HA

COMMONWEALTH OF MASSACHUSETTS

CONTRACT DOCUMENTS AND SPECIAL PROVISIONS

PROPOSAL NO.	609082-127511
P.V. =	$4,127,000.00
PLANS	YES

FOR

Federal Aid Project No. HIP(BR)-003S(779)X
Bridge Replacement, C-20-004, North Poland Road over Poland Brook

in the Town of

CONWAY

In accordance with the STANDARD SPECIFICATIONS
for HIGHWAYS and BRIDGES dated 2024

This Proposal to be opened and read: **TUESDAY, SEPTEMBER 17, 2024 at 2:00 P.M.**

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DOCUMENT 00010

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DOCUMENT 00104

NOTICE TO CONTRACTORS

Electronic proposals for the following project will be received through the internet using Bid Express until the date and time stated below and will be posted on www.bidx.com forthwith after the bid submission deadline. No paper copies of bids will be accepted. All Bidders must have a valid vendor code issued by MassDOT in order to bid on projects. Bidders need to apply for a Digital ID at least 14 days prior to a scheduled bid opening date with Bid Express.

TUESDAY, SEPTEMBER 17, 2024 at 2:00 P.M. **
CONWAY
Federal Aid Project No. HIP(BR)-003S(779)X
Bridge Replacement, C-20-004, North Poland Road over Poland Brook
****Date Subject to Change**

PROJECT VALUE = $4,127,000.00

Bidders must be pre-qualified by the Department in the BRIDGE - CONSTRUCTION category to bid on the above project. An award will not be made to a Contractor who is not pre-qualified by the Department prior to the opening of Proposals.

All prospective Bidders who intend to bid on this project must obtain "Request Proposal Form (R109)". The blank "Request Proposal Form (R109)" can be obtained at: https://www.mass.gov/prequalification-of-horizontal-construction-firms.

All prospective Bidders must complete and e-mail an electronic copy of "Request Proposal Form (R109)" to the MassDOT Director of Prequalification for approval: prequal.r109@dot.state.ma.us.

Proposal documents for official bidders are posted on www.bidx.com. Other interested parties may receive informational Contract Documents containing the Plans and Special Provisions, free of charge.

Bids will be considered, and the contract awarded in accordance with statutes governing such contracts in accordance with Massachusetts General Laws Chapter 30 § 39M.

The Project Bids File Attachments folder for proposals at www.bidx.com shall be used for submitting at the time of bid required information such as the Bid Bond required document, and other documents that may be requested in the proposal.

NOTICE TO CONTRACTORS (Continued)

All parties who wish to have access to information plans and specification must send a "Request for Informational Documents" to MassDOTBidDocuments@dot.state.ma.us.

A Proposal Guaranty in the amount of 5% of the value of the bid is required.

This project is subject to the schedule of prevailing wage rates as determined by the Commissioner of the Massachusetts Department of Labor and Workforce Development, and the Division of Occupational Safety, and the United States Department of Labor.

Plans will be on display and information will be available at the MassDOT Boston Office and at the District Office in LENOX.

The Massachusetts Department of Transportation, in accordance with Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby affirmatively ensures that for any contract entered into pursuant to this advertisement, all bidders, including disadvantaged business enterprises, will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin in consideration for an Award.

This Proposal contains the "STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)". The goals and timetables applicable to this proposal for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all work, are contained in Appendices A and B-80 of the above specifications.

The Contractor (hereinafter includes consultants) will comply with the Acts and Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this Contract as contained in Appendices C and D of the above specifications.

NOTICE TO CONTRACTORS (Continued)

PRICE ADJUSTMENTS

This Contract contains price adjustments for hot mix asphalt and Portland cement mixtures, diesel fuel, and gasoline. For reference the base prices are as follows: liquid asphalt $585.00 per ton, Portland cement $425.53 per ton, diesel fuel $2.883 per gallon, and gasoline $2.813 per gallon, and Steel Base Price Index 425.7. MassDOT posts the **Price Adjustments** on their Highway Division's website at
https://www.mass.gov/massdot-contract-price-adjustments

This Contract contains Price Adjustments for steel. See Document 00813 - PRICE ADJUSTMENT FOR STRUCTURAL STEEL AND REINFORCING STEEL for their application and base prices.

MassDOT projects are subject to the rules and regulations of the Architectural Access Board (521 CMR 1.00 et seq.)

Prospective bidders and interested parties can access this information and more via the internet at WWW.COMMBUYS.COM.

BY: Monica G. Tibbits-Nutt, Secretary and CEO, MassDOT
Jonathan L. Gulliver, Administrator, MassDOT Highway Division
SATURDAY, AUGUST 3, 2024

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DOCUMENT 00210

REQUIREMENTS OF MASSACHUSETTS GENERAL LAWS
CHAPTER 30, SECTION 39R;
CHAPTER 30, SECTION 39O

July 1, 1981, updated October 2016

M.G.L. c. 30, § 39R. Award of Contracts; Accounting Statements; Annual Financial Statements; Definitions.

(a) The words defined herein shall have the meaning stated below whenever they appear in this section:

(1) “Contractor" means any person, corporation, partnership, joint venture, sole proprietorship, or other entity awarded a contract pursuant to sections thirty-eight A1/2 to thirty-eight O, inclusive, of chapter seven and any contract awarded or executed pursuant to section eleven C of chapter twenty-five A, section thirty-nine M of chapter thirty, or sections forty-four A to forty-four H, inclusive, of chapter one hundred and forty-nine, which is for an amount or estimated amount greater than one hundred thousand dollars.

(2) "Contract" means any contract awarded or executed pursuant to sections thirty-eight A1/2 to thirty-eight O, inclusive, of chapter seven and any contract awarded or executed pursuant to section eleven C of chapter twenty-five A, section thirty-nine M of chapter thirty, or sections forty-four A through forty-four H, inclusive, of chapter one hundred and forty-nine, which is for amount or estimated amount greater than one hundred thousand dollars.

(3) “Records" means books of original entry, accounts, checks, bank statements and all other banking documents, correspondence, memoranda, invoices, computer printouts, tapes, discs, papers and other documents or transcribed information of any type, whether expressed in ordinary or machine language.

(4) “Independent Certified Public Accountant" means a person duly registered in good standing and entitled to practice as a certified public accountant under the laws of the place of his residence or principal office and who is in fact independent. In determining whether an accountant is independent with respect to a particular person, appropriate consideration should be given to all relationships between the accountant and that person or any affiliate thereof. Determination of an accountant's independence shall not be confined to the relationships existing in connection with the filing of reports with the awarding authority.

(5) “Audit", when used in regard to financial statements, means an examination of records by an independent certified public accountant in accordance with generally accepted accounting principles and auditing standards for the purpose of expressing a certified opinion thereon, or, in the alternative, a qualified opinion or a declination to express an opinion for stated reasons.

(6) "Accountant's Report", when used in regard to financial statements, means a document in which an independent certified public accountant indicates the scope of the audit which he has made and sets forth his opinion regarding the financial statements taken as a whole with a listing of noted exceptions and qualifications, or an assertion to the effect that an overall opinion cannot be expressed. When an overall opinion cannot be expressed the reason therefor shall be stated. An accountant's report shall include as a part thereof a signed statement by the responsible corporate officer attesting that management has fully disclosed all material facts to the independent certified public accountant, and that the audited financial statement is a true and complete statement of the financial condition of the contractor.

(7) “Management", when used herein, means the chief executive officers, partners, principals or other person or persons primarily responsible for the financial and operational policies and practices of the contractor.

(8) Accounting terms, unless otherwise defined herein, shall have a meaning in accordance with generally accepted accounting principles and auditing standards.

(b) Subsection (a)(2) hereof notwithstanding, every agreement or contract awarded or executed pursuant to sections thirty-eight A 1/2 to thirty-eight O, inclusive, of chapter seven, or eleven C of chapter twenty-five A, and pursuant to section thirty-nine M of chapter thirty or to section forty-four A through H, inclusive, of chapter one hundred and forty-nine, shall provide that:

(1) The contractor shall make, and keep for at least six years after final payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of the contractor, and

(2) Until the expiration of six years after final payment, the office of inspector general, and the commissioner of capital asset management and maintenance shall have the right to examine any books, documents, papers or records of the contractor or of his subcontractors that directly pertain to, and involve transactions relating to, the contractor or his subcontractors, and

(3) If the agreement is a contract as defined herein, the contractor shall describe any change in the method of maintaining records or recording transactions which materially affect any statements filed with the awarding authority, including in his description the date of the change and reasons therefor, and shall accompany said description with a letter from the contractor's independent certified public accountant approving or otherwise commenting on the changes, and

(4) If the agreement is a contract as defined herein, the contractor has filed a statement of management on internal accounting controls as set forth in paragraph (c) below prior to the execution of the contract, and

(5) If the agreement is a contract as defined herein, the contractor has filed prior to the execution of the contracts and will continue to file annually, an audited financial statement for the most recent completed fiscal year as set forth in paragraph (d) below.

(c) Every contractor awarded a contract shall file with the awarding authority a statement of management as to whether the system of internal accounting controls of the contractor and its subsidiaries reasonably assures that:

(1) transactions are executed in accordance with management's general and specific authorization;

(2) transactions are recorded as necessary

i. to permit preparation of financial statements in conformity with generally accepted accounting principles, and

ii. to maintain accountability for assets;

(3) access to assets is permitted only in accordance with management's general or specific authorization; and

(4) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.

Every contractor awarded a contract shall also file with the awarding authority a statement prepared and signed by an independent certified public accountant, stating that he has examined the statement of management on internal accounting controls, and expressing an opinion as to:

(1) whether the representations of management in response to this paragraph and paragraph (b) above are consistent with the result of management's evaluation of the system of internal accounting controls; and

(2) whether such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicant's financial statements.

(d) Every contractor awarded a contract by the commonwealth or by any political subdivision thereof shall annually file with the commissioner of capital asset management and maintenance during the term of the contract a financial statement prepared by an independent certified public accountant on the basis of an audit by such accountant. The final statement filed shall include the date of final payment. All statements shall be accompanied by an accountant's report. Such statements shall be made available to the awarding authority upon request.

(e) The office of inspector general, the commissioner of capital asset management and maintenance and any other awarding authority shall enforce the provisions of this section. The commissioner of capital asset management and maintenance may after providing an opportunity for the inspector general and other interested parties to comment, promulgate pursuant to the provisions of chapter thirty A such rules, regulations and guidelines as are necessary to effectuate the purposes of this section. Such rules, regulations and guidelines may be applicable to all awarding authorities. A contractor's failure to satisfy any of the requirements of this section may be grounds for debarment pursuant to section forty-four C of chapter one hundred and forty-nine.

(f) Records and statements required to be made, kept or filed under the provisions of this section shall not be public records as defined in section seven of chapter four and shall not be open to public inspection; provided, however, that such records and statements shall be made available pursuant to the provisions of clause (2) of paragraph (b).

M.G.L. c. 30, § 39O: Suspension, Delay, or Interruption or Failure to Act by Awarding Authority; Adjustment in Contract Price; Submission of Claims.

Section 39O. Every contract subject to the provisions of section thirty-nine M of this chapter or subject to section forty-four A of chapter one hundred forty-nine shall contain the following provisions (a) and (b) in their entirety and, in the event a suspension, delay, interruption or failure to act of the awarding authority increases the cost of performance to any subcontractor, that subcontractor shall have the same rights against the general contractor for payment for an increase in the cost of his performance as provisions (a) and (b) give the general contractor against the awarding authority, but nothing in provisions (a) and (b) shall in any way change, modify or alter any other rights which the general contractor or the subcontractor may have against each other.

(a) The awarding authority may order the general contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as it may determine to be appropriate for the convenience of the awarding authority; provided however, that if there is a suspension, delay or interruption for fifteen days or more or due to a failure of the awarding authority to act within the time specified in this contract, the awarding authority shall make an adjustment in the contract price for any increase in the cost of performance of this contract but shall not include any profit to the general contractor on such increase; and provided further, that the awarding authority shall not make any adjustment in the contract price under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this contract provides for an equitable adjustment of the contract price under any other contract provisions.

(b) The general contractor must submit the amount of a claim under provision (a) to the awarding authority in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this contract and, except for costs due to a suspension order, the awarding authority shall not approve any costs in the claim incurred more than twenty days before the general contractor notified the awarding authority in writing of the act or failure to act involved in the claim.

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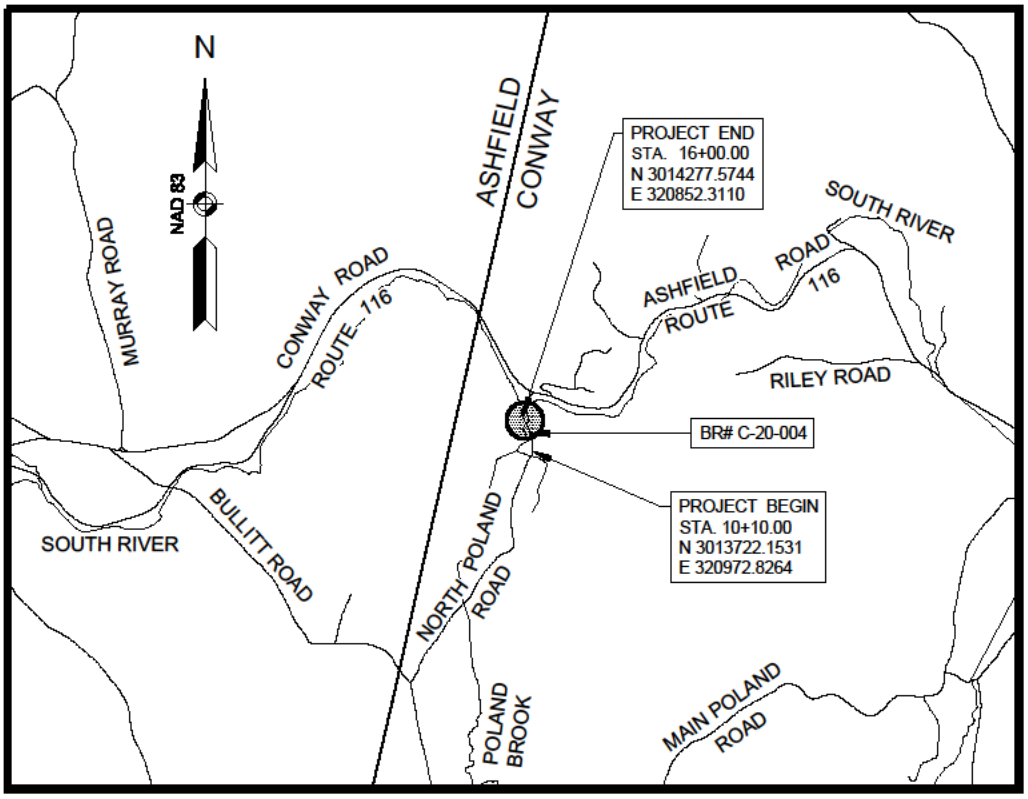
DOCUMENT 00331

LOCUS MAP

CONWAY
Federal Aid Project No. HIP(BR)-003S(779)X
Bridge Replacement, C-20-004, North Poland Road over Poland Brook



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DOCUMENT 00439

Final Report ☐

Interim Report ☐

CONTRACTOR PROJECT EVALUATION FORM

For instructions on using this form, see Engineering Directive E-10-002, Dated 4/20/2010

Date: _____

City/Town: _____ Contractor: _____

Project: _____ Address: _____

F.A. No. _____ Contract Number: _____

Bid Price: _____ Notice to Proceed: _____

Funds: State: _____ Fed Aid: _____ Current Contract Completion Date: _____

Date Work Started: _____ Date Work Completed*: _____

Contractor's Superintendent: _____

Division: (indicates class of work) Highway: _____ Bridge: _____ Maintenance: _____

*If work was NOT completed within specified time (including extensions) give reasons on following page.

	Excellent 10	Very Good 9	Average 8	7	Fair 6	5	Poor 4	% Rating
1. Workmanship								x 2=
2. Safety								x 2=
3. Schedule								x 1.5=
4. Home Office Support								x 1=
5. Subcontractors Performance								x 1=
6. Field Supervision/ Superintendent								x 1=
7. Contract Compliance								x 0.5=
8. Equipment								x 0.5=
9. Payment of Accounts								x 0.5=
(use back for additional comments)						**Overall Rating:**		

(Give explanation of items 1 through 9 on the following page in numerical order if overall rating is below 80%. Use additional sheets if necessary.)

_____ _____

District Construction Engineer's Signature/Date Resident Engineer's Signature/Date

_____

Contractor's Signature Acknowledging Report/Date

Contractor Requests Meeting with the District: No ☐ Yes ☐ Date Meeting Held: _____

Contractor's Comments/Meeting Notes (extra sheets may be added to this form and noted here if needed): _____

_____

_____

CONTRACTOR PROJECT EVALUATION FORM (Continued)

Date: _____ Contract Number:_____

INFORMATION FOR DISTRICT HIGHWAY DIRECTORS RELATING TO PREQUALIFICATION

A deduction shall be recommended for unsatisfactory performance if computed overall rating is under 80%.
A deduction may be recommended for this project being completed late due to the Contractor's fault.

RECOMMENDATIONS FOR DEDUCTIONS FROM CONTRACTORS' ASSIGNED FACTOR
(*Write Yes or No in space provided*)

I recommend a deduction for Contractor's unsatisfactory performance: _____

I recommend a deduction for project completed late:_____

Signed: _____
District Highway Director

EXPLANATION OF RATINGS 1 – 9:_____

WORK NOT COMPLETED WITHIN SPECIFIED TIME: _____

Revised: 04/28/17

*** END OF DOCUMENT ***

DOCUMENT 00440

Final Report ☐

Interim Report ☐

SUBCONTRACTOR PROJECT EVALUATION FORM

For instructions on using this form, see Engineering Directive E-10-002, Dated 4/20/2010

Date: _____

City/Town: _____ Subcontractor: _____

Project: _____ Address: _____

F.A. No.: _____ Contract Number: _____

Prime Contractor _____ Current Contract Completion Date: _____

Date Work Started: _____ Date Work Completed*: _____

Subcontractor's Superintendent: _____

Type of Work Performed by Subcontractor: _____

*If work was NOT completed within specified time (including extensions) give reasons on following page.

	Excellent 10	Very Good 9	Average 8	7	Fair 6	5	Poor 4	% Rating
1. Workmanship								x 2=
2. Safety								x 2=
3. Schedule								x 1.5=
4. Home Office Support								x 1.5=
5. Field Supervision/ Superintendent								x 1=
6. Contract Compliance								x 1=
7. Equipment								x 0.5=
8. Payment of Accounts								x 0.5=
(use back for additional comments)							**Overall Rating:**	

(Give explanation of items 1 through 8 on the following page in numerical order if overall rating is below 80%. Use additional sheets if necessary.)

_____ _____

District Construction Engineer's Signature/Date Resident Engineer's Signature/Date

_____ _____

Contractor Signature Acknowledging Report/Date Subcontractor Signature Acknowledging Report/Date

Subcontractor Requests Meeting with the District: No ☐ Yes ☐ Date Meeting Held: _____

Subcontractor's Comments / Meeting Notes (extra sheets may be added to this form and noted here if needed):

_____

_____

Contractor's Comments: _____

_____

SUBCONTRACTOR PROJECT EVALUATION FORM (Continued)

Date: _____ Contract Number:_____

INFORMATION FOR DISTRICT HIGHWAY DIRECTORS RELATING TO PREQUALIFICATION

A deduction shall be recommended for unsatisfactory performance if computed overall rating is under 80%.
A deduction may be recommended for this project being completed late due to the Contractor's fault.

RECOMMENDATIONS FOR DEDUCTIONS FROM CONTRACTORS' ASSIGNED FACTOR
(*Write Yes or No in space provided*)

I recommend a deduction for Contractor's unsatisfactory performance: _____

I recommend a deduction for project completed late:_____

Signed: _____
District Highway Director

EXPLANATION OF RATINGS 1 – 8: _____

WORK NOT COMPLETED WITHIN SPECIFIED TIME: _____

Revised: 04/28/17

*** END OF DOCUMENT ***

DOCUMENT 00710
GENERAL CONTRACT PROVISIONS
Revised: 05/06/24

NOTICE OF AVAILABILITY

The STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES dated 2024, the SUPPLEMENTAL SPECIFICATIONS, the 1996 METRIC CONSTRUCTION AND TRAFFIC STANDARD DETAILS, the 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS; the 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING and the 2017 CONSTRUCTION STANDARD DETAILS are available online at https://www.mass.gov/massdot-highway-division-manuals-and-publications

SPECIAL PROVISIONS FOR RIGHT-TO-KNOW ACT REQUIREMENTS

The Contractor's attention is directed to Massachusetts General Laws, Chapter 111F, commonly known as the Right-To-Know Act, and to the regulations promulgated pursuant thereto. Among the provisions of the Right-To-Know Act is a requirement that employers make available to employees Materials Safety Data Sheets (MSDS) for any substance on the Massachusetts Substance List (MSL) to which employees are, have been, or may be exposed.

To ensure prompt compliance with these regulations and legislation, the Contractor shall:

1. Deliver to the Department, prior to the start of any work under this contract, copies of MSDS for all MSL substances to be used, stored, processed or manufactured at the worksite by the Contractor.

2. Train employees of the Department, who may be exposed to MSL substances as a result of the Contractor's work under this contract, with regard to those specific substances in accordance with requirements of the Right-To-Know Act.

3. Observe all safety precautions recommended on the MSDS for any MSL substance to be used, stored, processed, or manufactured at the worksite by the Contractor.

4. Inform the Department in writing regarding specific protective equipment recommended in the MSDS for MSL substances to which employees of the Department may be exposed as a result of the Contractor's work under this contract.

The Department shall not be liable for any delay or suspension of work caused by the refusal of its employees to perform any work due to the Contractor's failure to comply with the Right-To-Know Act. The Contractor agrees to hold the Department or the Commissioner of the Department harmless and fully indemnified for any and all claims, demands, fines, actions, complaints, and causes of action resulting from or arising out of the Contractor's failure to comply with the requirements of the Right-To-Know Act.

ALTERNATIVE DISPUTE RESOLUTION
Forum, Choice of Law and Mediations:

Any actions arising out of a contract shall be governed by the laws of Massachusetts and shall be brought and maintained in a State or federal court in Massachusetts which shall have exclusive jurisdiction thereof. MassDOT and the Contractor may both agree to mediation of any claim and will share the costs of such mediation pro rata based on the number of parties involved.

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DOCUMENT 00715

SUPPLEMENTAL SPECIFICATIONS

JUNE 30, 2024

The 2024 *Standard Specifications for Highways and Bridges* are amended by the following modifications, additions and deletions. These Supplemental Specifications prevail over those published in the Standard Specifications.

The Specifications Committee has issued these Supplemental Specifications for inclusion into each proposal until such time as they are updated or incorporated into the next Standard Specifications.

Contractors are cautioned that these Supplemental Specifications are dated and will change as they are updated.

DIVISION I

GENERAL REQUIREMENTS AND COVENANTS

SECTION 4: SCOPE OF WORK

Subsection 4.06: Increased or Decreased Contract Quantities
Replace the second paragraph with the following.

Where the actual quantity of a pay item varies by more than 25% above or below the estimated quantity stated in the Contract, an equitable adjustment in the Contract Price for that pay item shall be negotiated upon demand of either party regardless of the cause of the variation in quantity. A demand for an equitable adjustment must be submitted to the other party within 30 days after beginning the work of the affected item that is greater than 25% above the bid quantity or within 30 days after completing the work when the actual quantity is 25% less than the bid quantity.

DIVISION II

CONSTRUCTION DETAILS

DIVISION II: Construction Details
Replace M4.02.15 Cement Mortar with M4.04.0 Grout, Mortar, and Concrete Products where encountered, including in Subsections 230.40, 485.40, 501.40, 685.40, 940.40A and 983.40.

SECTION 100: EARTHWORK, GRADING, DEMOLITION, RODENT CONTROL AND BORINGS

SUBSECTION 150: EMBANKMENT

Subsection 150.62: Embankment Construction with Materials Other Than Rock
Replace the fourth paragraph with the following.

