)–issued permit. Ensure surface water discharge systems are properly performing and any discharge to groundwater and waterways complies with Applicable Law and Governmental Approvals.	3	90 Days	30 Days
M27 RIGHT OF WAY – TRAFFIC CAMERAS, ITS (NON-TOLLING RELATED)					
M27.1 Intelligent Transportation System (ITS) Devices	Maintain ITS devices in functioning condition	Maintain ITS in accordance with Department Pub 408, Specifications	2	30 Days	7 Days
ROADWAY					
M28 ROADWAY – LOCAL ROADWAYS (DE RESPONSIBILITY ENDS AFTER MUNICIPALITY MAINTENANCE AGREEMENT IN PLACE)					
M28.1 Local Roadway Maintenance	Maintain open travel lanes in sites temporarily open to traffic, temporary Work, and local and state roads used as detour routes	Maintain open travel lanes free of hazards, debris, and encumbrances and generally in compliance with the requirements of <i>Section 20, Maintenance and Protection of Traffic (MPT)</i>	3	24 hours	24 hours
M29 ROADWAY – TYPE A AND SMALLER SIGNAGE INSPECTION (<i>DEPARTMENT RESPONSIBILITY</i>)					
M30 ROADWAY – TYPE A AND SMALLER SIGNAGE MAINTENANCE/REPAIR (<i>DEPARTMENT RESPONSIBILITY</i>)					
M31 ROADWAY – SIGN, SIGNAL, AND LIGHTING SUPPORT STRUCTURES					
M31.1 Sign, Signal, and lighting support structures	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain structural safety and functionality of sign, signal and lighting support structures and foundations, free of: loose nuts and bolts, damages in surface protection systems, corrosion, cracks in metal, loss of section, impact damage, graffiti, vandalism, and debris/vegetation on pedestals and anchorages.	2	60 Days	30 Days
M37 ROADWAY – GUIDERAIL/BARRIER AND TRANSITIONS (ENDS OF BRIDGES)					
M37.1 Guiderrails and safety devices	Ensure state of good condition and safety for road Users	Maintain structural safety, reliability and functionality of guiderails, guiderail end treatments, impact attenuators, safety barriers, concrete barriers, and other safety devices leading up to a bridge. Ensure safety devices are free of damages and vehicular impact damages and are appropriately placed and correctly installed at the correct height and distance from roadway or obstacles and foundations/anchors are sound. For inspection and assessments, follow Department Pub 33, Shoulder & Guiderail Condition Survey Field Manual; Department Pub 23, Maintenance Manual; Department Pub 13M, Design Manual Part 2 – Highway Design; and other Department publications as applicable.	3	30 Days	7 Days
M38 ROADWAY – EMERGENCY/FIRST RESPONSE (<i>DEPARTMENT RESPONSIBILITY</i>)					

Element Category or requirement category	General Requirement	Minimum Performance Requirement (Noncompliance points are assigned for failure to meet these criteria)	Noncompliance Points	Cure Period	Interval of Recurrence
M39 ROADWAY – INSPECTION, DAMAGE ASSESSMENT, AND IDENTIFICATION/PERFORMANCE OF REPAIRS FOR SAFE REOPENING, IF ANY. (POST EMERGENCY/FIRST RESPONSE) (<i>DEPARTMENT RESPONSIBILITY</i>)					
M40 ROADWAY – INSPECTION (<i>DEPARTMENT RESPONSIBILITY</i>)					
M44 ROADWAY – LINE STRIPING (BRIDGES)					
M44.1 Pavement Marking	Maintain at acceptable levels of safety and proper functioning conditions for Users	Maintain pavement markings in accordance with <i>Section 18.8.4, Pavement Marking</i> of these Technical Provisions. Non-compliance will be measured across the individual bridge sites where more than 10% of the total pavement marking length do not meet the standard.	2	30 Days	30 Days
M45 [RESERVED]					
M46 [RESERVED]					
M47 ROADWAY - SLOPE AND EMBANKMENT MAINTENANCE					
M47.1 Slopes and embankments	Ensure slope stability	For slopes and embankments constructed or modified during the D&C Period, allow no slope failure, undercut slopes or embankments, and no slumped areas. Maintain slopes and embankments in general conformance to the original graded cross-sections in the Design Documents. Replace landscaping materials and reseeding as necessary for erosion control. Remove and dispose of all eroded materials and keep roadways, shoulders, and bridges clear of eroded material. All structural or natural failures of embankments and cut slopes are to be repaired and maintained according to their original grades; landscaping materials (including reseeding and re-vegetation for erosion control purposes) are to be replaced, and eroded materials are to be removed and disposed. For assessing slopes, follow <i>Department Pub 72M, Roadway Construction Standards, RC-40M</i> ; and <i>Department Pub 23, Maintenance Manual</i> ; and Department publications as applicable.	2	60 Days	30 Days
M48 ROADWAY – WINTER MAINTENANCE (<i>DEPARTMENT RESPONSIBILITY</i>)					

Notes:

1. Rehabilitation Work for rigid pavement shall include removal and replacement of the entire approach pavement when there is a deviation beyond the threshold levels indicated in Table A32-4, Maintenance Performance Requirements, which total a remedial action area greater than 20% of the surface area of any approach pavement. Also, a medium severity crack will be considered to be a deviation affecting 6 inches on either side of the crack for the entire length of the crack. All Rehabilitation Work must meet the surface tolerance as specified in Department Pub 408, Highway Construction Specifications, Section 409.3 (l).
2. As measured along the centerline of roadway from paving notch to paving notch or back-to-back of backwalls of abutments, if present. Otherwise, the structure length is measured from end-to-end of the bridge deck, but in no case less than the bridge opening length and supporting structural Elements.

Attachment 33

[Reserved]

Attachment 34

[Reserved]