The embankment materials shall be compacted to not less than 95% of the maximum dry density of the embankment material as determined by AASHTO T 99, Method C. If required, a correction for oversized particles shall be in accordance with Annex A of AASHTO T 99. If the material retained on the ¾-in. sieve is 30% or more of the total sample, this test shall not apply and the material shall be compacted to the target density. The target density shall be established by determining the number of passes of a roller required to produce a constant and uniform density, after conducting a series of tests using either AASHTO T 310, *In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)*, AASHTO T 191, *Density of Soil In-Place by the Sand-Cone Method*, or *ASTM D 8167 Standard Test Method for In-Place Bulk Density of Soil and Soil-Aggregate by a Low-Activity Nuclear Method (Shallow Depth)*. The Contractor shall, without additional compensation, employ whatever measures may be necessary to adjust the natural water content of the suitable embankment material to permit the placement and compaction as hereinbefore specified.

SUBSECTION 160: CONTROLLED LOW-STRENGTH MATERIAL

Subsection 160: Controlled Low-Strength Material
Add this new subsection.

DESCRIPTION

160.20: General

Controlled Low-Strength Material shall be installed in accordance with the relevant provisions of Subsection 150: Embankment, Section 901: Cement Concrete and in accordance with the procedures described herein.

Controlled Low Strength Materials (CLSM) shall be a self-compacting, self-leveling, flowable, excavatable or non-excavatable, low strength, rigid setting, and unshrinkable material, used as an alternative to compacted granular fills, including backfill, structural fill, utility fill, pavement base, subgrade, subbase, base course, conduit bedding, erosion control, and void filling.

MATERIALS

160.40: General

Material for controlled low-strength material shall meet the requirement specified of M4.08.0 Controlled Low-Strength Material. The material shall be specified by the Engineer as one of the following types;

CLSM – Manual Excavatable (≤100 psi)

CLSM – Mechanical Excavatable (101-300 psi)
CLSM – Structural Non Excavatable (> 300 psi)

Permeability testing as specified in Table M4.08.0-2 shall be required when the material is placed outside of roadway areas or footings for concrete structures, or as directed by the Engineer.

CONSTRUCTION METHODS

160.60: General

The Contractor shall submit a placement plan for Controlled Low-Strength Material (CLSM). The plan shall include the type of CLSM, detailed descriptions of methods used for placing and containing the controlled density fill and the set time to strength.

The Contractor shall remove all debris prior to placing the fill. Fill shall not be placed against any structural elements or utilities unless approved by the Engineer.

CLSM shall be poured in lifts not exceeding 4 feet to insure stability under the fluid effects of the pour. Care shall be taken to ensure the integrity of the forms or other means of supporting the material until the material sets up.

COMPENSATION

160.80: Method of Measurement

Controlled Low-Strength Material shall be measured by the cubic yard in place to the neat lines established on the plans or specified by the Engineer. When backfilling pipes the horizontal neat lines shall be not greater than 3.0 ft. greater than the rated inside diameter of the pipe and vertically from the top of the crushed stone foundation material, if any, or 6 in. below the pipe invert whichever is less to the specified top elevation. A deduction shall be made for the volume of the pipe or conduit encased.

160.81: Basis of Payment

Payment under this item shall constitute full compensation for the placement, testing, and all material, equipment and labor to complete the work.

160.82: Payment Items

160.1	Controlled Low-Strength Material - Manual Excavatable (≤ 100 PSI)	Cubic Yard
160.2	Controlled Low-Strength Material – Mechanical Excavatable (101-300 PSI)	Cubic Yard
160.3	Controlled Low-Strength Material (>300 PSI)	Cubic Yard

SECTION 200: DRAINAGE

SUBSECTION 201: BASINS, MANHOLES AND INLETS

Subsection 201.40: General
Replace "Cement Mortar ..... M4.02.15" with "Mortar ..... M4.04.0".

SECTION 400: SUB-BASE, BASE COURSES, SHOULDERS, PAVEMENTS AND BERMS

SUBSECTION 401: GRAVEL SUB-BASE

Subsection 401.60: Gravel Sub-base
Replace the last sentence of the first paragraph with the following.

The specific density of the Gravel Sub-base shall be maintained by determining the number of passes of a roller required to produce a constant and uniform density, after conducting a series of tests using a nuclear device or the sand/volume method in accordance with AASHTO T310, AASHTO T 191, or ASTM D 8167.

SUBSECTION 402: DENSE GRADED CRUSHED STONE FOR SUB-BASE

Subsection 402.61: Spreading and Compacting
Replace the last sentence of the first paragraph with the following.

The specified density of the Dense Graded Crushed Stone shall be maintained by determining the number of passes of a roller are required to produce a constant and uniform density, after conducting a series of tests using a nuclear device or the sand/volume method in accordance with AASHTO T310, AASHTO T 191, or ASTM D 8167.

SUBSECTION 403: RECLAIMED PAVEMENT FOR BASE COURSE AND/OR SUB-BASE

Subsection 403.64: Compaction and Dust Control
Replace the second paragraph with the following.

The reclaimed base course shall be tested for compaction and smoothness and accuracy of grade in accordance with the applicable provisions of 401.60: Gravel Sub-base. The required density shall be measured by using a nuclear device or the sand/volume method in accordance with AASHTO T310, AASHTO T 191, or ASTM D 8167. If any portions are found to be unacceptable by the Engineer, such portions shall be reprocessed, regraded, and recompacted until the required smoothness and accuracy are obtained.

SUBSECTION 404: RECLAIMED PAVEMENT BORROW MATERIAL

Subsection 404.60: General
Replace the second sentence with the following.

The specified density of the Reclaimed Pavement Borrow Material shall be maintained by determining the number of passes of a roller that are required to produce a constant and uniform density, after conducting a series of tests using a nuclear device or the sand/volume method in accordance with AASHTO T310, AASHTO T 191, or ASTM D 8167

SUBSECTION 450: HOT MIX ASPHALT PAVEMENT

Subsection 450.40: General
Add the following paragraph to the end of this subsection.

Prior to placing hot mix asphalt the contractor shall provide notice to the Engineer at least 48 hours in advance of the work. The notice shall include the anticipated schedule, HMA tonnage, the type of mix, the mix provider and plant location.

SUBSECTION 460: HOT MIX ASPHALT PAVEMENT FOR LOCAL ROADS

Subsection 460.40: General
Add the following paragraph to the end of this subsection.

Prior to placing hot mix asphalt the contractor shall provide notice to the Engineer at least 48 hours in advance of the work. The notice shall include the anticipated schedule, HMA tonnage, the type of mix, the mix provider and plant location.

SUBSECTION 466: STRESS ABSORBING MEMBRANE & STRESS ABSORBING MEMBRANE INTERLAYER

Subsection 466.40: General
Replace this subsection with the following.

Prior to placing stress absorbing membrane the contractor shall provide notice to the Engineer at least 48 hours in advance of the work. The notice shall include the anticipated schedule, tonnage, the type of mix, the mix provider and plant location. Stress absorbing membrane and stress absorbing membrane interlayer shall be constructed as specified herein.

SUBSECTION 470: HOT MIX ASPHALT PAVEMENT BERM

Subsection 470.40: General
Replace this subsection with the following.

Prior to placing hot mix asphalt the contractor shall provide notice to the Engineer at least 48 hours in advance of the work. The notice shall include the anticipated schedule, HMA tonnage, the type of mix, the mix provider and plant location. The Contractor shall obtain HMA berm material of the type specified.

SUBSECTION 472: TEMPORARY ASPHALT PATCHING

Subsection 472.40: General
Add the following paragraph to the beginning of this subsection.

Prior to placing hot mix asphalt the contractor shall provide notice to the Engineer at least 48 hours in advance of the work. The notice shall include the anticipated schedule, HMA tonnage, the type of mix, the mix provider and plant location.

SUBSECTION 486: ULTRATHIN BONDED OVERLAY

Subsection 486.40: General
Add the following paragraph to the end of this subsection.

Prior to placing ultrathin bonded overlay the contractor shall provide notice to the Engineer at least 48 hours in advance of the work. The notice shall include the anticipated schedule, tonnage, the type of mix, the mix provider and plant location.

SECTION 600: HIGHWAY GUARD, FENCES AND WALLS

SUBSECTION 690: WALLS REMOVED AND RESET

Subsection 403.64: General
Replace the last sentence with the following.

Mortar shall meet the requirement of M4.04.0: Grout, Mortar, and Concrete Products.

SECTION 700: INCIDENTAL WORK

SUBSECTION 702: HOT MIX ASPHALT SIDEWALKS AND DRIVEWAYS

Subsection 702.40: General
Add the following paragraph to the end of this subsection.

Prior to placing hot mix asphalt the contractor shall provide notice to the Engineer at least 48 hours in advance of the work. The notice shall include the anticipated schedule, HMA tonnage, the type of mix, the mix provider and plant location.

SECTION 800: TRAFFIC CONTROL DEVICES

SUBSECTION 825: RECTANGULAR RAPID FLASHING BEACONS

Subsection 825: Rectangular Rapid Flashing Beacons
Add this new subsection.

DESCRIPTION

825.20: General

This work shall consist of furnishing and installing a solar-powered, actuated, Rectangular Rapid Flashing Beacon (RRFB) system at the location(s) shown in the Plans.

MATERIALS

825.40: General

Rectangular Rapid-Flashing Beacons shall meet the requirements specified in the following Subsections of Division III, Materials:

Cement Concrete.....M4.02.00
Signal Posts and Bases.....M10.05.1
APS Pushbuttons.....M10.09.1
RRFB Assemblies.....M10.11.0

An RRFB system shall include the following items (quantities shown in the Major Items List found in the Plans):

- Cement Concrete Foundation
- Signal Post and Pedestal Base
- APS Pushbutton
- Light Bar
- Signage
- Enclosure for Controller, Activation Unit, and Battery System
- Solar Panel
- All mounting and supporting hardware and wiring necessary to complete a working system

The Contractor shall supply cement concrete foundations per the Plans.

The Contractor shall supply Schedule 80 aluminum signal posts with a brushed or spun finish and square, pedestal aluminum bases with a natural finish unless otherwise shown in the Plans or Special Provisions.

Each Light Bar shall have a pair of yellow beacons facing one or both directions of traffic, as shown in the Plans.

All sign designs shall conform to the MUTCD. Sign panel information, including dimensions, shall be per the Plans.

The warning signs (MUTCD code W11-2, W11-15, or S1-1 signs – see Plans for sign type), and the diagonal downward arrow sign (W16-7P) signs shall be on Type A substrate, conforming to 828.42: Panels. The sign sheeting shall be fluorescent yellow-green, conforming to ASTM D4956 Type IX.

An R10-25 sign, conforming to the MUTCD, shall be mounted above the APS Pushbutton on a Type A substrate or may be integral to the button assembly.

The solar panel and battery system may be integrated into a single unit or housed separately, per the manufacturer's design. These may also be co-housed with the Light Bar and/or the Controller and Activation Unit.

The solar panel and battery system shall be sized appropriately to accommodate 300 actuations per day, 365 days a year, for the duration of the repeating flashing sequence shown in the Plans. The sizing calculations shall be based upon solar and temperature conditions for a typical December-January in Massachusetts. The system shall have a minimum autonomy of 5 days.

Each assembly shall be rated for wind speeds of up to 90 mph.

Any proprietary software required for the programming and/or operation of the system during its lifetime shall be included at no additional cost.

825.41: Shop Drawings

Within 30 days from the Notice to Proceed the Contractor shall submit shop drawings for the RRFB system, including cutsheets for all components to show conformance with M10.05, M10.09.1, and M10.11.0 and these specifications.

Shop drawings shall include all solar and battery sizing calculations. These calculations shall have Contractor- or manufacturer-supplied, site-specific shading factors applied.

825.42: Material Warranties

All RRFB components shall include a minimum 1-year manufacturer's replacement warranty for manufacturing or installation defects starting at the date of acceptance by the Engineer. A battery shall be considered defective should it not retain 80% of its original capacity within the warranty period.

CONSTRUCTION METHODS

825.60: General

RRFBs shall be installed on new foundations at the locations as shown in the Plans. Bases shall be secured to the foundation in accordance with the manufacturer's specifications.

All systems shall be installed per the manufacturer's instructions.

The location and orientation of the system shall be per the Plans.

The arrow on each APS pushbutton shall be aligned parallel to the direction of travel of the crosswalk.

The Light Bar(s) shall be oriented towards the incoming lane(s).

Solar panels shall be oriented to maximize sunlight gain.

SYSTEM OPERATION

825.70: APS Pushbuttons

APS Pushbuttons shall actuate the RRFB system. Upon actuation, an audible speech message shall be broadcast from each pushbutton in the system that says, "Warning lights are flashing," shall be stated twice. This message shall be repeated upon each actuation. No other messages shall be allowed.

While the system is in dark mode, the APS Pushbuttons shall broadcast a locator tone. The locator tone shall have a duration of 0.15 seconds or less and shall repeat at 1-second intervals at all times that the system is in dark mode. The locator tone shall be set 2 to 5 dBA above ambient sound, shall automatically adjust intensity, but cap at a maximum volume of 100 dBA.

APS Pushbuttons shall have all other vibrotactile and percussive indications disabled.

825.71: Light Bar

The Light Bar shall remain dark until actuated.

Upon actuation, all Light Bars in the system shall be activated simultaneously for a predetermined repeating flash sequence. The flashing rate shall be 75 flashing sequences per minute.

The left and right yellow beacons shall operate using the following sequence:

A. The yellow beacon on the left-hand side shall be illuminated for approximately 50 milliseconds.
B. Both yellow beacons shall be dark for approximately 50 milliseconds.
C. The yellow beacon on the right-hand side shall be illuminated for approximately 50 milliseconds.
D. Both yellow beacons shall be dark for approximately 50 milliseconds.
E. The yellow beacon on the left-hand side shall be illuminated for approximately 50 milliseconds.
F. Both yellow beacons shall be dark for approximately 50 milliseconds.
G. The yellow beacon on the right-hand side shall be illuminated for approximately 50 milliseconds.
H. Both yellow beacons shall be dark for approximately 50 milliseconds.
I. Both yellow beacons shall be illuminated for approximately 50 milliseconds.
J. Both yellow beacons shall be dark for approximately 50 milliseconds.
K. Both yellow beacons shall be illuminated for approximately 50 milliseconds.
L. Both yellow beacons shall be dark for approximately 250 milliseconds.

The flash rate of each individual RRFB indication, as applied over the full flashing sequence, shall not be more than 5 flashes per second, to avoid frequencies that might cause seizures.

The sequence shall then be repeated until the duration time has been met and then all yellow beacons shall return to dark mode simultaneously. The duration time shall be per the Plans.

The predetermined repeating flash sequence shall be immediately initiated every time a pushbutton detector is actuated. If the RRFBs are already flashing and an actuation is received, it shall restart the duration time. There shall be no delay time programmed between actuations.

COMPENSATION

825.80: Method of Measurement

RRFBs will be measured as a single system, 2-Post Assembly or 3-Post Assembly, furnished and installed.

825.81: Basis of Payment

The work will be paid for at the contract price each under the respective item for a 2-Post Assembly System or 3-Post Assembly System. Any additional wiring, mounting equipment, or other materials or labor required to for an operating system per the Plans and Specifications shall be considered as incidental to the construction and be included in the contract price.

825.82: Payment Item

825.2	RRFB (2-Post Assembly System)	Each
825.3	RRFB (3-Post Assembly System)	Each

SECTION 900: STRUCTURES

Subsection 922: Elastomeric Bearing Pads
Add this new subsection.

SUBSECTION 922: ELASTOMERIC BEARING PADS

DESCRIPTION

922.20: General

This specification consists of the construction requirements for elastomeric bearing pads. Elastomeric bearing pads shall consist of plain or laminated bearings consisting of layers of elastomers restrained at their interfaces by bonded steel laminates.

MATERIALS

922.40: General

Elastomeric bearing pads shall meet the following requirements:

Elastomeric Bearing Pads M9.14.5

Anchor bolts M8.01.5

CONSTRUCTION METHODS

922.50: Submittals

The Contractor shall submit the following to the Engineer for approval:

1. Prior to fabrication:
    a. Written notification 30 days prior to the start of bearing production. The notification shall include the contract number, quantity, type, and size of bearing being produced, manufacturer's name, and the name of the independent testing lab.
    b. Shop drawings for approval in accordance with Subsection 5.02, 14 days prior to the start of bearing production.
2. At the time of bearing pad delivery:
    a. A certificate of compliance (COC) certifying that the elastomeric bearing pads meet the requirements of the contract specifications. The COC shall be accompanied by:
        - A mill certificate for steel laminates used in bearings, where applicable.
        - Fabricator QC test reports.
    b. Independent test results as required under Subsection 922.62.

922.51: Fabricators

Fabricators shall be in accordance with Subsection M9.14.5D.

922.52: Fabrication

Fabrication shall be in accordance with Subsection M9.14.5E.

In addition to the number of bearing pads required for the contract the Contractor shall order additional bearing pads as defined in Subsection M9.14.5G, in order to allow the Engineer to randomly select a bearing pad for testing in accordance with 922.72.

922.53: Packaging, Handling, & Storage

The bearing pads shall be packaged, handled, and stored in accordance with Subsection M9.14.5F.

All bearing devices and components shall be stored on the project in an area that provides protection from environmental and physical damage. When installed, bearings shall be clean and free of all foreign substances.

922.54 Installation

Bearing pads shall be installed only on concrete bridge seat bearing areas that have been prepared in accordance with Subsection 901.65A(3).

Bearing pads shall be installed by qualified personnel to the positions, elevations, and slopes shown on the plans and to the dimensions and offsets prescribed by the manufacturer. The bearing pads shall be adjusted, as necessary, to take into account the ambient temperature at installation and future movements of the bridge due to temperature changes, release of falsework, and shortening due to post-tensioning.

Elastomeric bearings shall be placed directly on the concrete surface provided that it is flat within the bearing area to within a tolerance of 0.005 times the smallest nominal dimension of the bearing as measured by a

straight edge from peak to valley. Bearings shall be placed on surfaces that do not deviate from the specified bridge seat slope in any direction by more than 0.01 rad.

Any bearing areas that exceed these tolerances shall be brought into compliance by grouting or use of shims as directed by the Engineer before the weight of the structure acts on the bearing.

Bearings that have an internal tapered load plates shall be marked with an arrow that points up-station in order to properly align the slope of the internal tapered load plate with the centerline of the bridge.

Sole plates that sit on the bearing shall not be welded to the beam flange in the field unless at least 1.5 in. of the steel exists between the weld and the elastomer. In no case shall the elastomer or the bond be subjected to temperatures higher than 400°F.

No beams shall be erected until the bearings have been accepted by the Engineer.

CONTRACTOR QUALITY CONTROL

922.60: General

The Contractor shall provide a Quality Control System (QC System) to ensure that all materials and workmanship meet the required specifications.

922.61: Quality Control Inspection

The Contractor shall perform QC inspection of all work items addressed under this specification. Inspection activities during placement may be performed by qualified production personnel. The Contractor's QC personnel shall have overall responsibility for the QC inspection. The Contractor shall not rely on the results of the Engineer's Acceptance inspection for QC purposes. The Engineer shall be provided with the opportunity to monitor and witness all QC inspections.

QC inspection activities must address the following three primary components:

a. Materials
b. Environmental Conditions
c. Workmanship

The minimum frequency of QC inspection activity shall be in accordance with the requirements below.

Table 922.61-1 - Minimum QC Inspection of Elastomeric Bearing Pads

Inspection Component	Inspection Attribute	Minimum Inspection Frequency	Point of Inspection	Inspection Method
Materials	Bearing Pad	Each Delivery	Bearing Pad	Check COC
	Geometry and Surface	Each Bearing Pad	Bearing Pad Surface	Visual Check & Check Measurement
Environmental Conditions	Temperature of Air	1 per Day	At Project Site	Check Measurement
Workmanship	Bridge Seat	Each Bearing Location	Bearing Pad Location	Visual Check
	Elevation	Each Bearing Pad	Bearing Pad Location	Check Measurement
	Orientation	Each Bearing Pad	Bearing Pad Location	Check Measurement

922.62: Quality Control Sampling and Testing Requirements

The Contractor shall have each Lot of bearing pads sampled and tested in accordance with Subsection M9.14.5G. This shall include both QC and compliant independent laboratory test results.

DEPARTMENT ACCEPTANCE

922.70: General

The Department shall sample and test bearing pads as part of its Acceptance activities. Independent testing shall also be used to supplement its testing.

922.71: Acceptance Inspection

The Engineer will perform Acceptance inspection to ensure that materials and completed work are in conformance with the contract requirements. Acceptance inspection is intended to visually assess the quality of each Lot produced and placed and will address only the inspection components of materials and workmanship in support of the Department's final Acceptance determination. All Acceptance inspection activities by the Department will be performed independent of the Contractor's QC inspection.

Table 922.71-1 – Department Acceptance Inspection of Elastomeric Bearing Pads

Inspection Component	Inspection Attribute	Minimum Inspection Frequency	Point of Inspection	Inspection Method
Materials	Bearing Pad	1 Per Bearing Pad	Bearing Pad Surface	Check COC
	Geometry and Surface	1 Per Bearing Pad	Bearing Pad Surface	Visual Check & Check Measurement
Workmanship	Elevation	1 per Bearing Pad	Bearing Pad Location	Check Measurement
	Orientation	1 per Bearing Pad	Bearing Pad Location	Check Measurement

922.72: Acceptance Sampling and Testing Requirements

For Acceptance samples taken by the Engineer at the project, the sampling rate shall be in accordance with Subsection M9.14.5G. Bearing pads shall be tested by the Department in accordance with Table M9.14.5-1.

922.73: Lot Acceptance Determination Based on Inspection Results

The Engineer's Acceptance inspection results will be used in the final Acceptance determination for all Lots. Prior to final Acceptance of each Lot produced and placed, the Engineer will evaluate all Acceptance inspection information for the Lot. The materials and product workmanship for the completed work will be evaluated for conformance with the plans and the requirements specified in Subsections 922.60, 922.61, and 922.62.

When the Acceptance information identifies deficiencies in either material quality or product workmanship, the location will be isolated and further evaluated by the Engineer through additional Acceptance inspection. Depending upon the findings of the additional Acceptance inspection activity, the Engineer will determine the disposition of the nonconforming work in accordance with Division I, Subsection 5.03, Conformity with Plans and Specifications.

922.74: Lot Acceptance Determination Based on Testing Data

Prior to final Acceptance of each Lot, the Engineer will evaluate all available QC, independent, and Acceptance testing data for the Lot to determine conformance with the minimum requirements in Subsection M9.14.5G and Table M9.14.5-1.

If a test result does not meet the minimum requirement, the Contractor and Engineer will further assess the quality to determine whether the material can remain in place.

If the Engineer's assessment determines that the material quality is not sufficient to permit the bearing pad to remain in place, the pad shall be removed and replaced. When a nonconforming bearing pad is corrected or replaced, the Engineer will perform Acceptance testing of the replacement bearing pad and evaluate the test results for conformance with the minimum requirements.

922.75: Final Lot Acceptance Determination

For each Lot produced and placed, the Engineer will evaluate all Acceptance inspection and testing data for the Lot. The final review and visual inspection shall be conducted jointly by the Contractor and Engineer. Any items that do not meet the requirements of the specifications and plans shall be addressed at this time, at no additional cost to the Department.

After each Lot is complete, including any corrective action, the Engineer will perform a final evaluation of all Acceptance data for the Lot. The Engineer will accept the Lot if the evaluation of all inspection and testing data for the Lot is in conformance with this specification and the contract documents.

When the above requirements have been met, the Engineer will accept all completed bearing pads.

COMPENSATION

922.80: Method of Measurement

Laminated Elastomeric Bearing Pads will be measured by each pad installed. Plain Elastomeric Bearing Pads will be measured by the square foot installed. The measured quantities do not include the additional bearings required for conformance and destructive testing.

922.81: Basis of Payment

Payment under this item shall be at the contract unit price. This price will include all materials, equipment, tools and labor, additional bearing pads for testing and all required testing necessary to complete the work.

922.82: Payment Items

921.	Laminated Elastomeric Bearing Pad with Anchor Bolts	Each
922.	Laminated Elastomeric Bearing Pad without Anchor Bolts	Each
923.	Laminated Sliding Elastomeric Bearing Pad with Anchor Bolts	Each
933.	Plain Elastomeric Bearing Pad	Square Foot

SECTION 970: DAMP-PROOFING

Subsection 970.30: General
Add the following material to this subsection.

Mortar..... M4.04.0

Subsection 970.40: General
Replace the second sentence in the second paragraph with the following.

All holes in concrete surfaces shall be satisfactorily filled with mortar before damp-proofing is applied.

SUBSECTION 983: REVETMENT

Subsection 983.64 Special Slope Paving Under Bridges
Replace the last sentence under B. Quarry Stone or Precast Concrete Blocks. with the following.

Mortar shall then be placed in the joints to the top of the paved surface.

Subsection 983.65 Channel Paving and Grouted Channel Paving
Replace the last sentence with the following.

The grout shall conform to M4.04.0: Grout, Mortar, and Concrete Products.

DIVISION III

MATERIALS SPECIFICATIONS

SECTION M4: CEMENT AND CEMENT CONCRETE MATERIALS

Subsection M4.02.00 Cement Concrete

Add the following to the end of this subsection.

Alkali Silica Reactivity - Resistant Portland Cement Concrete

All cement concrete and precast/prestressed concrete products shall be alkali silica reactivity-resistant. Proportion Portland cement concrete mixes to include materials that meet either the aggregate requirement or Alkali-Silica Reactivity (ASR) mitigation criteria listed below. Provide cement mill test reports from certified laboratories that show the materials' source, composition and the cement alkali content expressed as sodium oxide equivalent(s) not to exceed 1.4%. Certified test reports according to test procedures as specified in Table A will be required to be submitted with the trial batch submission to RMS for approval every year or whenever the source of material is changed.

Select non-reactive aggregates that meet all the criteria of Table M4.02.00-2. Mitigate the mix as described below when nonreactive aggregates are unavailable. If non-reactive aggregates are used for portland cement concrete mix, 15% by weight of the cementitious content shall be fly ash meeting AASHTO M 295, Type F.

Select a material or a combination of materials that meet the criteria shown in Table M4.02.00-3 to mitigate ASR when concrete mixes must be proportioned with reactive aggregates. Perform verification test according to AASHTO T 303 and ASTM C295 to determine the effectiveness of the resulting mix design against ASR. Use the same proportion of cement and pozzolan for each test mixture as that proposed for the actual mix design. Provide the Department with certified documentation of the mixtures' effectiveness to control ASR.

Table M4.02.00-2: Tests and Criteria for Proposed Aggregates

Procedure	Description	Limits
AASHTO T 303: Accelerated Detection of Potentially Deleterious Expansion of Mortar Bars Due to Alkali-Silica Reaction	Mean mortar bar expansion at 14 days. Perform a polynomial fit (1) of 4, 7, 11, and 14 days to determine reliability of results	0.08% maximum metamorphic aggregate; 0.10% maximum all other aggregates. Repeat AASHTO T 303 if r^2 is less than 0.95.
ASTM C295: Petrographic Examination of Aggregates for Concrete	Optically strained, microfractured, or microcrystalline quartz	5.0% maximum (2)
	Chert or chalcedony	3.0% maximum (2)
	Tridymite or cristobolite	1.0% maximum (2)
	Opal	0.5% maximum (2)
	Natural volcanic glass	3.0% maximum (2)

(1) Use a second order polynomial of $\%Exp = A^o + A^1 SQRT(t) + A^2t$. See publication SD92-04-F.
(2) Based on the total aggregate sample.

Table M4.02.00-3: Mitigation Methods for ASR in Portland Cement Concrete

Material	Specification	Cementitious Material Percentage (1)
Low alkali cement (2)	AASHTO M 85	100%
Fly ash - Class F	AASHTO M 295	15% minimum to 30% (4) maximum
Silica Fume (5)	AASHTO M 307	6% ± 1% (6)
Slag Grade 100 and 120	AASHTO M 302	25% minimum to 50% maximum

(1) Measure this minimum content of cementitious material as percent by weight of cement plus pozzolan.
(2) This single criterion is not effective in all cases in remediating ASR. Low alkali cement (0.60% maximum (3)) must be used in combination with other pozzolanic materials in Table B.
(3) Na_2O equivalent = $\%Na_2O + 0.658 (\%K_2O)$
(4) Fly ash, Type F, shall replace 15% by weight of the design cement content, and any additional fly ash will be considered as fine aggregate.
(5) Silica fume shall only be used in silica fume cement concrete.
(6) The total amount of Type F fly ash and silica fume shall constitute 20% by weight of the design cement content, and any additional fly ash shall be considered as fine aggregate.

Subsection M4.02.15 Cement Mortar
Delete this subsection.

Subsection M4.04.0: Grout, Mortar and Concrete Products
Replace this subection with the following.

M4.04.0: Grout, Mortar, and Concrete Products

Grout, cementitious mortar, and concrete products shall be packaged, dry, and preblended with preformulated constituent materials (excluding mixing water) to produce a material with acceptable quality characteristics and material properties, including time of set, compressive strength, flexural strength, slant shear bond strength, resistance to alkali silica reaction, freezing/thawing, and de-icing cycles, shrinkage, expansion, and sulfate reaction.

Mortar products shall be defined as products containing aggregate of which less than 5% by mass of the total mixture is retained on the 3/8 in. sieve. Mortar products for concrete repairs shall be used only on repair depths of 2 in. or less. Concrete products shall be defined as products containing aggregate of which 5% or more by mass of the total mixture is retained on the 3/8 in. sieve. Concrete products for concrete repairs shall be used only on repair depths greater than 2 in.

The aggregate sources included in the prepackaged product or extended into the product shall meet Section M4.02.02: Aggregates. Grout, cementitious mortar, and concrete products shall only be applied per the requirements provided on the product's technical data sheet. Grout, cementitious mortar, and concrete products shall maintain valid listing on the MassDOT Qualified Construction Materials List (QCML). Grout, cementitious mortar, and concrete products shall meet requirements specified herein.

A. Technical Data Sheet.

The Manufacturer shall submit the product's technical data sheet to the Department for review. At a minimum, the product's technical data sheets shall include:

(a) Product Name
(b) Manufacturer, including address and contact information
(c) Packaging
(d) Yield
(e) Product Description, including an overview of the product and its intended application(s) and use(s).
(f) Technical Data, including quality characteristics and corresponding performance criteria with the AASHTO and/or ASTM standard test methods identified.

(g) Recommended Equipment
(h) Instructions, including surface preparation, mixing, forming, placing, finishing, curing, and protection from adverse conditions, such as precipitation, cold conditions, and hot conditions.
(i) Limitations
(j) Storage and Shelf Life
(k) Safety

B. Mix Design Formulation.

Products that are extended with aggregate not included in the original product packaging shall be formulated per the product's technical data sheet and evaluated through Department mix design evaluation and verification testing. Producers shall report and submit proposed mix design formulations onto the Department issued mix design sheet. The Producer shall select an AASHTO accredited independent laboratory to conduct verification testing. The sampling and testing conducted by the independent laboratory shall be witnessed by the Department.

C. Product Verification Testing.

Verification test results shall be within the limits specified herein.

M4.04.1: Conventional Grout, Cementitious Mortar, and Concrete Products

Conventional grout, cementitious mortar, and concrete products shall meet the requirements of Section M4: Cement and Cement Concrete Materials, performance criteria of the product's technical data sheet, and the requirements specified herein.

M4.04.2: Rapid Hardening Cementitious Mortar and Concrete Products

Rapid hardening cementitious mortar and concrete products shall meet the requirements and performance criteria of the product's technical data sheet, ASTM C928 Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs, and Table M4.04.2-2.

Table M4.04.2-1: Types of Rapid Hardening Cementitious Products for Concrete Repairs

Type	Description	Application
R1	General Rapid Hardening	Vertical and Overhead Repairs
R2	Medium Rapid Hardening	Vertical and Overhead Repairs
R3	Very Rapid Hardening	Horizontal, Vertical, and Overhead Repairs

Table M4.04.2-2: Verification Testing Requirements

Property	Method	Quality Characteristic		Limits					
				R1		R2		R3	
				Min.	Max.	Min.	Max.	Min.	Max.
Setting	T 197	Initial Set (min.)		Technical Data Sheet					
		Final Set (min.)		Technical Data Sheet					
Strength	T 97[1]	Flexural Strength (psi)	24 Hours	–	–	–	–	650	–
			7 Days	–	–	–	–	–	–
Durability	T 358	Surface Chloride Ion Penetration Resistance (kΩ-cm)	28 Days	21	–	21	–	21	–
	T 161 (A)	Relative Durability Factor		90	–	90	–	90	–
		Mass Loss (%)		–	6.0	–	6.0	–	6.0
[1] Not applicable to vertical and overhead repair applications.									

M4.04.3: Mortar Products for Unit Masonry

Mortar products for unit masonry shall meet the requirements and performance criteria of the product's technical data sheet and Type M specified in ASTM C270 Standard Specification for Mortar for Unit Masonry. Field proportioned cement mortar for laying brick and block shall be composed of 1 part Portland cement and 2 parts of fine aggregate by volume with a sufficient amount of water to form a workable mixture, while still achieving the properties specified herein.

M4.04.4: Grout Products for Unit Masonry

Grout products for unit masonry shall meet the requirements and performance criteria of the product's technical data sheet and ASTM C476 Standard Specification for Grout for Masonry.

M4.04.5: Non-Shrink Grout Products

Non-shrink grout products are intended for use under applied load, including supporting a structure, transfer medium between load-bearing members, shear keys, and other non-shrink applications, where a change in height below initial placement height is to be avoided. Non-shrink grout products shall meet the requirements and performance criteria of the product's technical data sheet and ASTM C1107 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

SECTION M5: PIPE, CULVERT SECTIONS AND CONDUIT

Subsection M5.01.0: Joint Material for Pipe
Replace M4.02.15 Cement Mortar with M4.04.0 Grout, Mortar, and Concrete Products in paragraph B.

SECTION M8: METALS AND RELATED MATERIALS

Subsection M8.18.1: Traffic Signal Supports
Delete the heading Posts and the two paragraphs under it. Delete the heading Bases and the three paragraphs under it.

SECTION M9: MISELLANEOUS MATERIALS

Subsection M9.14.5: Elastomeric Bridge Bearing Pads
Replace this subsection with the following:

M9.14.5: Elastomeric Bearing Pads

A. General Requirements

Elastomeric bearing pads shall be plain or laminated. They shall meet the applicable requirements of AASHTO M 251, the MassDOT Bridge Manual, and the AASHTO LRFD Bridge Design and Construction Specifications. The type of bearing will be specified on the plans.

Laminated elastomeric bearing pads consist of layers of elastomers restrained at their interfaces by bonded metal laminates.

B. Material Requirements

Plain elastomeric bearing pads shall consist of elastomer.

Laminated elastomeric bearing pad shall consist of:

- Elastomer
- Internal Steel Laminates
- Tapered Internal Load Plates (if used)

The components of the elastomeric bearing pad shall conform to AASHTO M 251 and the following:

- The elastomer compound shall be 100% virgin neoprene and classified as being of low-temperature grade 3.
- The steel laminates shall meet the requirements of ASTM A 1011 Grade 36 or higher

C. Material Qualification

Elastomeric bearing pads shall be approved on a project basis. The Contractor shall furnish to the Research and Materials Section certified independent test reports demonstrating conformance. All testing shall be performed by the same independent lab in accordance with Subsection M9.14.5G.

D. Fabricators

Bearing shall be fabricated by a fabricator listed on the MassDOT Qualified Construction Materials List (QCML).

E. Fabrication

Fabrication shall not begin until the shop drawings have been approved and the Department has an inspector at the fabricator's facility.

The shop drawings shall specify bearing dimensions as shown on the plans and, where applicable, shall include:

- Elastomer thickness and edge cover,
- Number and thickness of steel reinforcing laminates,
- Dimensions of load plates (if any),
- Design shear modulus of the elastomer shall be as shown on the Plans.

Plain elastomeric bearing pads shall be fabricated and tested in accordance with the "Method A" design outlined in the AASHTO LRFD Bridge Design Specifications.

Laminated elastomeric bearing pads shall be fabricated and tested in accordance with the "Method B" design outlined in the AASHTO LRFD Bridge Design Specifications.

The manufacturer shall designate the bearings in each Lot, as described in Subsection M9.14.5G, and certify that each bearing in the Lot was manufactured in a reasonably continuous manner from the same batch of elastomer and cured under the same conditions. In addition, the manufacturer shall certify that each bearing in the Lot satisfies the requirements of this specification, AASHTO M 251, the AASHTO LRFD Bridge Construction Specifications, and the contract plans and documents.

The tolerances on the overall dimensions for the bearings shall be according to Table 2 of AASHTO M 251, except that the tolerance on the overall vertical dimension shall be limited to 0, +1/8" regardless of the design thickness.

All steel included in the final bearing product must conform to Buy America Requirements.

F. Packaging, Handling, & Storage

The bearing pads shall be packaged, handled, and stored as specified below:

Prior to shipment from the point of manufacture, bearings shall be packaged in such a manner to ensure that during shipment and storage the bearings will be protected against damage from handling, weather, or any normal hazard. Each completed bearing shall have its components clearly identified, be securely bolted, strapped, or otherwise fastened to prevent any relative movement, and be marked on it top as to location and orientation in each structure in the project in conformity with the contract documents.

Each elastomeric bearing shall be marked in indelible ink or flexible paint. The marking shall consist of the order number, lot number, bearing identification number, and elastomer type and grade per AASHTO M 251. For bearing pads fabricated with a tapered internal load plate, a 1/32" deep direction arrow shall be inscribed into the bearing which will allow the bearing to be aligned with the up-station direction. All marks shall be permanent and be visible after the bearing is installed.

G. Testing Requirements

Quality Control System

Fabricators shall perform Quality Control (QC) testing in accordance with their quality system. QC test reports shall accompany the bearing pads when delivered to the project.

Acceptance System

MassDOT will evaluate the fabricator's quality system and QC test reports. It will also perform its own testing and verify the independent laboratory's test reports, if applicable.

Lot Sizes

Sampling of bearing pads for testing shall be random and performed on a Lot basis. A Lot of bearings shall be a group of 100 or fewer bearings that are:

- For a single contract,
- Cured under the same conditions,
- The same size and configuration,
- Manufactured in a reasonably continuous manner from the same batch of elastomer.

Testing of Plain Bearings

Testing Laboratory

Plain elastomeric bearing pads shall be tested by both an independent laboratory and MassDOT:

- Independent testing shall be performed by a nationally recognized third-party laboratory approved by the Research & Materials Section.
- Acceptance testing shall be performed by the Research and Materials.

Sampling Frequency

Each Lot of plain bearings shall be randomly sampled for testing. The Contractor shall ensure that the fabricator produces the additional bearings required for testing.

Samples for independent testing shall be selected by the fabricator. The sampling rate for the independent

testing shall be as follows:

- Lot sizes less than 10 bearings – One full-size bearing per Lot.
- Lot sizes greater than or equal to 10 bearings – Two full-size bearings per lot.

Samples for Acceptance testing shall be selected by the Engineer. The sampling rate for Acceptance testing shall be one bearing pad per lot.

Testing Requirements

The laboratory shall test the bearings in accordance with Sections 8 and 9 of AASHTO M 251 as specified below:

1. Dimensions per Section 8.4.
2. Elastomer per Section 8.6.
    - The hardness, tensile strength, and ultimate elongation shall be in accordance with Table 1 of AASHTO M 251.
3. Test procedures per Section 8.9.
    - Heat resistance per Section 8.9.3.

Testing of Laminated Bearings

Testing Laboratory

Laminated elastomeric bearing pads shall be tested by both an independent laboratory and MassDOT:

- Independent testing shall be performed by a nationally recognized third-party laboratory approved by the Research & Materials Section.
- Acceptance testing shall be performed by the Research and Materials.

Sampling Frequency

Each Lot of laminated bearings shall be randomly sampled for testing. The Contractor shall ensure that the fabricator produces the additional bearings required for testing.

Samples for independent testing shall be selected by the fabricator. The sampling rate for the independent testing shall be as follows:

- Lot sizes less than 10 bearings – One full-size bearing per Lot.
- Lots sizes greater than or equal to 10 bearings:
    - One full-size bearing per every twenty per lot, or a minimum of two bearings.
    - The number of laminated bearings to sample shall be determined by taking the Lot size divided by 20. If the integer part of this calculation is 0 or 1, then two bearings shall be sampled. For example, if the lot size is 58 laminated bearings, two bearings shall be sampled; if the lot size is 65, three bearings shall be sampled; and if the lot size is 22, two bearings shall be sampled.

Samples for Acceptance testing shall be selected by the Engineer. The sampling rate for Acceptance testing shall be one bearing pad per lot.

Testing Requirements

Testing of the bearings shall be in accordance with Sections 8 and 9 of AASHTO M 251 as specified below:

1. Dimensions per Section 8.4.
2. Elastomer per Section 8.6.
    - The hardness, tensile strength, and ultimate elongation shall be in accordance with Table 1 of AASHTO M 251.
3. Compressive strain at the maximum design dead plus live service compressive load per Section 8.8.1.1.

- The compressive deflection, as determined per Section 9.1., between the two loadings for each bearing tested shall not exceed 10%.

4. Bond via Compressive Load per Section 8.8.2.2.
5. Shear Modulus of the elastomer per Section 8.8.3.
   - Shear modulus shall meet the requirements on the plans.
6. Test procedures per Section 8.9.
   a. Additional Low Temperature Shear Modulus testing per Section 8.9.1.
   b. Heat resistance per Section 8.9.3.
   c. Compression set per Section 8.9.4.
   d. Creep per Section 8.9.5.
      - The percent creep shall be less than 35%.
   e. Long Term Compression per Section 8.9.6.

Table M9.14.5-1: Department Acceptance Testing of Elastomeric Bearing Pads

Quality Characteristic	**Test Method**	**Requirement**
Hardness	ASTM D2240	From Independent Test Results ± 5 Pts
Tensile Strength	ASTM D412	≥ 2250 psi
Ultimate Elongation	ASTM D412	Minimum Elongation Based on Durometer according to AASHTO M 251 Table 1
Shear Modulus (see Note 1)	ASTM D4014	Specified Value ± 15%
After Heat Aging for 70 Hours at 100°C (Maximum Change from Unaged Testing)		
Hardness	ASTM D573	Hardness + 15 Pts
Tensile Strength	ASTM D573	Tensile Strength - 15%
Ultimate Elongation	ASTM D573	Ultimate Elongation - 40%
Note 1: Test is only required for laminated elastomeric bearing pads.		

SECTION M10: TRAFFIC CONTROL DEVICES

Subsection M10.05.0: Traffic Signal Structures (General)
Add this new subsection.

M10.05.0: Traffic Signal Structures (General)

The bases of all Traffic Signal Structures shall be supplied with a bonding lug.

Subsection M10.05.1: Signal Posts and Bases
Add this new subsection.

M10.05.1: Signal Posts and Bases

All Signal Posts shall be one-piece 4-in. diameter, Schedule 40 or Schedule 80, and machine-threaded.

Signal Posts may be fabricated from aluminum with a brushed or spun finish or from steel with a galvanized finish.

The interior of Signal Posts shall be coated as specified in Underwriters Laboratories UL-6 for enameled conduit, or aluminum conduit conforming to M5.07.1: Electrical Conduit-Rigid Metallic (Type RM), Paragraph C.

Signal Posts Bases shall be fabricated to accept the threads from the Signal Post and locked into place with set screws.

Signal Post Bases shall be fabricated from aluminum with a natural or anodized finish or galvanized cast iron.

Signal Post Bases shall be square or octagonal.

Signal Posts and Bases conform to Table M10.05.1-1.

Table M10.05.1-1: Signal Post and Base Material Requirements

Component	Material	Specification
Signal Post	Aluminum	6063-T6 (ASTM B221, B429 or B241)
Signal Post	Steel	ASTM A53, Grade A or B
Signal Post Base	Aluminum	356.0-T6 (ASTM B26, B108)
Signal Post Base	Cast Iron	AASHTO M 105

Subsection M10.11.0: RRFB Assemblies
Add this new subsection.

M10.11.0: RRFB Assemblies

Rectangular Rapid Flashing Beacon (RRFB) Assemblies shall consist of a Light Bar and an enclosure for the Controller and Activation Unit.

Light Bar

The Light Bar shall consist of two rapidly-flashed rectangular-shaped yellow indications, each with an LED-array based pulsing light source. The size of each RRFB indication shall conform to the Construction Standard Details.

The light intensity of the yellow indications during daytime conditions shall meet the minimum specifications for Class 1 yellow peak luminous intensity in the publication "Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles J595," 2005, Society of Automotive Engineers (SAE). A photocell or equivalent device shall be included to reduce the brilliance of the LED beacons during nighttime conditions.

Controller and Activation Unit

The enclosure for the Controller and Activation Unit shall be NEMA rated for outdoor use and protection against rain and sleet.

The Controller and Activation Unit shall be powered by a DC battery/solar array system or a 120 VAC service connection.

The Controller and Activation Unit shall be actuated by a pedestrian pushbutton, a passive pedestrian detection device, or both.

Communications between multiple units within the same system shall be via a 900MHz or 2.4 GHz frequency hopping spread spectrum with a minimum range of 200 ft. Multiple channels shall be available to prevent cross-communication between multiple systems located close to each other.

The Controller shall be programmable via an on-board user interface or a no-fee wireless (Wi-Fi, Bluetooth®, etc.) connection and application.

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END OF SUPPLEMENTAL SPECIFICATIONS

DOCUMENT 00719

(Revised September 14, 2023 – for all Federally Aided Projects)

SPECIAL PROVISIONS FOR PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES

(IMPLEMENTING TITLE 49 OF THE CODE OF FEDERAL REGULATIONS, PART 26)

Section: Page 00719-

POLICY

The Massachusetts Department of Transportation (MassDOT) receives Federal financial assistance from the Federal Highway Administration (FHWA), United States Department of Transportation (U.S. DOT), and as a condition of receiving this assistance, has signed an assurance that it will comply with 49 CFR Part 26 (Participation By Disadvantaged Business Enterprises In Department Of Transportation Financial Assistance Programs). The U.S. DOT Disadvantaged Business Enterprise Program is authorized by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users ("SAFETEA-LU"), as amended, at Title 23, United States Code, § 1101.

Accordingly, MassDOT has established a Disadvantaged Business Enterprise (DBE) Program in accordance with 49 CFR Part 26. It is the policy of MassDOT to ensure that DBEs have an equal opportunity to receive and participate in U.S. DOT assisted Contracts, without regard to race, color, national origin, or sex. To this end, MassDOT shall not directly, or through contractual or other arrangements, use criteria or methods of administration that have the effect of defeating or substantially impairing accomplishment of the program objectives stated below:

- To ensure nondiscrimination in the award and administration of U.S. DOT assisted Contracts;
- To create a level playing field on which DBEs can compete fairly for U.S. DOT assisted Contracts;
- To ensure that the DBE Program is narrowly tailored in accordance with applicable law;
- To ensure that only firms that fully meet 49 CFR Part 26 eligibility standards are permitted to participate as DBEs;
- To help remove barriers to the participation of DBEs in U.S. DOT assisted Contracts; and
- To assist the development of firms that can compete successfully in the market place outside the DBE Program.

The Director of Civil Rights of MassDOT has been designated as the DBE Liaison Officer. The DBE Liaison Officer is responsible for implementing all aspects of the DBE Program. Other MassDOT employees are responsible for assisting the Office of Civil Rights in carrying out this obligation. Implementation of the DBE Program is accorded the same priority as compliance with all other legal obligations incurred by MassDOT in its financial assistance agreements with each operating administration of the U.S. DOT. Information on the Federal requirements and MassDOT's policies and information can be found at:

Type of Info	***Website***	***Description***
MassDOT Highway Division Policies and Info	https://www.mass.gov/disadvantaged-business-enterprise-goals-2019-2022	*MassDOT–Highway Div'n Page*
For copies of the Code of Federal Regulations	http://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR	FDsys – US Gov't Printing Office
For information about the U.S.DOT DBE Program	https://www.transportation.gov/civil-rights/disadvantaged-business-enterprise	U.S. DOT/ FHWA page

1. DEFINITIONS

As used in these provisions, the terms set out below are defined as follows:

"Broker", for purposes of these provisions, shall mean a DBE Entity that has entered into a legally binding relationship to provide goods or services delivered or performed by a third party. A broker may be a DBE Entity that arranges or expedites transactions but performs no work or installation services.

"Contractor", "General" or "Prime" Contractor, "Bidder," and "DB Entity" shall mean a person, firm, or other entity that has contracted directly with MassDOT to provide contracted work or services.

"Contract" shall mean the Contract for work between the Contractor and MassDOT.

"DBB" or "Design-Bid-Build" shall mean the traditional design, bid and project delivery method consisting of separate contracts between awarding authority and a designer resulting in a fully designed project; and a separate bidding process and Contract with a construction Contractor or Bidder.

"DB" or "Design-Build" shall mean an accelerated design, bid and project delivery method consisting of a single contract between the awarding authority and a DB Entity, consisting of design and construction companies that will bring a project to full design and construction.

"Disadvantaged Business Enterprise" or "DBE" shall mean a for-profit, small business concern:

(a) that is at least fifty-one (51%) percent owned by one or more individuals who are both socially and economically disadvantaged, or, in the case of any corporation, in which at least fifty-one (51%) percent of the stock is owned by one or more such individuals; and

(b) where the management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.

"FHWA" shall mean the Federal Highway Administration," an agency within U.S. DOT that supports State and local governments in the design, and maintenance of the Nation's highway system (Federal Aid Highway Program).

"Good faith efforts" shall mean efforts to achieve a DBE participation goal or other requirement of these Special Provisions that, by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement. Such efforts must be deemed acceptable by MassDOT.

"Joint Venture" shall mean an association of a DBE firm and one or more other firms to carry out a single, for-profit business enterprise, for which the parties combine their property, capital, efforts, skills and knowledge, and in which the DBE is responsible for a distinct, clearly defined portion of the work of the Contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.

"Approved Joint Venture" shall mean a joint venture, as defined above, which has been approved by MassDOT's Prequalification Office and Office of Civil Rights for DBE participation on a particular Contract.

"Manufacturer" shall mean a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles or equipment required under the contract and of the general character described by the specifications.

"Regular Dealer" shall mean a DBE firm that owns, operates, or maintains a store, warehouse, or other establishment in which materials, supplies, articles or equipment of the general character described by the specifications and required under the Contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business.

(a) To be a regular dealer, the firm must be an established, regular business that engages, as its principal business, and under its own name, in the purchase and sale of the products in question.

(b) A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provided above if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment shall be by long term lease agreement and not on an ad hoc or contract by contract basis.

(c) Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this definition.

"Responsive" and "Responsible" refers to the bidder's submittal meeting all of the requirements of the advertised request for proposal. The term responsible refers to the ability of the Contractor to perform the work. This ability can be determined prior to bid invitations.

"Small Business or Small Business Concern" shall mean a small business concern or company as defined in Section 3 of the Small Business Act and SBA regulations implementing it (13 CFR Part 121); and is a business that does not exceed the cap on annual average gross receipts established by the U.S. Secretary of Transportation pursuant to 49 CFR Part 26.65; see also 49 CFR Part 26.39.

"SDO" shall mean the Massachusetts Supplier Diversity Office, formerly known as the State Office of Minority and Women Business Assistance (SOMWBA). In 2010, SOMWBA was abolished and the SDO was established. *See* St. 2010, c. 56. The SDO has assumed all the functions of SOWMBA. SDO is an agency within the Commonwealth of Massachusetts Executive office of Administration and Finance (ANF) Operational Services Division (OSD). The SDO mandate is to help promote the development of business enterprises and non-profit organizations owned and operated by minorities and women.

"Socially and economically disadvantaged individuals" shall mean individuals who are citizens of the United States (or lawfully admitted permanent residents) and who are:

(a) Individuals found by SDO to be socially and economically disadvantaged individuals on a case by case basis.

(b) Individuals in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:

(1) "Black Americans" which includes persons having origin in any of the Black racial groups of Africa; (2) "Hispanic Americans" which include persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race; (3) "Native Americans" which include persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians; (4) "Asian Pacific Americans" which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Tuvalu, Nauru, Federated States of Micronesia, or Hong Kong; (5) "Subcontinent Asian Americans" which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka; (6) Women; or (7) Any additional groups whose members are designated as socially and economically disadvantaged by the Small Business Administration (SBA), at such time as the SBA designation becomes effective.

Other terms and definitions applicable to the U.S. DOT DBE Program may be found at 49 CFR Part 26 and related appendices and guidance pages.

2. DBE PARTICIPATION

a. Goal

On this Contract, MassDOT has established the following goal(s) for participation by firms owned and controlled by socially and economically disadvantaged persons. At least half of the goal must be met in the form of DBE Subcontractor construction activity as opposed to material supplies or other services. The applicable goal remains in effect throughout the life of the contract regardless of whether pre-identified DBE Subcontractors remain on the Project or under Contract.

☒ Design-Bid-Build Projects: DBE Participation Goal **11 %**
(*One half of this goal shall be met in the form of Subcontractor construction activity*)

☐ Design-Build Projects: DBE Design Participation Goal ____**%** and DBE Construction Participation Goal **%**
(One half of the Construction Goal shall be met in the form of Subcontractor construction activity)

b. Bidders List

Pursuant to the provisions of 49 CFR Part 26.11(c), Recipients such as MassDOT, must collect from all Bidders who seek work on Federally assisted Contracts the firm full company name(s), addresses and telephone numbers of all firms that have submitted bids or quotes to the Bidders in connection with this Project. All bidders should refer to the Special Provision Document "A00801" of the Project proposal for this requirement.

In addition, MassDOT must provide to U.S. DOT, information concerning contractors firm status as a DBE or non-DBE, the age of the firm, and the annual gross receipts of the firm within a series of brackets (e.g., less than $500,000; $500,000–$1 million; $1–2 million; $2–5 million, etc.). The status, firm age, and annual gross receipt information will be sought by MassDOT regularly prior to setting its DBE participation goal for submission to U.S. DOT. MassDOT will survey each individual firm for this information directly.

Failure to comply with a written request for this information within fifteen (15) business days may result in the suspension of bidding privileges or other such sanctions, as provided for in Section 9 of this provision, until the information is received.

3. CONTRACTOR ASSURANCES

No Contractor or any Subcontractor shall discriminate on the basis of race color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in all respects and as applicable prior to, or subsequent to, award of U.S. DOT assisted Contracts. The Contractor agrees to affirmatively seek out and consider DBE firms as Contractors, Subcontractors, and/or suppliers of materials and services for this Contract. No Contract will be approved until MassDOT has reviewed Bidders'/Contractors' affirmative actions concerning DBEs. Failure to carry out these requirements is a material breach of this Contract which may result in the termination of the Contract or such other remedy as MassDOT or FHWA deem appropriate.

4. REQUIRED SUBCONTRACT PROVISIONS

The Prime Contractor shall include the provisions of Section 3 above in every subcontract, making those provisions binding on each Subcontractor; in addition, the Prime Contractor shall include a copy of this Special Provision, in its entirety, in every subcontract with a DBE firm which is, or may be, submitted for credit toward the Contract participation goal.

5. ELIGIBILITY OF DBES

Only firms that have been certified by SDO and confirmed by MassDOT as eligible in accordance with 49 CFR Part 26 to participate as DBEs on federally aided MassDOT Contracts may be used on this Contract for credit toward the DBE participation goal.

a. Massachusetts DBE Directory

MassDOT makes available to all bidders the most current Massachusetts Disadvantaged Business Enterprise Directory. This directory is made available for Contractors' convenience and is informational only. The Directory lists those firms that have been certified as eligible in accordance with the criteria of 49 CFR Part 26 to participate as DBEs on federally aided MassDOT contracts. The Directory also lists the kinds of work each firm is certified to perform but does not constitute an endorsement of the quality of performance of any business and does not represent MassDOT Subcontractor approval.

Contractors are encouraged to make use of the DBE Directory maintained by SDO on the Internet. This listing is updated daily and may be accessed at the SDO's website at:
https://www.diversitycertification.mass.gov/BusinessDirectory/BusinessDirectorySearch.aspx

b. DBE Certification

A firm must apply to SDO, currently acting as certification agent for MassDOT, for DBE certification to participate on federally aided MassDOT Contracts. A DBE application may be made in conjunction with a firm's application to SDO for certification to participate in state-funded minority and women business enterprise programs or may be for DBE certification only. An applicant for DBE certification must identify the area(s) of work it seeks to perform on U.S. DOT funded projects.

c. Joint Venture Approval

To obtain recognition as an approved DBE Joint Venture, the parties to the joint venture must provide to MassDOT's Office of Civil Rights and Prequalification Office, at least fourteen (14) business days before the bid opening date, an Affidavit of DBE/Non-DBE Joint Venture in the form attached hereto, and including, but not limited to the following:

1. a copy of the Joint Venture Agreement;
2. a description of the distinct, clearly defined portion of the contract work that the DBE will perform with its own forces; and,
3. all such additional information as may be requested by MassDOT for the purpose of determining whether the joint venture is eligible.

6. COUNTING DBE PARTICIPATION TOWARDS DBE PARTICIPATION GOALS

In order for DBE participation to count toward the Contract participation goal, the DBE(s) must have served a commercially useful function in the performance of the Contract and must have been paid in full for acceptable performance.

a. Commercially Useful Function

(1) In general, a DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. With respect to materials and supplies used on the Contract, the DBE must be responsible for negotiating price, determining quality and quantity, ordering the material, installing (where applicable) and paying for the material itself.

(2) To determine whether a DBE is performing a commercially useful function, MassDOT will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the Contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and other relevant factors.

(3) A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation. In determining whether a DBE is such an extra participant, MassDOT will examine similar transactions, particularly those in which DBEs do not participate.

b. Counting Participation Toward The Contract Participation Goal

DBE participation which serves a commercially useful function shall be counted toward the DBE participation goal in accordance with the Provisions of 49 CFR Part 26.55(a) to (h), as follows:

(1) When a DBE participates in a construction Contract, MassDOT will count the value of the work performed by the DBE's own forces. MassDOT will count the cost of supplies and materials obtained by the DBE for the work of its contract, including supplies purchased or equipment leased by the DBE. Supplies, labor, or equipment the DBE Subcontractor uses, purchases, or leases from the Prime Contractor or any affiliate of the Prime Contractor will not be counted.

(2) MassDOT will count the entire amount of fees or commissions charged by a DBE firm for providing bona fide services, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a U.S. DOT assisted Contract, toward DBE participation goals, provided it is determined that the fee is reasonable and not excessive as compared with fees customarily allowed for similar services.

(3) When a DBE performs as a participant in a joint venture, MassDOT will count toward DBE participation goals a portion of the total dollar value of the contract that is equal to the distinct, clearly defined portion of the work of the Contract that the DBE performs with its own forces.

(4) MassDOT will use the following factors in determining whether a DBE trucking company is performing a commercially useful function:

(i) the DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract; there cannot be a contrived arrangement for the purpose of meeting DBE participation goals.

(ii) the DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the Contract.

(iii) the Contractor will receive DBE credit for the total value of the transportation services the DBE provides on the Contract using trucks owned, insured, and operated by the DBE itself and using drivers the DBE employs alone.

(iv) the DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The Contractor who has a contract with a DBE who leases trucks from another DBE will receive credit for the total value of the transportation services of the lease.

(v) the DBE may also lease trucks from a non-DBE firm, including an owner-operator. The Contractor who has a Contract with a DBE who leases trucks from a non-DBE is entitled to credit for the total value of the transportation services provided by non-DBE lessees not to the exceed the value of transportation services provided by DBE-owned trucks on the Contract. Additional participation by non-DBE lessees receives credit only for the fee or commission it receives as a result of the lease arrangement, fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE.

(vi) the lease must indicate that the DBE has exclusive use of, and control over, the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

(5) MassDOT will count the Prime Contractor's expenditures with DBEs for materials or supplies toward DBE participation goals as follows:

(i) if the materials or supplies are obtained from a DBE manufacturer, as defined in Section 1 above, MassDOT will count one hundred (100%) percent of the cost of the materials or supplies toward DBE participation goals, provided the DBE meets the other requirements of the regulations.

(ii) if the materials or supplies are purchased from a DBE regular dealer, as defined in Section 1 above, MassDOT will count sixty (60%) percent of the cost of the materials or supplies toward the Contract participation goal, provided the DBE meets the other requirements of the regulations.

(iii) for materials or supplies purchased from a DBE which is neither a manufacturer nor a regular dealer, MassDOT will count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site toward the Contract participation goal, provided that MassDOT determines the fees to be reasonable and not excessive as compared with fees customarily allowed for similar services; the cost of the materials and supplies themselves will not be counted; and provided the DBE meets the other requirements of the regulations.

c. Joint Check Policy

MassDOT recognizes that the use of joint checks may be a business practice required by material suppliers and vendors in the construction industry. A joint check is a two-party check issued by a/the Prime Contractor to a DBE third party such as a regular dealer of material or supplies. The Prime Contractor issues the check as payor to the DBE and the third party jointly as payees to guarantee payment to the third party for materials or supplies obtained or to be used by the DBE. FHWA has established criteria to ensure that DBEs are in fact performing a commercially useful function ("CUF") while using a joint check arrangement. Contractors and DBEs must meet and conform to these conditions and criteria governing the use of joint checks.

In the event that a Contractor or DBE Subcontractor desires to a use joint check, MassDOT will require prior notice and will closely monitor the arrangement for compliance with FHWA regulations and guidance. MassDOT may allow a joint check arrangement and give credit to a Contractor for use of the DBE where one or more of the following conditions exist:

- The use of a joint check is in fact required by this type of vendor or supplier as a standard industry practice that applies to all Contractors (DBEs and non-DBEs); or is required by a specific vendor or supplier;
- Payment for supplies or materials would be delayed for an unreasonably extended period without the joint check arrangement;
- The DBE (or any of its Subcontractors) has a pattern or history of not paying a vendor or supplier within a reasonable time or has not established enough of a credit history with the supplier or vendor; and/or
- The presence of severe adverse economic conditions, where credit resources may be limited and such practices may be necessary or required to effect timely payments.

Other factors MassDOT may consider:

- Whether there is a requirement by the Prime Contractor that a DBE should use a specific vendor or supplier to meet their Subcontractor specifications;
- Whether there is a requirement that a DBE use the Prime Contractor's negotiated price;
- The independence of the DBE;
- Whether approval has been sought prior to use of a joint check arrangement; and
- Whether any approved joint check arrangement has exceeded a reasonable period of use;
- The operation of the joint check arrangement; and
- Whether the DBE has made an effort to establish alternate arrangements for following periods (i.e., the DBE must show it can, or has, or why it has not, established or increased a credit line with the vendor or supplier).

Even with the use of a Joint Check, both the Contractor and DBE remain responsible for compliance with all other elements under 49 CFR § 26.55 (c) (1), and must still be able to prove that a commercially useful function is being performed for the Contractor.

d. Joint Check Procedure(s)

- The DBE advises its General or Prime Contractor that it will have to use a Joint Check and provide proof of such requirement.
- The General or the Prime Contractor submits a request for approval to MassDOT, using MassDOT's approved Joint Check Request form (Document B00855) and by notification on the DBE Letter of Intent (Document B00854), and any other relevant documents. Requests that are not initiated during the bid process should be made in writing and comply with the procedure.
- The MassDOT Office of Civil Rights will review the request and render a decision as part of the approval process for DBE Schedules and Letters of Intent.
- Review and Approval will be project specific and relevant documents will be made part of the project Contract file.
- Payments should be made in the name of both the DBE and vendor or supplier. Payments should be issued and signed by the Contractor as only the guarantor for prompt payment of purchases to the vendor or supplier. The payment to the vendor or supplier should be handled by the DBE (i.e. if possible, funds or the joint check should be processed by the DBE and sent by the DBE to the vendor or supplier).
- MassDOT may request copies of cancelled checks (front and back) and transmittal information to verify any payments made to the DBE and vendor or supplier.
- MassDOT may request other information and documents, and may ask questions of the Contractor, Subcontractor and vendor or supplier prior to, during, and after the project performance to ascertain whether the Subcontractor is performing a commercially useful function and all parties are complying with DBE Program policies and procedures as part of the Subcontractor approval process.

7. AWARD DOCUMENTATION AND PROCEDURES

a. The two lowest bidders/the two bidders with the lowest price per quality score point, shall submit, by the close of business on the third (3rd) business day after the bid opening, a completed Schedule of Participation by DBEs (Document B00853) which shall list:

(1) The full company name, address and telephone number of each DBE with whom the bidder intends to make a commitment.

(2) The contract item(s), by number(s) and quantity(ies), if applicable, or specific description of other business activity to be performed by each DBE as set forth in the Letters of Intent. The Bidder shall list only firms which have the capacity to perform, manage and supervise the work proposed in accordance with the requirements of 49 CFR Part 26 and Section **6.b** of these Special Provisions.

(3) The total dollar amount to be paid to each DBE. (Bidders are cautioned that at least one half of the participation goal must be met with construction activity work.)

(4) The total dollar amount to be paid to each DBE that is eligible for credit toward the DBE participation goal under the counting rules set out in Section **6.b**.

(5) The total creditable DBE participation as a percentage of the total bid price.

b. All firms listed on the Schedule must be currently certified.

c. The two lowest bidders/the two bidders with the lowest price per quality score point, shall each submit, with their Schedules of Participation, fully completed, signed Letters of Intent (Document B00854) from each of the DBEs listed on the Schedule. The Letters of Intent shall be in the form attached and shall identify specifically the contract activity the DBE proposes to perform, expressed as contract item number, if applicable, description of the activity, NAICS code, quantity, unit price and total price. In the event of discrepancy between the Schedule and the Letter of Intent, the Letter of Intent shall govern.

d. Evidence of good faith efforts will be evaluated by MassDOT in the selection of the lowest responsible bidder.

All information requested by MassDOT for the purpose of evaluating the Contractor's efforts to achieve the participation goal must be provided within three (3) calendar days and must be accurate and complete in every detail. The apparent low bidder's attainment of the DBE participation goal or a satisfactory demonstration of good faith efforts is a prerequisite for award of the Contract.

e. Failure to meet, or to demonstrate good faith efforts to meet, the requirements of these Special Provisions shall render a bid non-responsive. Therefore, in order to be eligible for award, the bidder (1) must list all DBE's it plans to employ on the Schedule of Participation; and provide the required Letters of Intent for, DBE participation which meets or exceeds the Contract goal in accordance with the terms of these Special Provisions or (2) must demonstrate, to the satisfaction of MassDOT, that good faith efforts were made to achieve the participation goal. MassDOT will adhere to the guidance provided in Appendix A to 49 CFR Part 26 on the determination of a Contractor's good faith efforts to meet the DBE participation goal(s) set forth in Section 2 herein.

f. If MassDOT finds that the percentage of DBE participation submitted by the bidder on its Schedule does not meet the Contract participation goal, or that Schedule and Letters of Intent were not timely filed, and that the bidder has not demonstrated good faith efforts to comply with these requirements, it shall propose that the bidder be declared ineligible for award. In that case, the bidder may request administrative reconsideration. Such requests must be sent in writing within three (3) calendar days of receiving notice of proposed ineligibility to: The Office of the General Counsel, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA, 02116.

g. If, after administrative reconsideration, MassDOT finds that the bidder has not shown that sufficient good faith efforts were made to comply with the requirements of these Special Provisions, it shall reject the bidder's proposal and may retain the proposal guaranty.

h. Actions which constitute evidence of good faith efforts to meet a DBE participation goal include, but are not limited to, the following examples, which are set forth in 49 CFR Part 26, Appendix A:

(1) Soliciting through all reasonable and available means (e.g., attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform the work of the Contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.

(2) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE participation goal will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the Prime Contractor might otherwise prefer to perform these work items with its own forces.

(3) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(4) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE Subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE Subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone number of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

A bidder using good business judgment would consider a number of factors in negotiating with Subcontractors, including DBE Subcontractors, and would take a firm's price and capabilities as well as Contract participation goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the Contract DBE participation goal, as long as such costs are reasonable. Also, the ability or desire of a Prime Contractor to perform the work of a Contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Prime Contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

(5) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. Contractors should be careful of adding additional requirements of performance that would in effect limit participation by DBEs or any small business. The Contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. nonunion employee status) are not legitimate causes for the rejection or non-solicitation of bids in the Contractor's efforts to meet the Contract participation goal.

(6) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.

(7) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

(8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case by case basis to provide assistance in the recruitment and placement of DBEs.

8. COMPLIANCE

a. All activity performed by a DBE for credit toward the Contract participation goal must be performed, managed and supervised by the DBE in accordance with all commercially useful function requirements of 49 CFR Part 26. The Prime Contractor shall not enter into, or condone, any other arrangement.

b. The Prime Contractor shall not perform with its own organization, or assign to any other business, an activity designated for the DBE(s) named on the Schedule(s) submitted by the Prime Contractor under Section 7 or under paragraph **8.f** of this section, without the approval of MassDOT in accordance with the requirements of paragraphs **8.f** and **8.j** of this section.

c. MassDOT may suspend payment for any activity that was not performed by the DBE to whom the activity was committed on the approved Schedule of Participation, or that was not performed in accordance with the requirements of Section 6.

d. MassDOT retains the right to approve or disapprove of any or all Subcontractors. Requests by the Prime Contractor for approval of participation by a DBE Subcontractor for credit toward the Contract participation goal must include, in addition to any other requirements for Subcontractor approval, the following:

(1) A copy of the proposed subcontract. The subcontract must be for at least the dollar amount, and for the work described, in the Bidder's Schedule of Participation.

(2) A resume stating the qualifications and experience of the DBE Superintendent and/or foreperson who will supervise the on-site work. A new resume will be required for any change in supervisory personnel during the progress of the work.

(3) A Schedule of Operations indicating when the DBE is expected to perform the work.

(4) A list of (1) equipment owned by the DBE to be used on the Project, and (2) equipment to be leased by the DBE for use on the Project.

(5) A list of: (1) all projects (public and private) which the DBE is currently performing; (2) all projects (public and private) to which the DBE is committed; and (3) all projects (public and private) to which the DBE intends to make a commitment. For each Contract, list the contracting organization, the name and telephone number of a contact person for the contracting organization, the dollar value of the work, a description of the work, and the DBE's work schedule for each project.

e. If, pursuant to the Subcontractor approval process, MassDOT finds that a DBE Subcontractor does not have sufficient experience or resources to perform, manage and supervise work of the kind proposed in accordance with the requirements of 49 CFR Part 26, approval of the DBE Subcontractor may be denied. In the event of such denial, the Prime Contractor shall proceed in accordance with the requirements paragraphs **8.f** and **8.j** of this section.

f. If, for reasons beyond its control, the Prime Contractor cannot comply with its DBE participation commitment in accordance with the Schedule of Participation submitted under Section 7, the Prime Contractor shall submit to MassDOT the reasons for its inability to comply with its obligations and shall submit, and request approval for, a revised Schedule of Participation. If approved by MassDOT, the revised Schedule shall govern the Prime Contractor's performance in meeting its obligations under these Special Provisions.

g. A Prime Contractor's compliance with the participation goal in Section 2 shall be determined by reference to the established percentage of the total contract price, provided, however, that no decrease in the dollar amount of a bidder's commitment to any DBE shall be allowed without the approval of MassDOT.

h. If the contract amount is increased, the Prime Contractor may be required to submit a revised Schedule of Participation in accordance with paragraphs **8.f** and **8.j** of this section.

i. In the event of the decertification of a DBE scheduled to participate on the Contract for credit toward the participation goal, but not under subcontract, the Contractor shall proceed in accordance with paragraphs **8.f** and **8.j** of this section.

j. The Prime Contractor shall notify MassDOT immediately of any facts that come to its attention indicating that it may or will be unable to comply with any aspect of its DBE obligation under this Contract.

k. Any notice required by these Special Provisions shall be given in writing to: (1) the Resident Engineer; (2) the District designated Compliance Officer; and (3) the DBE Liaison Officer, MassDOT Office of Civil Rights, 10 Park Plaza, – 3rd Floor - West, Boston, MA, 02116 and cc'd to the Deputy Chief of External Programs.

l. The Prime Contractor and its Subcontractors shall comply with MassDOT's Electronic Reporting System Requirements (MassDOT Document 00821) and submit all information required by MassDOT related to the DBE Special Provisions through the Equitable Business Opportunity Solution ("EBO"). MassDOT reserves the right to request reports in the format it deems necessary anytime during the performance of the Contract.

m. Termination of DBE by Prime Contractor

(1) A Prime Contractor shall not terminate a DBE Subcontractor or an approved substitute DBE firm without the prior written consent of MassDOT. This includes, but is not limited to, instances in which a Prime Contractor seeks to perform work originally designated for a DBE Subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

(2) MassDOT may provide such written consent only if MassDOT agrees, for reasons stated in its concurrence document, that the Prime Contractor has good cause to terminate the DBE firm.

(3) For purposes of this paragraph, good cause includes the following circumstances:

(i) The DBE Subcontractor fails or refuses to execute a written contract;

(ii) The DBE Subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Good cause, however, does not exist if the failure or refusal of the DBE Subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Prime Contractor;

(iii) The DBE Subcontractor fails or refuses to meet the Prime Contractor's reasonable, nondiscriminatory bond requirements.

(iv) The DBE Subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;

(v) The DBE Subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1,200 or applicable State law;

(vi) (vii) MassDOT has determined that the listed DBE Subcontractor is not a responsible contractor;

(vii) The listed DBE Subcontractor voluntarily withdraws from the Project and provides written notice of its withdrawal;

(viii) The listed DBE is ineligible to receive DBE credit for the type of work required;

(ix) A DBE owner dies or becomes disabled with the result that the listed DBE Contractor is unable to complete its work on the Contract;

(x) Other documented good cause that MassDOT determines compels the termination of the DBE Subcontractor. Good cause, however, does not exist if the Prime Contractor seeks to terminate a DBE it relied upon to obtain the Contract so that the Prime Contractor can self-perform the DBE work or substitute another DBE or non-DBE Contractor after Contract Award.

(4) Before transmitting to MassDOT a request to terminate and/or substitute a DBE Subcontractor, the Prime Contractor must give notice in writing to the DBE Subcontractor, with a copy to MassDOT, of its intent to request to terminate and/or substitute, and the reason for the request.

(5) The Prime Contractor must give the DBE five (5) business days to respond to the Prime Contractor's notice. The DBE must advise MassDOT and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why MassDOT should not approve the Prime Contractor's action. If required in a particular case as a matter of public necessity (e.g., safety), MassDOT may provide a response period shorter than five (5) business days.

(6) In addition to post-award terminations, the provisions of this section apply to pre-award deletions of or substitutions for DBE firms.

n. Prompt Payment.

Contractors are required to promptly pay Subcontractors under this Prime Contract within ten (10) business days from the receipt of each payment the Prime Contractor receives from MassDOT. Failure to comply with this requirement may result in the withholding of payment to the Prime Contractor until such time as all payments due under this provision have been received by the Subcontractor(s) and/or referral to the Prequalification Committee for action which may affect the Contractor's prequalification status.

9. SANCTIONS

If the Prime Contractor does not comply with the terms of these Special Provisions and cannot demonstrate to the satisfaction of MassDOT that good faith efforts were made to achieve such compliance, MassDOT may, in addition to any other remedy provided for in the Contract, and notwithstanding any other provision in the Contract:

a. Retain, in connection with final acceptance and final payment processing, an amount determined by multiplying the total contract amount by the percentage in Section 2, less the amount paid to approved DBE(s) for work performed under the Contract in accordance with the provisions of Section 8.

b. Suspend, terminate or cancel this Contract, in whole or in part, and call upon the Prime Contractor's surety to perform all terms and conditions in the Contract.

c. In accordance with 720 CMR 5.05(1)(f), modify or revoke the Prime Contractor's Prequalification status or recommend that the Prime Contractor not receive award of a pending Contract. The Prime Contractor may appeal the determination of the Prequalification Committee in accordance with the provisions of 720 CMR 5.06.

d. Initiate debarment proceedings pursuant to M.G.L. c. 29 §29F and, as applicable, 2 CFR Parts 180, 215 and 1,200.

e. Refer the matter to the Massachusetts Attorney General for review and prosecution, if appropriate, of any false claim or pursuant to M.G.L. c. 12, §§ 5A to 5O (the Massachusetts False Claim Act).

f. Refer the matter to the U.S. DOT's Office of the Inspector General or other agencies for prosecution under Title 18, U.S.C. § 1001, 49 CFR Parts 29 and 31, and other applicable laws and regulations.

10. FURTHER INFORMATION; ENFORCEMENT, COOPERATION AND CONFIDENTIALITY.

a. Any proposed DBE, bidder, or Contractor shall provide such information as is necessary in the judgment of MassDOT to ascertain its compliance with the terms of this Special Provision. Further, pursuant to 49 CFR, Part 26.107:

(1) If you are a firm that does not meet the eligibility criteria of 49 CFR, Parts 26.61 to 26.73 ("subpart D"), that attempts to participate in a DOT- assisted program as a DBE on the basis of false, fraudulent, or deceitful statements or representations or under circumstances indicating a serious lack of business integrity or honesty, MassDOT or FHWA may initiate suspension or debarment proceedings against you under 49 CFR Part 29.

(2) If you are a firm that, in order to meet DBE Contract participation goals or other DBE Program requirements, uses or attempts to use, on the basis of false, fraudulent or deceitful statements or representations or under circumstances indicating a serious lack of business integrity or honesty, another firm that does not meet the eligibility criteria of subpart D, FHWA may initiate suspension or debarment proceedings against you under 49 CFR Part 29.

(3) In a suspension or debarment proceeding brought either under subparagraph a.(1) or b.(2) of this section, the concerned operating administration may consider the fact that a purported DBE has been certified by a recipient. Such certification does not preclude FHWA from determining that the purported DBE, or another firm that has used or attempted to use it to meet DBE participation goals, should be suspended or debarred.

(4) FHWA may take enforcement action under 49 CFR Part 31, Program Fraud and Civil Remedies, against any participant in the DBE Program whose conduct is subject to such action under 49 CFR Part 31.

(5) FHWA may refer to the Department of Justice, for prosecution under 18 U.S.C. 1001 or other applicable provisions of law, any person who makes a false or fraudulent statement in connection with participation of a DBE in any DOT-assisted program or otherwise violates applicable Federal statutes.

b. Pursuant to 49 CFR Part 26.109, the rules governing information, confidentiality, cooperation, and intimidation or retaliation are as follows:

(1) Availability of records.

(i) In responding to requests for information concerning any aspect of the DBE Program, FHWA complies with provisions of the Federal Freedom of Information and Privacy Acts (5 U.S.C. 552 and 552a). FHWA may make available to the public any information concerning the DBE Program release of which is not prohibited by Federal law.

(ii) MassDOT shall safeguard from disclosure to unauthorized persons information that may reasonably be considered as confidential business information, consistent with Federal and Massachusetts General Law (M.G.L. c. 66, § 10, M.G.L. c. 4, §7 (26), 950 CMR 32.00).

(2) Confidentiality of information on complainants. Notwithstanding the provisions of subparagraph b.(1) of this section, the identity of complainants shall be kept confidential, at their election. If such confidentiality will hinder the investigation, proceeding or hearing, or result in a denial of appropriate administrative due process to other parties, the complainant must be advised for the purpose of waiving the privilege. Complainants are advised that, in some circumstances, failure to waive the privilege may result in the closure of the investigation or dismissal of the proceeding or hearing.

(3) Cooperation. All participants in FHWA's DBE Program (including, but not limited to, recipients, DBE firms and applicants for DBE certification, complainants and appellants, and Contractors using DBE firms to meet Contract participation goals) are required to cooperate fully and promptly with U.S. DOT and recipient compliance reviews, certification reviews, investigations, and other requests for information. Failure to do so shall be a ground for appropriate action against the party involved (e.g., with respect to recipients, a finding of noncompliance; with respect to DBE firms, denial of certification or removal of eligibility and/or suspension and debarment; with respect to a complainant or appellant, dismissal of the complaint or appeal; with respect to a Contractor which uses DBE firms to meet participation goals, findings of non-responsibility for future Contracts and/or suspension and debarment).

(4) Intimidation and retaliation. No recipient, Contractor, or any other participant in the program, may intimidate, threaten, coerce, or discriminate against any individual or firm for the purpose of interfering with any right or privilege secured by this part or because the individual or firm has made a complaint, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under this part. If any recipient or contractor violates this prohibition, that entity is in noncompliance with this 49 CFR Part 26.

11. LIST OF ADDITIONAL DOCUMENTS.

a. The following documents shall be completed and signed by the bidder and designated DBEs in accordance with Section 7 - Award Documentation and Procedures. These documents must be returned by the bidder to MassDOT's Bid Document Distribution Center:

- □ Schedule of DBE Participation (Document B00853)
- □ Letter of Intent (Document B00854)
- □ DBE Joint Check Arrangement Approval Form (Document B00855), if Contractor and DBE plan, or if DBE is required to use a Joint Check

b. The following document shall be signed and returned by Contractor and Subcontractors/DBEs to the MassDOT District Office overseeing the Project, as applicable:

- □ Contractor/Subcontractor Certification Form (Document No. 00859) (a checklist of other documents to be included with every subcontract (DBEs and non-DBEs alike)).

c. The following document shall be provided to MassDOT's Office of Civil Rights and Prequalification Office at least fourteen (14) business days before the bid opening date, if applicable:

- □ Affidavit of DBE/Non-DBE Joint Venture (Document B00856)

d. The following document shall be provided to MassDOT's District Office of Civil Rights within 30 calendar days after the work of the DBE is completed, or no later than 30 calendar days after the work of the DBE is on a completed and processed CQE. This document shall be completed and submitted by the Prime Contractor:

- □ Certificate of Completion by a Minority/Women or Disadvantaged Business Enterprise (M/W/DBE) (Form No. CSD-100)

*** END OF DOCUMENT ***

DOCUMENT 00760

FHWA-1273 – Revised October 23, 2023

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (*see* 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:
(1) Withholding monthly progress payments;
(2) Assessing sanctions;
(3) Liquidated damages; and/or
(4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than $10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 “Contract provisions and related matters” with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. *Wage rates and fringe benefits.* All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in paragraphs (d) and (e) of 29 CFR 5.5, the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act (40 U.S.C. 3141(2)(B)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.e. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in paragraph 4. of this section. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided,* That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph 1.c. of this section) and the Davis-Bacon poster (WH–1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. *Frequently recurring classifications.* (1) In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in 29 CFR part 1, a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to paragraph 1.c. of this section, provided that:

(i) The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;

(ii) The classification is used in the area by the construction industry; and

(iii) The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.

(2) The Administrator will establish wage rates for such classifications in accordance with paragraph 1.c.(1)(iii) of this section. Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

c. *Conformance.* (1) The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is used in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

(3) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to DBAconformance@dol.gov. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30–day period that additional time is necessary.

(4) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to DBAconformance@dol.gov, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30–day period that additional time is necessary.

(5) The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division under paragraphs 1.c.(3) and (4) of this section. The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 1.c.(3) or (4) of this section must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

d. *Fringe benefits not expressed as an hourly rate.* Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

e. *Unfunded plans.* If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided,* That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in § 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

f. *Interest.* In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

2. Withholding (29 CFR 5.5)

a. *Withholding requirements.* The contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in this section for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in paragraph 3.d. of this section, the contracting agency may on its own initiative and after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with paragraph

2.a. of this section or Section V, paragraph 3.a., or both, over claims to those funds by:

(1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;

(2) A contracting agency for its reprocurement costs;

(3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;

(4) A contractor's assignee(s);

(5) A contractor's successor(s); or

(6) A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901–3907.

3. Records and certified payrolls (29 CFR 5.5)

a. *Basic record requirements* (1) *Length of record retention.* All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

(2) *Information required.* Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 40 U.S.C. 3141(2)(B) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

(3) *Additional records relating to fringe benefits.* Whenever the Secretary of Labor has found under paragraph 1.e. of this section that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in 40 U.S.C. 3141(2)(B) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

(4) *Additional records relating to apprenticeship.* Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

b. *Certified payroll requirements* (1) *Frequency and method of submission.* The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the contracting agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

(2) *Information required.* The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under paragraph 3.a.(2) of this section, except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (*e.g.,* the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH–347 or in any other format desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division website at *https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/wh347/.pdf* or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the contracting agency.

(3) *Statement of Compliance.* Each certified payroll submitted must be accompanied by a “Statement of Compliance,” signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

(i) That the certified payroll for the payroll period contains the information required to be provided under paragraph 3.b. of this section, the appropriate information and basic records are being maintained under paragraph 3.a. of this section, and such information and records are correct and complete;

(ii) That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3; and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

(4) *Use of Optional Form WH–347.* The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 will satisfy the requirement for submission of the “Statement of Compliance” required by paragraph 3.b.(3) of this section.

(5) *Signature.* The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

(6) *Falsification.* The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 3729.

(7) *Length of certified payroll retention.* The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

c. *Contracts, subcontracts, and related documents.* The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

d. *Required disclosures and access* (1) *Required record disclosures and access to workers.* The contractor or subcontractor must make the records required under paragraphs 3.a. through 3.c. of this section, and any other documents that the contracting agency, the State DOT, the FHWA, or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by § 5.1, available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

(2) *Sanctions for non-compliance with records and worker access requirements.* If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to § 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under 29 CFR part 6 any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

(3) *Required information disclosures.* Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address of each covered worker, and must provide them upon request to the contracting agency, the State DOT, the FHWA, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

4. Apprentices and equal employment opportunity (29 CFR 5.5)

a. *Apprentices* (1) *Rate of pay.* Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) *Fringe benefits.* Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.

(3) *Apprenticeship ratio.* The allowable ratio of apprentices to journeyworkers on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to paragraph 4.a.(4) of this section. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in paragraph 4.a.(1) of this section, must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(4) *Reciprocity of ratios and wage rates.* Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

b. *Equal employment opportunity.* The use of apprentices and journeyworkers under this part must be in conformity with

the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

c. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeyworkers shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor must insert FHWA-1273 in any subcontracts, along with the applicable wage determination(s) and such other clauses or contract modifications as the contracting agency may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate. 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility. a. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of 40 U.S.C. 3144(b) or § 5.12(a).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of 40 U.S.C. 3144(b) or § 5.12(a).

c. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, 18 U.S.C. 1001.

11. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, this part, or 29 CFR part 1 or 3;

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, this part, or 29 CFR part 1 or 3;

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, this part, or 29 CFR part 1 or 3; or

d. Informing any other person about their rights under the DBA, Related Acts, this part, or 29 CFR part 1 or 3.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchpersons and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1. of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or

mechanic, including watchpersons and guards, employed in violation of the clause set forth in paragraph 1. of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1. of this section.

* $31 as of January 15, 2023 (See 88 FR 88 FR 2210) as may be adjusted annually by the Department of Labor, pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990.

3. Withholding for unpaid wages and liquidated damages

a. *Withholding process.* The FHWA or the contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with Section IV paragraph 2.a. or paragraph 3.a. of this section, or both, over claims to those funds by:

(1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;

(2) A contracting agency for its reprocurement costs;

(3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;

(4) A contractor's assignee(s);

(5) A contractor's successor(s); or

(6) A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901–3907.

4. Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1. through 5. of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1. through 5. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

5. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or

d. Informing any other person about their rights under CWHSSA or this part.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of $150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.327.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.327.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1**. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. “First Tier Covered Transactions” refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (https://www.sam.gov/). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

* * * * *

3. **Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (https://www.sam.gov/), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily

excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

* * * * *

4. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

a. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(1) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(2) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(3) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. 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 Federal 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.

b. 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 Federal 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 Form to Report Lobbying," in accordance with its instructions.

2. 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 by 31 U.S.C. 1352. 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 each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.

2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, ‘on-board’ commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B) This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

DOCUMENT 00811

SPECIAL PROVISIONS
MONTHLY PRICE ADJUSTMENT FOR HOT MIX ASPHALT (HMA) MIXTURES
Revised: 02/03/2023

This provision applies to all projects using greater than 100 tons of hot mix asphalt (HMA) mixtures containing liquid asphalt cement as stipulated in the Notice to Contractors section of the bid documents.

Price Adjustments will be based on the variance in price, for the liquid asphalt component only, between the Base Price and the Period Price. They shall not include transportation or other charges. Price Adjustments will occur on a monthly basis.

Base Price
The Base Price of liquid asphalt on a project as listed in the Notice to Contractors section of the bid documents is a fixed price determined by the Department at the time of the bid using the same method as the determination of the Period Price detailed below. The Base Price shall be used in all bids.

Period Price
The Period Price is the price of liquid asphalt for each monthly period as determined by the Department using the average selling price per standard ton of PG64-28 paving grade (primary binder classification) asphalt, FOB manufacturer's terminal, as listed under the "East Coast Market - New England, Boston, Massachusetts area" section of the Poten & Partners, Inc. "Asphalt Weekly Monitor". This average selling price is listed in the issue having a publication date of the second Friday of the month and will be posted as the Period Price for that month. The Department will post this Period Price on its website at https://www.mass.gov/service-details/massdot-current-contract-price-adjustments following its receipt of the relevant issue of the "Asphalt Weekly Monitor". Poten and Partners has granted the Department the right to publish this specific asphalt price information sourced from the Asphalt Weekly Monitor.

Price Adjustment Determination, Calculation and Payment
The Contract Price of the HMA mixture will be paid under the respective item in the Contract. Price Adjustments, as herein provided, either upwards or downwards, will be made after the work has been performed using the monthly period price for the month during which the work was performed.

Price Adjustments will be paid only if the variance from the Base Price is 5% or more for a monthly period. The complete adjustment will be paid in all cases with no deduction of the 5% from either upward or downward adjustments.

The Price Adjustment applies only to the actual virgin liquid asphalt content in the mixture placed on the job in accordance with the approved Job Mix Formula.

Price Adjustments will be separate payment items. The pay item numbers are 999.401 for a positive price adjustment (a payment) and 999.402 for a negative price adjustment (a deduction). Price Adjustments will be calculated using the following equation:

Price Adjustment = Tons of HMA Placed X Liquid Asphalt Content % X RAP Factor X (Period Price - Base Price)

No Price Adjustment will be allowed beyond the Completion Date of this Contract, unless there is a Department-approved extension of time.

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DOCUMENT 00812

SPECIAL PROVISIONS
MONTHLY PRICE ADJUSTMENT FOR DIESEL FUEL AND GASOLINE –
ENGLISH UNITS
Revised: 02/01/2021

This monthly fuel price adjustment is inserted in this contract because the national and worldwide energy situation has made the future cost of fuel unpredictable. This adjustment will provide for either additional compensation to the Contractor or repayment to the Commonwealth, depending on an increase or decrease in the average price of diesel fuel or gasoline.

This adjustment will be based on fuel usage factors for various items of work developed by the Highway Research Board in Circular 158, dated July 1974. These factors will be multiplied by the quantities of work done in each item during each monthly period and further multiplied by the variance in price from the Base Price to the Period Price.

The Base Price of Diesel Fuel and Gasoline will be the price as indicated in the Department's web site https://www.mass.gov/service-details/massdot-current-contract-price-adjustments for the month in which the contract was bid, which includes State Tax.

The Period Price will be the average of prices charged to the State, including State Tax for the bulk purchases made during each month.

This adjustment will be effected only if the variance from the Base Price is 5% or more for a monthly period. The complete adjustment will be paid in all cases with no deduction of the 5% from either upward or downward adjustments.

No adjustment will be paid for work done beyond the extended completion date of any contract.

Any adjustment (increase or decrease) to estimated quantities made to each item at the time of final payment will have the fuel price adjustment figured at the average period price for the entire term of the project for the difference of quantity.

The fuel price adjustment will apply only to the following items of work at the fuel factors shown:

ITEMS COVERED	FUEL FACTORS	
	Diesel	Gasoline
Excavation: and Borrow Work: Items 120, 120.1, 121, 123, 124, 125, 127, 129.3, 140, 140.1, 141, 142, 143, 144, 150, 150.1, 151 and 151.1 (Both Factors used)	0.29 Gallons / CY.	0.15 Gallons / CY
Surfacing Work: All Items containing Hot Mix Asphalt	2.90 Gallons / Ton	Does Not Apply

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DOCUMENT 00813

SPECIAL PROVISIONS

PRICE ADJUSTMENTS FOR STRUCTURAL STEEL AND REINFORCING STEEL

July 18, 2024

This special provision applies to all projects containing the use of structural steel and/or reinforcing steel as specified elsewhere in the Contract work. It applies to all structural steel and all reinforcing steel, as defined below, on the project. Compliance with this provision is mandatory, i.e., there are no "opt-in" or "opt-out" clauses. Price adjustments will be handled as described below and shall only apply to unfabricated reinforcing steel bars and unfabricated structural steel material, consisting of rolled shapes, plate steel, sheet piling, pipe piles, steel castings and steel forgings.

Price adjustments will be variances between Base Prices and Period Prices. Base Prices and Period Prices are defined below.

Price adjustments will only be made if the variances between Base Prices and Period Prices are 5% or more. A variance can result in the Period Price being either higher or lower than the Base Price. Once the 5% threshold has been achieved, the adjustment will apply to the full variance between the Base Price and the Period Price.

Price adjustments will be calculated by multiplying the number of pounds of unfabricated structural steel material or unfabricated reinforcing steel bars on a project by the index factor calculated as shown below under Example of a Period Price Calculation.

Price adjustments will ***not*** include guardrail panels or the costs of shop drawing preparation, handling, fabrication, coatings, transportation, storage, installation, profit, overhead, fuel costs, fuel surcharges, or other such charges not related to the cost of the unfabricated structural steel and unfabricated reinforcing steel.

The weight of steel subject to a price adjustment shall not exceed the final shipping weight of the fabricated part by more than 10%.

Base Prices and Period Prices are defined as follows:

Base Prices of unfabricated structural steel and unfabricated reinforcing steel on a project are fixed prices determined by the Department and found in the table below. While it is the intention of the Department to make this table comprehensive, some of a project's unfabricated structural steel and/or unfabricated reinforcing steel may be inadvertently omitted. Should this occur, the Contractor shall bring the omission to the Department's attention so that a contract alteration may be processed that adds the missing steel to the table and its price adjustments to the Contract.

The Base Price Date is the month and year of the most recent finalized period price index at the time that MassDOT opened bids for the project. The Base Price Index for this contract is the Steel PPI listed in the Notice to Contractors.

Period Prices of unfabricated structural steel and unfabricated reinforcing steel on a project are variable prices that have been calculated using the Period Price Date and an index of steel prices to adjust the Base Price.

The Period Price Date is the date the steel was delivered to the fabricator as evidenced by an official bill of lading submitted to the Department containing a description of the shipped materials, weights of the shipped materials and the date of shipment. This date is used to select the Period Price Index.

The index used for the calculation of Period Prices is the U.S. Department of Labor Bureau of Labor Statistics Producer Price Index (PPI) Series ID WPU101702 (Not Seasonally Adjusted, Group: Metals and Metal Products, Item: Semi-finished Steel Mill Products.) As this index is subject to revision for a period of up to four (4) months after its original publication, no price adjustments will be made until the index for the period is finalized, i.e., the index is no longer suffixed with a "(P)".

Period Prices are determined as follows:

Period Price = Base Price X Index Factor
Index Factor = Period Price Index / Base Price Index

Example of a Period Price Calculation:

Calculate the Period Price for December 2009 using a Base Price from March 2009 of $0.82/Pound for 1,000 Pounds of ASTM A709 (AASHTO M270) Grade A36 Structural Steel Plate.

The Period Price Date is December 2009. From the PPI website*, the Period Price Index = 218.0.

The Base Price Date is March 2009. From the PPI website*, the Base Price Index = 229.4.

Index Factor = Period Price Index / Base Price Index = 218.0 / 229.4 = 0.950
Period Price = Base Price X Index Factor = $0.82/Pound X 0.950 = $0.78/Pound

Since $0.82 - $0.78 = $0.04 is less than 5% of $0.82, no price adjustment is required.

If the $0.04 difference shown above was greater than 5% of the Base Price, then the price adjustment would be 1,000 Pounds X $0.04/Pound = $40.00. Since the Period Price of $0.78/Pound is less than the Base Price of $0.82/Pound, indicating a drop in the price of steel between the bid and the delivery of material, a credit of $40.00 would be owed to MassDOT. When the Period Price is higher than the Base Price, the price adjustment is owed to the Contractor.

* To access the PPI website and obtain a Base Price Index or a Period Price Index, go to http://data.bls.gov/cgi-bin/srgate

End of example.

The Contractor will be paid for unfabricated structural steel and unfabricated reinforcing steel under the respective contract pay items for all components constructed of either structural steel or reinforced Portland cement concrete under their respective Contract Pay Items.

Price adjustments, as herein provided for, will be paid separately as follows:

Structural Steel
Pay Item Number 999.449 for positive (+) pay adjustments (payments to the Contractor)

Pay Item Number 999.457 for negative (-) pay adjustments (credits to MassDOT Highway Division)

Reinforcing Steel
Pay Item Number 999.466 for positive (+) pay adjustments (payments to the Contractor)

Pay Item Number 999.467 for negative (-) pay adjustments (credits to MassDOT Highway Division)

No price adjustment will be made for price changes after the Contract Completion Date, unless the MassDOT Highway Division has approved an extension of Contract Time for the Contract.

TABLE

Steel Type		Price per Pound
1	ASTM A615/A615M Grade 60 (AASHTO M31 Grade 60 or 420) Reinforcing Steel	$0.66
2	ASTM A27 (AASHTO M103) Steel Castings, H-Pile Points & Pipe Pile Shoes (See Note below.)	$0.90
3	ASTM A668 / A668M (AASHTO M102) Steel Forgings	$0.90
4	ASTM A108 (AASHTO M169) Steel Forgings for Shear Studs	$0.93
5	ASTM A709/A709M Grade 36 / AASHTO M270M/M270 Grade 36 or 250 Structural Steel Plate	$1.00
6	ASTM A709/A709M Grade 36 / AASHTO M270M/M270 Grade 36 or 250 Structural Steel Shapes	$0.92
7	ASTM A709/A709M Grade 50 / AASHTO M270M/M270 Grade 50 or 345 Structural Steel Plate	$1.00
8	ASTM A709/A709M Grade 50 / AASHTO M270M/M270 Grade 50 or 345 Structural Steel Shapes	$0.92
9	ASTM A709/A709M Grade 50WT / AASHTO M270M/M270 Grade 50WT or 345WT Structural Steel Plate	$1.04
10	ASTM A709/A709M Grade 50WT / AASHTO M270M/M270 Grade 50WT or 345WT Structural Steel Shapes	$0.93
11	ASTM A709/A709M Grade 50W / AASHTO M270M/M270 Grade 50W 345W Structural Steel Plate	$1.04
12	ASTM A709/A709M Grade 50W / AASHTO M270M/M270 Grade 50W or 345W Structural Steel Shapes	$0.93
13	ASTM A709/A709M Grade HPS 50W / AASHTO M270M/M270 Grade HPS 50W or 345W Structural Steel Plate	$1.09
14	ASTM A709/A709M Grade HPS 70W / AASHTO M270M/M270 Grade HPS 70W or 485W Structural Steel Plate	$1.16
15	ASTM A514/A514M-05 Grade HPS 100W / AASHTO M270M/M270 Grade HPS 100W or 690W Structural Steel Plate	$1.78
16	ASTM A992/A992M Grade 50S / AASHTO M270M/M270 Grade 50S or 345S Structural Steel Plate	$1.04
17	ASTM A992/A992M Grade 50S / AASHTO M270M/M270 Grade 50S or 345S Structural Steel Shapes	$0.93
18	ASTM A276 Type 316 Stainless Steel	$5.30
19	ASTM A240 Type 316 Stainless Steel	$5.30
20	ASTM A148 Grade 80/50 Steel Castings (See Note below.)	$1.83
21	ASTM A53 Grade B Structural Steel Pipe	$1.16
22	ASTM A500 Grades A, B, 36 & 50 Structural Steel Pipe	$1.16
23	ASTM A252, Grades 240 (36 KSI) & 414 (60 KSI) Pipe Pile	$0.91
24	ASTM 252, Grade 2 Permanent Steel Casing	$0.91
25	ASTM A36 (AASHTO M183) for H-piles, steel supports and sign supports	$0.98
26	ASTM A328 / A328M, Grade 50 (AASHTO M202) Steel Sheetpiling	$1.75
27	ASTM A572 / A572M, Grade 50 Sheetpiling	$1.75
28	ASTM A36/36M, Grade 50	$1.00
29	ASTM A570, Grade 50	$0.98
30	ASTM A572 (AASHTO M223), Grade 50 H-Piles	$1.00
31	ASTM A1085 Grade A (50 KSI) Steel Hollow Structural Sections (HSS), heat-treated per ASTM A1085 Supplement S1	$1.16
32	AREA 140 LB Rail and Track Accessories	$0.60

NOTE: Steel Castings are generally used only on moveable bridges. Cast iron frames, grates and pipe are not “steel” castings and will not be considered for price adjustments.

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DOCUMENT 00814

SPECIAL PROVISIONS
PRICE ADJUSTMENT FOR PORTLAND CEMENT CONCRETE MIXES

January 12, 2009

This provision applies to all projects using greater than 100 Cubic Yards (76 Cubic Meters) of Portland cement concrete containing Portland cement as stipulated in the Notice to Contractors section of the Bid Documents. This Price Adjustment will occur on a monthly basis.

The Price Adjustment will be based on the variance in price for the Portland cement component only from the Base Price to the Period Price. It shall not include transportation or other charges.

The Base Price of Portland cement on a project is a fixed price determined at the time of bid by the Department by using the same method as for the determination of the Period Price (see below) and found in the Notice to Contractors.

The Period Price of Portland cement will be determined by using the latest published price, in dollars per ton (U.S.), for Portland cement (Type I) quoted for Boston, U.S.A. in the **Construction Economics** section of *ENR Engineering News-Record* magazine or at the ENR website http://www.enr.com under **Construction Economics**. The Period Price will be posted on the MassDOT website the Wednesday immediately following the publishing of the monthly price in ENR, which is normally the first week of the month.

The Contract Price of the Portland cement concrete mix will be paid under the respective item in the Contract. The price adjustment, as herein provided, upwards or downwards, will be made after the work has been performed, using the monthly period price for the month during which the work was performed.

The price adjustment applies only to the actual Portland cement content in the mix placed on the job in accordance with the Standard Specifications for Highways and Bridges, Division III, Section M4.02.01. No adjustments will be made for any cement replacement materials such as fly ash or ground granulated blast furnace slag.

The Price Adjustment will be a separate payment item. It will be determined by multiplying the number of cubic yards of Portland cement concrete placed during each monthly period times the Portland cement content percentage times the variance in price between the Base Price and Period Price of Portland cement.

This Price Adjustment will be paid only if the variance from the Base Price is 5% or more for a monthly period. The complete adjustment will be paid in all cases with no deduction of the 5% from either upward or downward adjustments.

No Price Adjustment will be allowed beyond the Completion Date of this Contract, unless there is a Department-approved extension of time.

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DOCUMENT 00820

THE COMMONWEALTH OF MASSACHUSETTS SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY, NON-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM

I. Definitions

For purposes of this contract,

"Minority" means a person who meets one or more of the following definitions:

(a) American Indian or Native American means: all persons having origins in any of the original peoples of North America and who are recognized as an Indian by a tribe or tribal organization.
(b) Asian means: All persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian sub-continent, or the Pacific Islands, including, but Not limited to China, Japan, Korea, Samoa, India, and the Philippine Islands.
(c) Black means: All persons having origins in any of the Black racial groups of Africa, including, but not limited to, African-Americans, and all persons having origins in any of the original peoples of the Cape Verdean Islands.
(d) Eskimo or Aleut means: All persons having origins in any of the peoples of Northern Canada, Greenland, Alaska, and Eastern Siberia.
(e) Hispanic means: All persons having their origins in any of the Spanish-speaking peoples of Mexico, Puerto Rico, Cuba, Central or South America, or the Caribbean Islands.

"State construction contract" means a contract for the construction, reconstruction, installation, demolition, maintenance or repair of a building or capital facility, or a contract for the construction, reconstruction, alteration, remodeling or repair of a public work undertaken by a department, agency, board, or commission of the commonwealth.

"State assisted construction contract" means a contract for the construction, reconstruction, installation, demolition, maintenance or repair of a building or capital facility undertaken by a political subdivision of the commonwealth, or two or more political subdivisions thereof, an authority, or other instrumentality and whose costs of the contract are paid for, reimbursed, grant funded, or otherwise supported, in whole or in part, by the commonwealth.

II. Equal Opportunity, Non-Discrimination and Affirmative Action

During the performance of this Contract, the Contractor and all subcontractors (hereinafter collectively referred to as "the Contractor") for a state construction contract or a state assisted construction contract, for him/herself, his/her assignees and successors in interest, agree to comply with all applicable equal employment opportunity, non-discrimination and affirmative action requirements, including but not limited to the following:

In connection with the performance of work under this contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability, shall not discriminate in the selection or retention of subcontractors, and shall not discriminate in the procurement of materials and rentals of equipment.

The aforesaid provision shall include, but not be limited to, the following: employment upgrading, demotion, or transfer; recruitment advertising, layoff or termination; rates of pay or other forms of compensation; conditions or privileges of employment; and selection for apprenticeship or on-the-job training opportunity. The Contractor shall comply with the provisions of chapter 151B of the Massachusetts General Laws, as amended, and all other applicable anti-discrimination and equal opportunity laws, all of which are herein incorporated by reference and made a part of this Contract.

The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Massachusetts Commission Against Discrimination setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (Massachusetts General Laws Chapter l51 B).

In connection with the performance of work under this contract, the Contractor shall undertake, in good faith, affirmative action measures to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability. Such affirmative action measures shall entail positive and aggressive measures to ensure nondiscrimination and to promote equal opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, layoff or termination, rate of compensation, apprenticeship and on-the-job training programs. A list of positive and aggressive measures shall include, but not be limited to, advertising employment opportunities in minority and other community news media; notifying minority, women and other community-based organizations of employment opportunities; validating all job specifications, selection requirements, and tests; maintaining a file of names and addresses of each worker referred to the Contractor and what action was taken concerning such worker; and notifying the administering agency in writing when a union with whom the Contractor has a collective bargaining agreement has failed to refer a minority or woman worker. These and other affirmative action measures shall include all actions required to guarantee equal employment opportunity for all persons, regardless of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability. One purpose of this provision is to ensure to the fullest extent possible an adequate supply of skilled tradesmen for this and future Commonwealth public construction projects.

III. Minority and Women Workforce Participation

Pursuant to his/her obligations under the preceding section, the Contractor shall strive to achieve on this project the labor participation goals contained herein. Said participation goals shall apply in each job category on this project including but not limited to bricklayers, carpenters, cement masons, electricians, ironworkers, operating engineers and those classes of work enumerated in Section 44F of Chapter 149 of the Massachusetts General Laws. The participation goals for this project shall be 15.3% for minorities and 6.9% for women. The participation goals, as set forth herein, shall not be construed as quotas or set-asides; rather, such participation goals will be used to measure the progress of the Commonwealth's equal opportunity, non-discrimination and affirmative action program. Additionally, the participation goals contained herein should not be seen or treated as a floor or as a ceiling for the employment of particular individuals or group of individuals.

IV. Liaison Committee

At the discretion of the agency that administers the contract for the construction project there may be established for the life of the contract a body to be known as the Liaison Committee. The Liaison Committee shall be composed of one representative each from the agency or agencies administering the contract for the construction project, hereinafter called the administering agency, a representative from the Office of Affirmative action, and such other representatives as may be designated by the administering agency. The Contractor (or his/her agent, if any, designated by him/her as the on-site equal employment opportunity officer) shall recognize the Liaison Committee as an affirmative action body, and shall establish a continuing working relationship with the Liaison Committee, consulting with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.

V. Reports and Records

The Contractor shall prepare projected workforce tables on a quarterly basis when required by the administering agency. These shall be broken down into projections, by week, of workers required in each trade. Copies shall be furnished one week in advance of the commencement of the period covered, and also, when updated, to the administering agency and the Liaison Committee when required.

The Contractor shall prepare weekly reports in a form approved by the administering agency, unless information required is required to be reported electronically by the administering agency, the number of hours worked in each trade by each employee, identified as woman, minority, or non-minority. Copies of these shall be provided at the end of each such week to the administering agency and the Liaison Committee.

Records of employment referral orders, prepared by the Contractor, shall be made available to the administering agency on request.

The Contractor will provide all information and reports required by the administering agency on instructions issued by the administering agency and will permit access to its facilities and any books, records, accounts and other sources of information which may be determined by the administering agency to effect the employment of personnel. This provision shall apply only to information pertinent to the Commonwealth's supplementary non-discrimination, equal opportunity and access and opportunity contract requirements. Where information required is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the administering agency and shall set forth what efforts he has made to obtain the information.

VI. Access to Work Site

A designee of the administering agency and a designee of the Liaison Committee shall each have a right to access the work site.

VII. Solicitations for Subcontracts, and for the Procurement of Materials and Equipment

In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential subcontractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this contract relative to non-discrimination and equal opportunity.

VIII. Sanctions

Whenever the administering agency believes the General or Prime Contractor or any subcontractor may not be operating in compliance with the provisions of the Fair Employment Practices Law of the Commonwealth (Massachusetts General Laws Chapter 151B), the administering agency may refer the matter to the Massachusetts Commission Against Discrimination ("Commission") for investigation.

Following the referral of a matter by the administering agency to the Massachusetts Commission Against Discrimination, and while the matter is pending before the MCAD, the administering agency may withhold payments from contractors and subcontractors when it has documentation that the contractor or subcontractor has violated the Fair Employment Practices Law with respect to its activities on the Project, or if the administering agency determines that the contractor has materially failed to comply with its obligations and the requirements of this Section. The amount withheld shall not exceed a withhold of payment to the General or Prime Contractor of 1/100 or 1% of the contract award price or $5,000, whichever sum is greater, or, if a subcontractor is in non-compliance, a withhold by the administering agency from the General Contractor, to be assessed by the General Contractor as a charge against the subcontractor, of 1/100 or 1% of the subcontractor price, or $1,000 whichever sum is greater, for each violation of the applicable law or contract requirements. The total withheld from anyone General or Prime Contractor or subcontractor on a Project shall not exceed $20,000 overall. No withhold of payments or investigation by the Commission or its agent shall be initiated without the administering agency providing prior notice to the Contractor.

If, after investigation, the Massachusetts Commission Against Discrimination finds that a General or Prime Contractor or subcontractor, in commission of a state construction contract or state-assisted construction contract, violated the provisions of the Fair Employment Practices Law, the administering agency may convert the amount withheld as set forth above into a permanent sanction, as a permanent deduct from payments to the General or Prime Contractor or subcontractor, which sanction will be in addition to any such sanctions, fines or penalties imposed by the Massachusetts Commission Against Discrimination.

No sanction enumerated under this Section shall be imposed by the administering agency except after notice to the General or Prime Contractor or subcontractor and an adjudicatory proceeding, as that term is used, under Massachusetts General Laws Chapter 30A, has been conducted.

IX. Severability

The provisions of this section are severable, and if any of these provisions shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions.

X. Contractor's Certification

After award and prior to the execution of any contract for a state construction contract or a state assisted construction contract, the Prime or General Contractor shall certify that it will comply with all provisions of this Document 00820 Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program, by executing Document 00859 Contractor/Subcontractor Certification Form.

XI. Subcontractor Requirements

Prior to the award of any subcontract for a state construction contract or a state assisted construction contract, the Prime or General Contractor shall provide all prospective subcontractors with a complete copy of this Document 00820 entitled "Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program" and will incorporate the provisions of this Document 00820 into any and all contracts or work orders for all subcontractors providing work on the Project. In order to ensure that the said subcontractor's certification becomes a part of all subcontracts under the prime contract, the Prime or General Contractor shall certify in writing to the administering agency that it has complied with the requirements as set forth in the preceeding paragraph by executing Document 00859 Contractor/Subcontractor Certification Form.

Rev'd 03/07/14

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DOCUMENT 00821

ELECTRONIC REPORTING REQUIREMENTS
CIVIL RIGHTS PROGRAMS AND CERTIFIED PAYROLL

Implemented on March 2, 2009 Revised June 04, 2019

The Massachusetts Department Of Transportation (MassDOT) has replaced the CHAMP reporting system with Equitable Business Opportunity Solution (EBO), a new web-based civil rights reporting software system. This system is capable of handling both civil rights reporting requirements and certified payrolls. The program's functions include the administration of Equal Employment Opportunity (EEO) requirements, On-The-Job Training requirements (OJT), Disadvantage Business Enterprise (DBE) and/or Minority / Women's Business Enterprise (M/WBE) subcontracting requirements, and the electronic collection of certified payrolls associated with MassDOT projects. In addition, this system is used to generate various data required as part of the American Recovery and Reinvestment Act (ARRA). Contractors are responsible for all coordination with all sub-contractors to ensure timely and accurate electronic submission of all required data.

Contractor and Sub-Contractor EBO User Certification

All contractors and sub-contractors must use the EBO software system. The software vendor, Internet Government Solutions (IGS), has developed an online EBO Training Module that is available to contractors and sub-contractors. This module is a self-tutorial which allows all users in the company to access the training, complete the tutorial, and become certified as EBO users for a one time fee of $75.00. This is the only cost to contractors and sub-contractors associated with the EBO software system. The online EBO Training Module can be accessed at www.ebotraining.com. Click the "Register My Company" button on the login page to begin your training registration. Questions regarding EBO online training should be directed to Gerry Anguilano, IGS at (440) 238-1684.

MassDOT will track contractors and sub-contractors who have successfully completed the on-line training module. All persons performing civil rights program and/or certified payroll functions should be EBO certified.

Vetting of Firms and Designated Firm Individuals

Contractors must authorize a Primary Log-In ID Holder who has completed EBO on-line training to have access to the EBO system by completing and submitting the "Request For EBO System Log-In/Password Form" located on the MassDOT website at: https://www.mass.gov/how-to/how-to-get-an-ebo-login
Contractors must also agree to comply with the EBO system user agreement located on the MassDOT website.

All subcontracts entered into on a project must include language that identifies the submission and training requirements that the sub-contractor must perform. Sub-contractors will be approved by the respective District Office of MassDOT through the existing approval process. When new sub-contractors, who have not previously worked for MassDOT, are initially selected by a general contractor, the new sub-contractor must be approved by the District before taking the EBO on-line training module.

Interim Reporting Requirements

Until MassDOT is satisfied that the EBO system is fully operational and functioning as designed, contractors and sub-contractors will be required to submit certified payrolls manually. There will be a transition period where dual reporting, through manual and electronic submission, will be required. MassDOT, however, will notify contractors and sub-contractors when they may cease manual submission of certified payrolls.

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DOCUMENT 00859

CONTRACTOR/SUBCONTRACTOR CERTIFICATION FORM ‡

The contractor shall submit this completed document 00859 to MassDOT for each subcontract.

_____ **(Contractor)** **Date:**_____

_____**(Subcontractor)** ☐ District Approved Subcontractor

Contract No: 127511 **Project No.** 609082 **Federal Aid No.:** HIP(BR)-003S(779)X

Location: CONWAY

Project Description: Bridge Replacement, C-20-004, North Poland Road over Poland Brook

PART 1 CONTRACTOR CERTIFICATION: I hereby certify, as an authorized official of this company, that to the best of my knowledge, information and belief, the company is in compliance with all applicable federal and state laws, rules, and regulations governing fair labor and employment practices, that the company will not discriminate in their employment practices, that the company will make good faith efforts to comply with the minority employee and women employee workforce participation ratio goals and specific affirmative action steps contained in Contract Document 00820 The Commonwealth of Massachusetts Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program, and that the company will comply with the special provisions and documentation indicated below (as checked).

I further hereby certify, as an authorized official of this company, that the special provisions and documentation indicated below (as checked) have been or are included in, and made part of, the Subcontractor Agreement entered into with the firm named above.

☐ **This is not a Federally-aided construction project**

Document #

☐ 00718 –Participation By Minority Or Women's Business Enterprises and SDVOBE†
☐ 00761 –Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion
☐ 00820 – MA Supplemental Equal Employment Opportunity, Non-Discrimination, and Affirmative Action Program
☐ 00821 – Electronic Reporting Requirements, Civil Rights Programs, and Certified Payroll
☐ 00859 – Contractor/Subcontractor Certification Form (this document)
☐ 00860 – MA Employment Laws
☐ 00861 – Applicable State Wage Rates in the Contract Proposal**
☐ B00842 – MA Schedule of Participation By Minority or Women Business Enterprises (M/WBEs)†
☐ B00843 – MA Letter of Intent – M/WBEs†

** Does not apply to Material Suppliers, unless performing work on-site
† Applies only if Subcontractor is a M/WBE; only include these forms for the particular M/WBE Entity

☐ B00844 - Schedule of Participation By SDVOBE
☐ B00845 - Letter of Intent – SDVOBE
☐ B00846 – M/WBE or SDVOBE Joint Check Arrangement Approval Form
☐ B00847 – Joint Venture Affidavit

☐ **This is a Federally-aided construction project (Federal Aid Number is present)**

Document #

☐ 00719 – Special Provisions for Participation by Disadvantaged Business Enterprises†
☐ 00760 - Form FHWA 1273 - Required Contract Provisions for Federal-Aid Construction Contracts
☐ 00820 – MA Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program
☐ 00821 – Electronic Reporting Requirements, Civil Rights Programs and Certified Payroll
☐ 00859 – Contractor/Subcontractor Certification Form (this document)
☐ 00860 – MA Employment Laws
☐ 00870 – Standard Federal Equal Employment Opportunity Construction Contract Specifications Executive Order 11246, (41 CFR Parts 60-4.2 and 60-4.3 (Solicitations and Equal Opportunity Clauses)*
☐ 00875 – Federal Trainee Special Provisions

☐ B00853 – Schedule of Participation by Disadvantaged Business Enterprise†
☐ B00854 – Letter of Intent – DBEs†
☐ B00855 – DBE Joint Check Arrangement Approval Form
☐ B00856 – Joint Venture Affidavit
☐ 00861/00880 - Applicable state and federal wage rates from Contract Proposal**

*Applicable only to Contracts or Subcontracts in excess of $10,000
**Does not apply to Material Suppliers, unless performing work on-site
† Applies only if Subcontractor is a DBE; only include these forms for the particular DBE Entity

Signed this _____ Day of _____, 20_____ Under The Pains And Penalties Of Perjury.

_____ _____
(Print Name and Title) (Authorized Signature)

PART 2

PART 2 SUBCONTRACTOR CERTIFICATION: I hereby certify, as an authorized official of this company, that the required documents in Part 1 above were physically incorporated in our Agreement/Subcontract with the Contractor and give assurance that this company will fully comply or make every good faith effort to comply with the same. I further certify that:

1. This company recognizes that if this is a Federal-Aid Project, then this Contract is covered by the equal employment opportunity laws administered and enforced by the United States Department of Labor ("USDOL"), Office of Federal Contract Compliance Programs ('OFCCP"). By signing below, we acknowledge that this company has certain reporting obligations to the OFCCP, as specified by 41 CFR Part 60-4.2.
2. This company further acknowledges that any contractor with fifty (50) or more employees on a Federal-aid Contract with a value of fifty-thousand ($50,000) dollars or more must annually file an EEO-1 Report (SF 100) to the EEOC, Joint Reporting Committee, on or before September 30th, each year, as specified by 41 CFR Part 60-1.7a.
3. For more information regarding the federal reporting requirements, please contact the USDOL, OFCCP Regional Office, at 1-646-264-3170 or EEO-1, Joint Reporting Committee at 1-866-286-6440. You may also find guidance at: http://www.dol.gov/ofccp/TAguides/consttag.pdf or http://www.wdol.gov/dba.aspx#0.
4. This company ☐ has, ☐ has not, participated in a previous contract or subcontract subject to the Equal Opportunity clauses set forth in 41 CFR Part 60-4 and Executive Order 11246, and where required, has filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance Programs or the EEO Commission all reports due under the applicable filing requirements.
5. This company is in full compliance with applicable Federal and Commonwealth of Massachusetts laws, rules, and regulations and is not currently debarred or disqualified from bidding on or participating in construction contracts in any jurisdiction of the United States. See : https://www.mass.gov/service-details/contractors-and-vendors-suspended-or-debarred-by-massdot
6. This company is properly registered and in good standing with the Office of the Secretary of the Commonwealth.

Signed this _____ Day of _____, 20_____, Under The Pains And Penalties Of Perjury.

Firm: _____
Address: _____
_____
_____
Telephone Number:_____
Federal I.D. Number:_____
Estimated Start Date:_____
Estimated Completion Date:_____
Estimated Dollar Amount:_____

_____
(Print Name and Title)

_____
(Authorized Signature)

_____
(Date)

Rev'd 09/02/22

*** END OF DOCUMENT ***

DOCUMENT 00860

COMMONWEALTH OF MASSACHUSETTS PUBLIC EMPLOYMENT LAWS

Revised February 20, 2019

The Contractor's attention is directed to Massachusetts General Laws, Chapter 149, Sections 26 through 27H, and 150A. This contract is considered to fall within the ambit of that law, which provides that in general, the Prevailing Rate or Total Rate must be paid to employees working on projects funded by the Commonwealth of Massachusetts or any political subdivision including Massachusetts Department of Transportation (MassDOT).

A Federal Aid project is also subject to the Federal Minimum Wage Rate law for construction. When comparing a state minimum wage rate, monitored by the Massachusetts Attorney General, versus federal minimum wage rate, monitored by the U.S. Department of Labor Wage and Hour Division, for a particular job classification the higher wage is at all times to be paid to the affected employee.

Every contractor or subcontractor engaged in this contract to which sections twenty-seven and twenty-seven A apply will keep a true and accurate record of all mechanics and apprentices, teamsters, chauffeurs and laborers employed thereon, showing the name, address and occupational classification of each such employee on this contract, and the hours worked by, and the wages paid to, each such employee, and shall furnish to the MassDOT's Resident Engineer, on a weekly basis, a copy of said record, in a form approved by MassDOT and in accordance with M.G.L. c. 149, § 27B, signed by the employer or his/her authorized agent under the penalties of perjury.

Each such contractor or subcontractor shall preserve its payroll records for a period of three years from the date of completion of the contract.

The Prevailing Wage Rate generally includes the following:

> Minimum Hourly Wage + Employer Contributions to Benefit Plans = Prevailing Wage Rate or Total Rate
>
> Any employer who does not make contributions to Benefit Plans must pay the total Prevailing Wage Rate directly to the employee.

Any deduction from the Prevailing Wage Rate or Total Rate for contributions to benefit plans can only be for a Health & Welfare, Pension, or Supplementary Unemployment plan meeting the requirements of the Employee Retirement Income Security Act (ERISA) of 1974. The maximum allowable deduction for these benefits from the prevailing wage rate cannot be greater than the amount allowed by Executive Office of Labor (EOL) for the specified benefits. Any additional expense of providing benefits to the employees is to be borne by the employer and cannot be deducted from the Minimum Hourly Wage. If the employer's benefit expense is less than that so provided by EOL the difference will be paid directly to the employee. The rate established must be paid to all employees who perform work on the project.

When an employer makes deductions from the Minimum Hourly Wage for an employee's contribution to social security, state taxes, federal taxes, and/or other contribution programs, allowed by law, the employer shall furnish each employee a suitable pay slip, check stub or envelope notifying the employee of the amount of the deductions.

No contractor or subcontractor contracting for any part of the contract week shall require or permit any laborer or mechanic to be employed on such work in excess of forty hours in any workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay for all hours worked in excess of forty hours in such workweek, whichever is the greater number of overtime hours.

Apprentice Rates are permitted only when there is an Apprentice Agreement registered with the Massachusetts Division of Apprentice Training in accordance with M.G.L. c. 23, § 11E-11L.

The Prevailing Wage Rates issued for each project shall be the rates paid for the entire project. The Prevailing Wage Rates must be posted on the job site at all times and be visible from a public way.

In addition, each such contractor and subcontractor shall furnish to the MassDOT's Resident Engineer, within fifteen days after completion of its portion of the work, a statement, executed by the contractor or subcontractor or by any authorized officer or employee of the contractor or subcontractor who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

Date: _____

I , _____do hereby state:
(Name of signatory party) (Title)

That I pay or supervise the payment of the persons employed by:

_____
(Contractor or Subcontractor)

on the _____
(MassDOT Project Location and Contract Number)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty-nine of the General Laws.

Signature _____

Title _____

The above-mentioned copies of payroll records and statements of compliance shall be available for inspection by any interested party filing a written request to the MassDOT's Resident Engineer for such inspection and copying.

Massachusetts General Laws c. 149, §27, requires annual updates to prevailing wage schedules for all public construction contracts lasting longer than one year. MassDOT will request the required updates and furnish them to the Contractor. The Contractor is required to pay no less than the wage rates indicated on the annual updated wage schedules.

MassDOT will request the updates no later that two week before the anniversary of the Notice to Proceed date of the contract to allow for adequate processing by the Department of Labor Standards (DLS). The effective date for the new rates will be the anniversary date of the contract (i.e. the notice to proceed date), regardless of the date of issuance on the schedule from DLS.

All bidders are cautioned that the aforementioned laws require that employers pay to covered employees no less than the applicable minimum wages. In addition, the same laws require that the applicable prevailing wages become incorporated as part of this contract. The prevailing minimum wage law establishes serious civil and criminal penalties for violations, including imprisonment and exclusion from future public contracts. Bidders are cautioned to carefully read the relevant sections of the Massachusetts General Laws.

*** END OF DOCUMENT ***

DOCUMENT 00861

STATE PREVAILING WAGE RATES

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MAURA HEALEY
Governor

KIM DRISCOLL
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

LAUREN JONES
Secretary

MICHAEL FLANAGAN
Director

Awarding Authority: MassDOT Highway

Contract Number: 127511 **City/Town:** CONWAY

Description of Work: CONWAY- FAP No. HIP(BR)-003S(779)X Bridge Replacement, C-20-004, North Poland Road over Poland Brook

Job Location: North Poland Road over Poland Brook

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, the awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. The updated wage schedule must be provided to all contractors, including general and sub-contractors, working on the construction project.
- This annual update requirement is generally not applicable to 27F "rental of equipment" contracts. For such contracts, the prevailing wage rates issued by DLS shall remain in effect for the duration of the contract term. However, if the prevailing wage rate sheet issued does not contain wage rates for each year covered by the contract term, the Awarding Authority must request updated rate sheets from DLS and provide them to the contractor to ensure the correct rates are being paid throughout the duration of the contract. Additionally, if an Awarding Authority exercises an option to renew or extend the contract term, they must request updated rate sheets form DLS and provide them to the contractor.
- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule if it has not opened bids or selected a contractor within90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27.The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or a sub-contractor.
- Apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentices must keep their apprentice identification card on their persons during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DAS regardless of whether they are registered with another federal, state, local, or private agency must be paid the journeyworker's rate.**
- Every contractor or subcontractor working on the construction project must submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. For a sample payroll reporting form go to http://www.mass.gov/dols/pw.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Contractors must obtain the wage schedules from awarding authorities. Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may file a complaint with the Fair Labor Division of the office of the Attorney General at (617) 727-3465.

Issue Date: 08/02/2024 **Wage Request Number:** 20240802-017

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2024	$39.95	$15.07	$18.67	$0.00	$73.69
	12/01/2024	$39.95	$15.07	$20.17	$0.00	$75.19
	01/01/2025	$39.95	$15.57	$20.17	$0.00	$75.69
	06/01/2025	$40.95	$15.57	$20.17	$0.00	$76.69
	12/01/2025	$40.95	$15.57	$21.78	$0.00	$78.30
	01/01/2026	$40.95	$16.17	$21.78	$0.00	$78.90
	06/01/2026	$41.95	$16.17	$21.78	$0.00	$79.90
	12/01/2026	$41.95	$16.17	$23.52	$0.00	$81.64
	01/01/2027	$41.95	$16.77	$23.52	$0.00	$82.24
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2024	$40.02	$15.07	$18.67	$0.00	$73.76
	12/01/2024	$40.02	$15.07	$20.17	$0.00	$75.26
	01/01/2025	$40.02	$15.57	$20.17	$0.00	$75.76
	06/01/2025	$41.02	$15.57	$20.17	$0.00	$76.76
	12/01/2025	$41.02	$15.57	$21.78	$0.00	$78.37
	01/01/2026	$41.02	$16.17	$21.78	$0.00	$78.97
	06/01/2026	$42.02	$16.17	$21.78	$0.00	$79.97
	12/01/2026	$42.02	$16.17	$23.52	$0.00	$81.71
	01/01/2027	$42.02	$16.77	$23.52	$0.00	$82.31
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2024	$40.14	$15.07	$18.67	$0.00	$73.88
	12/01/2024	$40.14	$15.07	$20.17	$0.00	$75.38
	01/01/2025	$40.14	$15.57	$20.17	$0.00	$75.88
	06/01/2025	$41.14	$15.57	$20.17	$0.00	$76.88
	12/01/2025	$41.14	$15.57	$21.78	$0.00	$78.49
	01/01/2026	$41.14	$16.17	$21.78	$0.00	$79.09
	06/01/2026	$42.14	$16.17	$21.78	$0.00	$80.09
	12/01/2026	$42.14	$16.17	$23.52	$0.00	$81.83
	01/01/2027	$42.14	$16.77	$23.52	$0.00	$82.43
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2020	$103.05	$9.40	$23.12	$0.00	$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$34.38	$9.65	$16.84	$0.00	$60.87
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$35.30	$9.65	$15.06	$0.00	$60.01
	12/01/2024	$36.50	$9.65	$15.06	$0.00	$61.21
	06/01/2025	$37.75	$9.65	$15.06	$0.00	$62.46
	12/01/2025	$38.99	$9.65	$15.06	$0.00	$63.70
	06/01/2026	$40.29	$9.65	$15.06	$0.00	$65.00
	12/01/2026	$41.58	$9.65	$15.06	$0.00	$66.29
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS WORKER (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD)*	06/01/2024	$37.62	$14.50	$10.55	$0.00	$62.67
	12/01/2024	$38.52	$14.50	$10.55	$0.00	$63.57
	06/01/2025	$39.42	$14.50	$10.55	$0.00	$64.47
	12/01/2025	$40.32	$14.50	$10.55	$0.00	$65.37

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ASPHALT RAKER *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$33.88	$9.65	$16.84	$0.00	$60.37
ASPHALT RAKER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)* For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"	06/01/2024	$34.80	$9.65	$15.06	$0.00	$59.51
	12/01/2024	$36.00	$9.65	$15.06	$0.00	$60.71
	06/01/2025	$37.25	$9.65	$15.06	$0.00	$61.96
	12/01/2025	$38.49	$9.65	$15.06	$0.00	$63.20
	06/01/2026	$39.79	$9.65	$15.06	$0.00	$64.50
	12/01/2026	$41.08	$9.65	$15.06	$0.00	$65.79
AUTOMATIC GRADER-EXCAVATOR (RECLAIMER) *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49
BACKHOE/FRONT-END LOADER OPERATOR *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$33.88	$9.65	$16.84	$0.00	$60.37
BATCH/CEMENT PLANT - ON SITE *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$34.38	$9.65	$16.84	$0.00	$60.87
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)* For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"	06/01/2024	$35.30	$9.65	$15.06	$0.00	$60.01
	12/01/2024	$36.50	$9.65	$15.06	$0.00	$61.21
	06/01/2025	$37.75	$9.65	$15.06	$0.00	$62.46
	12/01/2025	$38.99	$9.65	$15.06	$0.00	$63.70
	06/01/2026	$40.29	$9.65	$15.06	$0.00	$65.00
	12/01/2026	$41.58	$9.65	$15.06	$0.00	$66.29
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2024	$48.12	$7.07	$20.60	$0.00	$75.79

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$31.28	$7.07	$13.22	$0.00	$51.57
2	65	$31.28	$7.07	$13.22	$0.00	$51.57
3	70	$33.68	$7.07	$14.23	$0.00	$54.98
4	75	$36.09	$7.07	$15.24	$0.00	$58.40
5	80	$38.50	$7.07	$16.25	$0.00	$61.82
6	85	$40.90	$7.07	$17.28	$0.00	$65.25
7	90	$43.31	$7.07	$18.28	$0.00	$68.66
8	95	$45.71	$7.07	$19.32	$0.00	$72.10

Notes:

Apprentice to Journeyworker Ratio:1:4

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) *BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD)*	08/01/2024	$52.06	$11.49	$21.46	$0.00	$85.01
	02/01/2025	$53.36	$11.49	$21.46	$0.00	$86.31
	08/01/2025	$55.51	$11.49	$21.46	$0.00	$88.46
	02/01/2026	$56.86	$11.49	$21.46	$0.00	$89.81
	08/01/2026	$59.06	$11.49	$21.46	$0.00	$92.01
	02/01/2027	$60.46	$11.49	$21.46	$0.00	$93.41

Apprentice - *BRICK/PLASTER/CEMENT MASON - Local 3 Springfield/Pittsfield*

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.03	$11.49	$21.46	$0.00	$58.98
2	60	$31.24	$11.49	$21.46	$0.00	$64.19
3	70	$36.44	$11.49	$21.46	$0.00	$69.39
4	80	$41.65	$11.49	$21.46	$0.00	$74.60
5	90	$46.85	$11.49	$21.46	$0.00	$79.80

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.68	$11.49	$21.46	$0.00	$59.63
2	60	$32.02	$11.49	$21.46	$0.00	$64.97
3	70	$37.35	$11.49	$21.46	$0.00	$70.30
4	80	$42.69	$11.49	$21.46	$0.00	$75.64
5	90	$48.02	$11.49	$21.46	$0.00	$80.97

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BULLDOZER/POWER SHOVEL/TREE SHREDDER /CLAM SHELL*OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2024	$46.63	$9.65	$18.22	$0.00	$74.50
	12/01/2024	$48.10	$9.65	$18.22	$0.00	$75.97
	06/01/2025	$49.60	$9.65	$18.22	$0.00	$77.47
	12/01/2025	$51.10	$9.65	$18.22	$0.00	$78.97
	06/01/2026	$52.65	$9.65	$18.22	$0.00	$80.52
	12/01/2026	$54.15	$9.65	$18.22	$0.00	$82.02
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2024	$45.48	$9.65	$18.22	$0.00	$73.35
	12/01/2024	$46.95	$9.65	$18.22	$0.00	$74.82
	06/01/2025	$48.45	$9.65	$18.22	$0.00	$76.32
	12/01/2025	$49.95	$9.65	$18.22	$0.00	$77.82
	06/01/2026	$51.50	$9.65	$18.22	$0.00	$79.37
	12/01/2026	$53.00	$9.65	$18.22	$0.00	$80.87
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2024	$45.81	$9.65	$18.22	$0.00	$73.68
	12/01/2024	$47.28	$9.65	$18.22	$0.00	$75.15
	06/01/2025	$48.78	$9.65	$18.22	$0.00	$76.65
	12/01/2025	$50.28	$9.65	$18.22	$0.00	$78.15
	06/01/2026	$51.83	$9.65	$18.22	$0.00	$79.70
	12/01/2026	$53.33	$9.65	$18.22	$0.00	$81.20
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$33.88	$9.65	$16.84	$0.00	$60.37
For apprentice rates see "Apprentice- LABORER"						
CARPENTER *CARPENTERS LOCAL 336 - HAMPDEN HAMPSHIRE FRANKLIN*	03/01/2024	$41.41	$7.91	$18.15	$0.00	$67.47
	09/01/2024	$42.36	$7.91	$18.15	$0.00	$68.42
	03/01/2025	$43.26	$7.91	$18.15	$0.00	$69.32
	09/01/2025	$44.21	$7.91	$18.15	$0.00	$70.27
	03/01/2026	$45.11	$7.91	$18.15	$0.00	$71.17
	09/01/2026	$46.06	$7.91	$18.15	$0.00	$72.12
	03/01/2027	$46.96	$7.91	$18.15	$0.00	$73.02

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CARPENTER - Local 336 Hampden Hampshire Franklin*

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$18.63	$7.91	$1.40	$0.00	$27.94
2	45	$18.63	$7.91	$1.40	$0.00	$27.94
3	55	$22.78	$7.91	$2.76	$0.00	$33.45
4	55	$22.78	$7.91	$2.76	$0.00	$33.45
5	70	$28.99	$7.91	$15.39	$0.00	$52.29
6	70	$28.99	$7.91	$15.39	$0.00	$52.29
7	80	$33.13	$7.91	$16.77	$0.00	$57.81
8	80	$33.13	$7.91	$16.77	$0.00	$57.81

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$19.06	$7.91	$1.40	$0.00	$28.37
2	45	$19.06	$7.91	$1.40	$0.00	$28.37
3	55	$23.30	$7.91	$2.76	$0.00	$33.97
4	55	$23.30	$7.91	$2.76	$0.00	$33.97
5	70	$29.65	$7.91	$15.39	$0.00	$52.95
6	70	$29.65	$7.91	$15.39	$0.00	$52.95
7	80	$33.89	$7.91	$16.77	$0.00	$58.57
8	80	$33.89	$7.91	$16.77	$0.00	$58.57

Notes:

Apprentice to Journeyworker Ratio:1:5

CARPENTER WOOD FRAME *CARPENTERS-ZONE 3 (Wood Frame)*	10/01/2023	$25.55	$7.02	$4.80	$0.00	$37.37
	10/01/2024	$26.65	$7.02	$4.80	$0.00	$38.47
	10/01/2025	$27.75	$7.02	$4.80	$0.00	$39.57
	10/01/2026	$28.85	$7.02	$4.80	$0.00	$40.67

All Aspects of New Wood Frame Work

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CARPENTER (Wood Frame) - Zone 3*

Effective Date - 10/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$15.33	$7.02	$0.00	$0.00	$22.35
2	60	$15.33	$7.02	$0.00	$0.00	$22.35
3	65	$16.61	$7.02	$1.00	$0.00	$24.63
4	70	$17.89	$7.02	$1.00	$0.00	$25.91
5	75	$19.16	$7.02	$4.80	$0.00	$30.98
6	80	$20.44	$7.02	$4.80	$0.00	$32.26
7	85	$21.72	$7.02	$4.80	$0.00	$33.54
8	90	$23.00	$7.02	$4.80	$0.00	$34.82

Effective Date - 10/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$15.99	$7.02	$0.00	$0.00	$23.01
2	60	$15.99	$7.02	$0.00	$0.00	$23.01
3	65	$17.32	$7.02	$1.00	$0.00	$25.34
4	70	$18.66	$7.02	$1.00	$0.00	$26.68
5	75	$19.99	$7.02	$4.80	$0.00	$31.81
6	80	$21.32	$7.02	$4.80	$0.00	$33.14
7	85	$22.65	$7.02	$4.80	$0.00	$34.47
8	90	$23.99	$7.02	$4.80	$0.00	$35.81

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $18.52/ 3&4 $21.07/ 5&6 $28.70/ 7&8 $31.26

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD)*	01/01/2024	$44.68	$12.90	$18.66	$1.25	$77.49

Apprentice - *CEMENT MASONRY/PLASTERING - Springfield/Pittsfield*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.34	$12.90	$15.86	$0.00	$51.10
2	60	$26.81	$12.90	$18.66	$1.25	$59.62
3	65	$29.04	$12.90	$18.66	$1.25	$61.85
4	70	$31.28	$12.90	$18.66	$1.25	$64.09
5	75	$33.51	$12.90	$18.66	$1.25	$66.32
6	80	$35.74	$12.90	$18.66	$1.25	$68.55
7	90	$40.21	$12.90	$18.66	$1.25	$73.02

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CHAIN SAW OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$33.88	$9.65	$16.84	$0.00	$60.37
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96
CRANE OPERATOR *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$43.06	$13.78	$15.15	$0.00	$71.99
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 3*	07/01/2024	$57.26	$9.95	$23.95	$0.00	$91.16
	01/01/2025	$58.46	$9.95	$23.95	$0.00	$92.36

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.63	$9.95	$0.00	$0.00	$38.58
2	55	$31.49	$9.95	$6.66	$0.00	$48.10
3	60	$34.36	$9.95	$7.26	$0.00	$51.57
4	65	$37.22	$9.95	$7.87	$0.00	$55.04
5	70	$40.08	$9.95	$20.32	$0.00	$70.35
6	75	$42.95	$9.95	$20.93	$0.00	$73.83
7	80	$45.81	$9.95	$21.53	$0.00	$77.29
8	90	$51.53	$9.95	$22.74	$0.00	$84.22

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$29.23	$9.95	$0.00	$0.00	$39.18
2	55	$32.15	$9.95	$6.66	$0.00	$48.76
3	60	$35.08	$9.95	$7.26	$0.00	$52.29
4	65	$38.00	$9.95	$7.87	$0.00	$55.82
5	70	$40.92	$9.95	$20.32	$0.00	$71.19
6	75	$43.85	$9.95	$20.93	$0.00	$74.73
7	80	$46.77	$9.95	$21.53	$0.00	$78.25
8	90	$52.61	$9.95	$22.74	$0.00	$85.30

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$44.98	$9.40	$17.82	$0.00	$72.20
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$45.48	$9.65	$18.07	$0.00	$73.20
DEMO: BURNERS *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$45.73	$9.40	$17.82	$0.00	$72.95

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$45.48	$9.65	$18.07	$0.00	$73.20
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$45.73	$9.40	$17.82	$0.00	$72.95
DEMO: WRECKING LABORER *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$44.98	$9.40	$17.82	$0.00	$72.20
DIVER *PILE DRIVER LOCAL 56 (ZONE 3)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	$68.70	$9.40	$23.12	$0.00	$101.22
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 3)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 3)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	$73.60	$9.40	$23.12	$0.00	$106.12
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 3)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	$103.05	$9.40	$23.12	$0.00	$135.57
DRAWBRIDGE OPERATOR (Construction) *DRAWBRIDGE - SEIU LOCAL 888*	07/01/2020	$26.77	$6.67	$3.93	$0.16	$37.53
ELECTRICIAN (Including Core Drilling) *ELECTRICIANS LOCAL 7*	06/30/2024	$50.01	$13.00	$14.86	$0.00	$77.87
	12/29/2024	$51.06	$13.25	$15.06	$0.00	$79.37
	06/29/2025	$52.16	$13.50	$15.21	$0.00	$80.87
	12/28/2025	$53.26	$13.75	$15.36	$0.00	$82.37
	06/28/2026	$54.41	$14.00	$15.46	$0.00	$83.87
	01/03/2027	$55.56	$14.25	$15.56	$0.00	$85.37

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELECTRICIAN - Local 7*

Effective Date - 06/30/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.00	$7.80	$0.60	$0.00	$28.40
2	45	$22.50	$7.80	$0.68	$0.00	$30.98
3	50	$25.01	$13.00	$7.40	$0.00	$45.41
4	55	$27.51	$13.00	$7.48	$0.00	$47.99
5	65	$32.51	$13.00	$9.64	$0.00	$55.15
6	70	$35.01	$13.00	$11.06	$0.00	$59.07

Effective Date - 12/29/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.42	$7.95	$0.60	$0.00	$28.97
2	45	$22.98	$7.95	$0.68	$0.00	$31.61
3	50	$25.53	$13.25	$7.40	$0.00	$46.18
4	55	$28.08	$13.25	$7.48	$0.00	$48.81
5	65	$33.19	$13.25	$9.64	$0.00	$56.08
6	70	$35.74	$13.25	$11.06	$0.00	$60.05

Notes:
Steps 1-2 are 1000 hrs; Steps 3-6 are 1500 hrs.

Apprentice to Journeyworker Ratio:2:3****

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 41*	01/01/2024	$61.98	$16.18	$20.96	$0.00	$99.12
	01/01/2025	$62.83	$16.28	$21.36	$0.00	$100.47
	01/01/2026	$63.68	$16.38	$21.76	$0.00	$101.82
	01/01/2027	$64.53	$16.48	$22.16	$0.00	$103.17

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELEVATOR CONSTRUCTOR - Local 41*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$30.99	$16.18	$0.00	$0.00	$47.17
2	55	$34.09	$16.18	$20.96	$0.00	$71.23
3	65	$40.29	$16.18	$20.96	$0.00	$77.43
4	70	$43.39	$16.18	$20.96	$0.00	$80.53
5	80	$49.58	$16.18	$20.96	$0.00	$86.72

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.42	$16.28	$0.00	$0.00	$47.70
2	55	$34.56	$16.28	$21.36	$0.00	$72.20
3	65	$40.84	$16.28	$21.36	$0.00	$78.48
4	70	$43.98	$16.28	$21.36	$0.00	$81.62
5	80	$50.26	$16.28	$21.36	$0.00	$87.90

Notes:
Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 41*	01/01/2024	$43.39	$16.18	$20.96	$0.00	$80.53
	01/01/2025	$43.98	$16.28	$21.36	$0.00	$81.62
	01/01/2026	$44.58	$16.38	$21.76	$0.00	$82.72
	01/01/2027	$45.17	$16.48	$22.16	$0.00	$83.81
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$34.80	$9.65	$15.06	$0.00	$59.51
	12/01/2024	$36.00	$9.65	$15.06	$0.00	$60.71
	06/01/2025	$37.25	$9.65	$15.06	$0.00	$61.96
	12/01/2025	$38.49	$9.65	$15.06	$0.00	$63.20
	06/01/2026	$39.79	$9.65	$15.06	$0.00	$64.50
	12/01/2026	$41.08	$9.65	$15.06	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FIELD ENG.INST/ROD-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 98*	06/01/1999	$18.84	$4.80	$4.10	$0.00	$27.74
FIELD ENG.PARTY CHIEF:BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 98*	06/01/1999	$21.33	$4.80	$4.10	$0.00	$30.23
FIELD ENG.SURVEY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 98*	06/01/1999	$22.33	$4.80	$4.10	$0.00	$31.23
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 7*	06/30/2024	$50.01	$13.00	$14.86	$0.00	$77.87
	12/29/2024	$51.06	$13.25	$15.06	$0.00	$79.37
	06/29/2025	$52.16	$13.50	$15.21	$0.00	$80.87
	12/28/2025	$53.26	$13.75	$15.36	$0.00	$82.37
	06/28/2026	$54.41	$14.00	$15.46	$0.00	$83.87
	01/03/2027	$55.56	$14.25	$15.56	$0.00	$85.37
For apprentice rates see "Apprentice- ELECTRICIAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING *ELECTRICIANS LOCAL 7*	06/30/2024	$50.01	$13.00	$14.86	$0.00	$77.87
	12/29/2024	$51.06	$13.25	$15.06	$0.00	$79.37
	06/29/2025	$52.16	$13.50	$15.21	$0.00	$80.87
	12/28/2025	$53.26	$13.75	$15.36	$0.00	$82.37
	06/28/2026	$54.41	$14.00	$15.46	$0.00	$83.87
	01/03/2027	$55.56	$14.25	$15.56	$0.00	$85.37
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96

Apprentice - *OPERATING ENGINEERS - Local 98 Class 3*

Effective Date - 12/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$23.42	$13.78	$15.15	$0.00	$52.35
2	70	$27.32	$13.78	$15.15	$0.00	$56.25
3	80	$31.22	$13.78	$15.15	$0.00	$60.15
4	90	$35.13	$13.78	$15.15	$0.00	$64.06

Notes:
Steps 1-2 are 1000 hrs.; Steps 3-4 are 2000 hrs.

Apprentice to Journeyworker Ratio:1:6

FLAGGER & SIGNALER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$27.01	$9.65	$15.06	$0.00	$51.72
	12/01/2024	$27.01	$9.65	$15.06	$0.00	$51.72
	06/01/2025	$28.09	$9.65	$15.06	$0.00	$52.80
	12/01/2025	$28.09	$9.65	$15.06	$0.00	$52.80
	06/01/2026	$29.21	$9.65	$15.06	$0.00	$53.92
	12/01/2026	$29.21	$9.65	$15.06	$0.00	$53.92
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE III*	03/01/2024	$41.41	$7.91	$18.15	$0.00	$67.47
	09/01/2024	$42.36	$7.91	$18.15	$0.00	$68.42
	03/01/2025	$43.26	$7.91	$18.15	$0.00	$69.32
	09/01/2025	$44.21	$7.91	$18.15	$0.00	$70.27
	03/01/2026	$45.11	$7.91	$18.15	$0.00	$71.17
	09/01/2026	$46.06	$7.91	$18.15	$0.00	$72.12
	03/01/2027	$46.96	$7.91	$18.15	$0.00	$73.02

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *FLOORCOVERER - Local 2168 Zone III*

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.71	$7.31	$1.38	$0.00	$29.40
2	55	$22.78	$7.31	$1.38	$0.00	$31.47
3	60	$24.85	$7.31	$2.76	$0.00	$34.92
4	65	$26.92	$7.31	$2.76	$0.00	$36.99
5	70	$28.99	$7.31	$15.39	$0.00	$51.69
6	75	$31.06	$7.31	$15.39	$0.00	$53.76
7	80	$33.13	$7.31	$16.77	$0.00	$57.21
8	85	$35.20	$7.31	$16.77	$0.00	$59.28

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.18	$7.31	$1.38	$0.00	$29.87
2	55	$23.30	$7.31	$1.38	$0.00	$31.99
3	60	$25.42	$7.31	$2.76	$0.00	$35.49
4	65	$27.53	$7.31	$2.76	$0.00	$37.60
5	70	$29.65	$7.31	$15.39	$0.00	$52.35
6	75	$31.77	$7.31	$15.39	$0.00	$54.47
7	80	$33.89	$7.31	$16.77	$0.00	$57.97
8	85	$36.01	$7.31	$16.77	$0.00	$60.09

Notes: Steps are 750 hrs.
% After 10/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)
Step 1&2 $26.72.24/ 3&4 $32.11/ 5&6 $50.75/ 7&8 $56.14

Apprentice to Journeyworker Ratio:1:1

FORK LIFT *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.25	$13.78	$15.15	$0.00	$68.18

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GENERATORS/LIGHTING PLANTS *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$35.80	$13.78	$15.15	$0.00	$64.73

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 1333*	06/01/2020	$39.18	$10.80	$10.45	$0.00	$60.43

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *GLAZIER - Local 1333*

Effective Date - 06/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.59	$10.80	$1.80	$0.00	$32.19
2	56	$22.04	$10.80	$1.80	$0.00	$34.64
3	63	$24.49	$10.80	$2.45	$0.00	$37.74
4	69	$26.94	$10.80	$2.45	$0.00	$40.19
5	75	$29.39	$10.80	$3.15	$0.00	$43.34
6	81	$31.83	$10.80	$3.15	$0.00	$45.78
7	88	$34.28	$10.80	$10.45	$0.00	$55.53
8	94	$36.73	$10.80	$10.45	$0.00	$57.98

Notes:

Apprentice to Journeyworker Ratio:1:3

GRADER/TRENCHING MACHINE/DERRICK *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 63*	07/01/2024	$40.98	$12.20	$18.74	$2.13	$74.05
	01/01/2025	$42.23	$12.20	$18.74	$2.13	$75.30
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 7*	06/30/2024	$50.01	$13.00	$14.86	$0.00	$77.87
	12/29/2024	$51.06	$13.25	$15.06	$0.00	$79.37
	06/29/2025	$52.16	$13.50	$15.21	$0.00	$80.87
	12/28/2025	$53.26	$13.75	$15.36	$0.00	$82.37
	06/28/2026	$54.41	$14.00	$15.46	$0.00	$83.87
	01/03/2027	$55.56	$14.25	$15.56	$0.00	$85.37
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 63*	07/01/2024	$40.98	$12.20	$18.74	$2.13	$74.05
	01/01/2025	$42.23	$12.20	$18.74	$2.13	$75.30
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PLUMBERS & PIPEFITTERS LOCAL 104*	03/17/2024	$49.21	$9.55	$17.10	$0.00	$75.86
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC *PLUMBERS & PIPEFITTERS LOCAL 104*	03/17/2024	$49.21	$9.55	$17.10	$0.00	$75.86
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$35.30	$9.65	$15.06	$0.00	$60.01
	12/01/2024	$36.50	$9.65	$15.06	$0.00	$61.21
	06/01/2025	$37.75	$9.65	$15.06	$0.00	$62.46
	12/01/2025	$38.99	$9.65	$15.06	$0.00	$63.70
	06/01/2026	$40.29	$9.65	$15.06	$0.00	$65.00
	12/01/2026	$41.58	$9.65	$15.06	$0.00	$66.29
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD)*	09/01/2023	$42.80	$14.75	$19.61	$0.00	$77.16
	09/01/2024	$45.54	$14.75	$19.61	$0.00	$79.90
	09/01/2025	$48.27	$14.75	$19.61	$0.00	$82.63
	09/01/2026	$51.01	$14.75	$19.61	$0.00	$85.37

Apprentice - *ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Springfield*

Effective Date - 09/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.40	$14.75	$14.32	$0.00	$50.47
2	60	$25.68	$14.75	$15.37	$0.00	$55.80
3	70	$29.96	$14.75	$16.43	$0.00	$61.14
4	80	$34.24	$14.75	$17.49	$0.00	$66.48

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.77	$14.75	$14.32	$0.00	$51.84
2	60	$27.32	$14.75	$15.37	$0.00	$57.44
3	70	$31.88	$14.75	$16.43	$0.00	$63.06
4	80	$36.43	$14.75	$17.49	$0.00	$68.67

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (SPRINGFIELD AREA)*	03/16/2024	$40.66	$8.25	$22.70	$0.00	$71.61

Apprentice - *IRONWORKER - Local 7 Springfield*

Effective Date - 03/16/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$24.40	$8.25	$22.70	$0.00	$55.35
2	70	$28.46	$8.25	$22.70	$0.00	$59.41
3	75	$30.50	$8.25	$22.70	$0.00	$61.45
4	80	$32.53	$8.25	$22.70	$0.00	$63.48
5	85	$34.56	$8.25	$22.70	$0.00	$65.51
6	90	$36.59	$8.25	$22.70	$0.00	$67.54

Notes:

Apprentice to Journeyworker Ratio:1:4

JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$33.88	$9.65	$16.84	$0.00	$60.37

For apprentice rates see "Apprentice- LABORER"

LABORER *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$33.50	$9.65	$16.84	$0.00	$59.99

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LABORER - Zone 3 Building & Site*

Effective Date - 12/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$20.10	$9.65	$16.84	$0.00	$46.59
2	70	$23.45	$9.65	$16.84	$0.00	$49.94
3	80	$26.80	$9.65	$16.84	$0.00	$53.29
4	90	$30.15	$9.65	$16.84	$0.00	$56.64

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$34.55	$9.65	$15.06	$0.00	$59.26
	12/01/2024	$35.75	$9.65	$15.06	$0.00	$60.46
	06/01/2025	$37.00	$9.65	$15.06	$0.00	$61.71
	12/01/2025	$38.24	$9.65	$15.06	$0.00	$62.95
	06/01/2026	$39.54	$9.65	$15.06	$0.00	$64.25
	12/01/2026	$40.83	$9.65	$15.06	$0.00	$65.54

Apprentice - *LABORER (Heavy & Highway) - Zone 3*

Effective Date - 06/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$20.73	$9.65	$15.06	$0.00	$45.44
2	70	$24.19	$9.65	$15.06	$0.00	$48.90
3	80	$27.64	$9.65	$15.06	$0.00	$52.35
4	90	$31.10	$9.65	$15.06	$0.00	$55.81

Effective Date - 12/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.45	$9.65	$15.06	$0.00	$46.16
2	70	$25.03	$9.65	$15.06	$0.00	$49.74
3	80	$28.60	$9.65	$15.06	$0.00	$53.31
4	90	$32.18	$9.65	$15.06	$0.00	$56.89

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$33.50	$9.65	$16.84	$0.00	$59.99
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$34.13	$9.40	$16.59	$0.00	$60.12
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$33.60	$9.65	$16.97	$0.00	$60.22

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$34.63	$9.65	$16.84	$0.00	$61.12
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$34.80	$9.65	$15.06	$0.00	$59.51
	12/01/2024	$36.00	$9.65	$15.06	$0.00	$60.71
	06/01/2025	$37.25	$9.65	$15.06	$0.00	$61.96
	12/01/2025	$38.49	$9.65	$15.06	$0.00	$63.20
	06/01/2026	$39.79	$9.65	$15.06	$0.00	$64.50
	12/01/2026	$41.08	$9.65	$15.06	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$33.50	$9.65	$16.84	$0.00	$59.99
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$33.50	$9.65	$16.84	$0.00	$59.99
This classification applies to the removal of standing trees, and the trimming and removal of branches and limbs when related to public works construction or site clearance incidental to construction . For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$33.88	$9.65	$16.84	$0.00	$60.37
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$34.80	$9.65	$15.06	$0.00	$59.51
	12/01/2024	$36.00	$9.65	$15.06	$0.00	$60.71
	06/01/2025	$37.25	$9.65	$15.06	$0.00	$61.96
	12/01/2025	$38.49	$9.65	$15.06	$0.00	$63.20
	06/01/2026	$39.79	$9.65	$15.06	$0.00	$64.50
	12/01/2026	$41.08	$9.65	$15.06	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE*	08/01/2024	$43.05	$11.49	$20.53	$0.00	$75.07
	02/01/2025	$44.90	$11.49	$20.53	$0.00	$76.92
	08/01/2025	$45.81	$11.49	$20.53	$0.00	$77.83
	02/01/2026	$46.89	$11.49	$20.53	$0.00	$78.91
	08/01/2026	$48.65	$11.49	$20.53	$0.00	$80.67
	02/01/2027	$49.77	$11.49	$20.53	$0.00	$81.79

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE-TILE FINISHER-Local 3 Marble/Tile (Spr/Pitt)*

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.53	$11.49	$20.53	$0.00	$53.55
2	60	$25.83	$11.49	$20.53	$0.00	$57.85
3	70	$30.14	$11.49	$20.53	$0.00	$62.16
4	80	$34.44	$11.49	$20.53	$0.00	$66.46
5	90	$38.75	$11.49	$20.53	$0.00	$70.77

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.45	$11.49	$20.53	$0.00	$54.47
2	60	$26.94	$11.49	$20.53	$0.00	$58.96
3	70	$31.43	$11.49	$20.53	$0.00	$63.45
4	80	$35.92	$11.49	$20.53	$0.00	$67.94
5	90	$40.41	$11.49	$20.53	$0.00	$72.43

Notes:

Apprentice to Journeyworker Ratio:1:5

MARBLE MASON/TILE LAYER(SP/PT)SeeBrick
BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE

See "BRICK/STONE/ARTIFICIAL MASONRY(INCL.MASONRY WATERPROOFING)

MECH. SWEEPER OPERATOR (ON CONST. SITES) *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANIC/WELDER/BOOM TRUCK *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 3) *MILLWRIGHTS LOCAL 1121 - Zone 3*	01/01/2024	$41.20	$10.08	$21.22	$0.00	$72.50
	01/06/2025	$43.48	$10.08	$21.22	$0.00	$74.78
	01/05/2026	$45.76	$10.08	$21.22	$0.00	$77.06

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 3*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$22.66	$10.08	$5.36	$0.00	$38.10
2	65	$26.78	$10.08	$6.34	$0.00	$43.20
3	75	$30.90	$10.08	$18.78	$0.00	$59.76
4	85	$35.02	$10.08	$19.76	$0.00	$64.86

Effective Date - 01/06/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$23.91	$10.08	$5.36	$0.00	$39.35
2	65	$28.26	$10.08	$6.34	$0.00	$44.68
3	75	$32.61	$10.08	$18.78	$0.00	$61.47
4	85	$36.96	$10.08	$19.76	$0.00	$66.80

Notes: Step 1&2 Appr. indentured after 1/6/2020 receive no pension, but do receive annuity. (Step 1 $5.72, Step 2 $6.66)
Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:4

MORTAR MIXER *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$33.88	$9.65	$16.84	$0.00	$60.37
For apprentice rates see "Apprentice- LABORER"						
OILER *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$35.02	$13.78	$15.15	$0.00	$63.95
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS VI *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$32.74	$13.78	$15.15	$0.00	$61.67
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 3*	07/01/2024	$57.26	$9.95	$23.95	$0.00	$91.16
	01/01/2025	$58.46	$9.95	$23.95	$0.00	$92.36

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.63	$9.95	$0.00	$0.00	$38.58
2	55	$31.49	$9.95	$6.66	$0.00	$48.10
3	60	$34.36	$9.95	$7.26	$0.00	$51.57
4	65	$37.22	$9.95	$7.87	$0.00	$55.04
5	70	$40.08	$9.95	$20.32	$0.00	$70.35
6	75	$42.95	$9.95	$20.93	$0.00	$73.83
7	80	$45.81	$9.95	$21.53	$0.00	$77.29
8	90	$51.53	$9.95	$22.74	$0.00	$84.22

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$29.23	$9.95	$0.00	$0.00	$39.18
2	55	$32.15	$9.95	$6.66	$0.00	$48.76
3	60	$35.08	$9.95	$7.26	$0.00	$52.29
4	65	$38.00	$9.95	$7.87	$0.00	$55.82
5	70	$40.92	$9.95	$20.32	$0.00	$71.19
6	75	$43.85	$9.95	$20.93	$0.00	$74.73
7	80	$46.77	$9.95	$21.53	$0.00	$78.25
8	90	$52.61	$9.95	$22.74	$0.00	$85.30

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) *	07/01/2024	$40.03	$9.65	$19.90	$0.00	$69.58
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 3*	01/01/2025	$41.23	$9.65	$19.90	$0.00	$70.78

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 3 - Spray/Sandblast - New*

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.02	$9.95	$0.00	$0.00	$29.97
2	55	$22.02	$9.95	$4.43	$0.00	$36.40
3	60	$24.02	$9.95	$4.83	$0.00	$38.80
4	65	$26.02	$9.95	$5.23	$0.00	$41.20
5	70	$28.02	$9.95	$17.49	$0.00	$55.46
6	75	$30.02	$9.95	$17.89	$0.00	$57.86
7	80	$32.02	$9.95	$18.29	$0.00	$60.26
8	90	$36.03	$9.95	$19.10	$0.00	$65.08

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.62	$9.95	$0.00	$0.00	$30.57
2	55	$22.68	$9.95	$4.43	$0.00	$37.06
3	60	$24.74	$9.95	$4.83	$0.00	$39.52
4	65	$26.80	$9.95	$5.23	$0.00	$41.98
5	70	$28.86	$9.95	$17.49	$0.00	$56.30
6	75	$30.92	$9.95	$17.89	$0.00	$58.76
7	80	$32.98	$9.95	$18.29	$0.00	$61.22
8	90	$37.11	$9.95	$19.10	$0.00	$66.16

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT) *PAINTERS LOCAL 35 - ZONE 3*	07/01/2024	$37.35	$9.95	$19.90	$0.00	$67.20
	01/01/2025	$38.55	$9.95	$19.90	$0.00	$68.40

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 3 - Spray/Sandblast - Repaint*

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$18.68	$9.95	$0.00	$0.00	$28.63
2	55	$20.54	$9.95	$4.43	$0.00	$34.92
3	60	$22.41	$9.95	$4.83	$0.00	$37.19
4	65	$24.28	$9.95	$5.23	$0.00	$39.46
5	70	$26.15	$9.95	$17.49	$0.00	$53.59
6	75	$28.01	$9.95	$17.89	$0.00	$55.85
7	80	$29.88	$9.95	$18.29	$0.00	$58.12
8	90	$33.62	$9.95	$19.10	$0.00	$62.67

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.28	$9.95	$0.00	$0.00	$29.23
2	55	$21.20	$9.95	$4.43	$0.00	$35.58
3	60	$23.13	$9.95	$4.83	$0.00	$37.91
4	65	$25.06	$9.95	$5.23	$0.00	$40.24
5	70	$26.99	$9.95	$17.49	$0.00	$54.43
6	75	$28.91	$9.95	$17.89	$0.00	$56.75
7	80	$30.84	$9.95	$18.29	$0.00	$59.08
8	90	$34.70	$9.95	$19.10	$0.00	$63.75

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	07/01/2024	$38.63	$9.95	$19.90	$0.00	$68.48
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 3*	01/01/2025	$39.83	$9.95	$19.90	$0.00	$69.68

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER - Local 35 Zone 3 - BRUSH NEW*

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.32	$9.95	$0.00	$0.00	$29.27
2	55	$21.25	$9.95	$4.43	$0.00	$35.63
3	60	$23.18	$9.95	$4.83	$0.00	$37.96
4	65	$25.11	$9.95	$5.23	$0.00	$40.29
5	70	$27.04	$9.95	$17.49	$0.00	$54.48
6	75	$28.97	$9.95	$17.89	$0.00	$56.81
7	80	$30.90	$9.95	$18.29	$0.00	$59.14
8	90	$34.77	$9.95	$19.10	$0.00	$63.82

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.92	$9.95	$0.00	$0.00	$29.87
2	55	$21.91	$9.95	$4.43	$0.00	$36.29
3	60	$23.90	$9.95	$4.83	$0.00	$38.68
4	65	$25.89	$9.95	$5.23	$0.00	$41.07
5	70	$27.88	$9.95	$17.49	$0.00	$55.32
6	75	$29.87	$9.95	$17.89	$0.00	$57.71
7	80	$31.86	$9.95	$18.29	$0.00	$60.10
8	90	$35.85	$9.95	$19.10	$0.00	$64.90

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 3*	07/01/2024	$35.95	$9.95	$19.90	$0.00	$65.80
	01/01/2025	$37.15	$9.95	$19.90	$0.00	$67.00

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 3 - BRUSH REPAINT*

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.98	$9.95	$0.00	$0.00	$27.93
2	55	$19.77	$9.95	$4.43	$0.00	$34.15
3	60	$21.57	$9.95	$4.83	$0.00	$36.35
4	65	$23.37	$9.95	$5.23	$0.00	$38.55
5	70	$25.17	$9.95	$17.49	$0.00	$52.61
6	75	$26.96	$9.95	$17.89	$0.00	$54.80
7	80	$28.76	$9.95	$18.29	$0.00	$57.00
8	90	$32.36	$9.95	$19.10	$0.00	$61.41

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$18.58	$9.95	$0.00	$0.00	$28.53
2	55	$20.43	$9.95	$4.43	$0.00	$34.81
3	60	$22.29	$9.95	$4.83	$0.00	$37.07
4	65	$24.15	$9.95	$5.23	$0.00	$39.33
5	70	$26.01	$9.95	$17.49	$0.00	$53.45
6	75	$27.86	$9.95	$17.89	$0.00	$55.70
7	80	$29.72	$9.95	$18.29	$0.00	$57.96
8	90	$33.44	$9.95	$19.10	$0.00	$62.49

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$34.55	$9.65	$15.06	$0.00	$59.26
	12/01/2024	$35.75	$9.65	$15.06	$0.00	$60.46
	06/01/2025	$37.00	$9.65	$15.06	$0.00	$61.71
	12/01/2025	$38.24	$9.65	$15.06	$0.00	$62.95
	06/01/2026	$39.54	$9.65	$15.06	$0.00	$64.25
	12/01/2026	$40.83	$9.65	$15.06	$0.00	$65.54

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)

PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2024	$39.78	$15.07	$18.67	$0.00	$73.52
	12/01/2024	$39.78	$15.07	$20.17	$0.00	$75.02
	01/01/2025	$39.78	$15.57	$20.17	$0.00	$75.52
	06/01/2025	$40.78	$15.57	$20.17	$0.00	$76.52
	12/01/2025	$40.78	$15.57	$21.78	$0.00	$78.13
	01/01/2026	$40.78	$16.17	$21.78	$0.00	$78.73
	06/01/2026	$41.78	$16.17	$21.78	$0.00	$79.73
	12/01/2026	$41.78	$16.17	$23.52	$0.00	$81.47
	01/01/2027	$41.78	$16.77	$23.52	$0.00	$82.07

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) *PILE DRIVER LOCAL 56 (ZONE 3)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	$43.53	$9.40	$23.12	$0.00	$76.05
PILE DRIVER *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2020	$43.53	$9.40	$23.12	$0.00	$76.05

Apprentice - *PILE DRIVER - Local 56 Zone 3*

Effective Date - 08/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	0	$0.00	$0.00	$0.00	$0.00	$0.00

Notes: Apprentice wages shall be no less than the following Steps;
(Same as set in Zone 1)
1$57.06/2$61.96/3$66.87/4$69.32/5$71.78/6$71.78/7$76.68/8$76.68

Apprentice to Journeyworker Ratio:1:5

PIPELAYER *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$33.88	$9.65	$16.84	$0.00	$60.37
PIPELAYER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$34.80	$9.65	$15.06	$0.00	$59.51
	12/01/2024	$36.00	$9.65	$15.06	$0.00	$60.71
	06/01/2025	$37.25	$9.65	$15.06	$0.00	$61.96
	12/01/2025	$38.49	$9.65	$15.06	$0.00	$63.20
	06/01/2026	$39.79	$9.65	$15.06	$0.00	$64.50
	12/01/2026	$41.08	$9.65	$15.06	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
PLUMBER & PIPEFITTER *PLUMBERS & PIPEFITTERS LOCAL 104*	03/17/2024	$49.21	$9.55	$17.10	$0.00	$75.86

Apprentice - *PLUMBER/PIPEFITTER - Local 104*

Effective Date - 03/17/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$22.14	$9.55	$10.10	$0.00	$41.79
2	50	$24.61	$9.55	$10.10	$0.00	$44.26
3	55	$27.07	$9.55	$10.10	$0.00	$46.72
4	60	$29.53	$9.55	$10.10	$0.00	$49.18
5	65	$31.99	$9.55	$10.10	$0.00	$51.64
6	70	$34.45	$9.55	$10.10	$0.00	$54.10
7	75	$36.91	$9.55	$10.10	$0.00	$56.56
8	80	$39.37	$9.55	$10.10	$0.00	$59.02
9	80	$39.37	$9.55	$17.10	$0.00	$66.02
10	80	$39.37	$9.55	$17.10	$0.00	$66.02

Notes: **1:1,2:5,3:9,4:12

Apprentice to Journeyworker Ratio:**

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PNEUMATIC CONTROLS (TEMP.) *PLUMBERS & PIPEFITTERS LOCAL 104* For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"	03/17/2024	$49.21	$9.55	$17.10	$0.00	$75.86
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$34.80	$9.65	$15.06	$0.00	$59.51
	12/01/2024	$36.00	$9.65	$15.06	$0.00	$60.71
	06/01/2025	$37.25	$9.65	$15.06	$0.00	$61.96
	12/01/2025	$38.49	$9.65	$15.06	$0.00	$63.20
	06/01/2026	$39.79	$9.65	$15.06	$0.00	$64.50
	12/01/2026	$41.08	$9.65	$15.06	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWDERMAN & BLASTER *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$35.13	$9.40	$16.59	$0.00	$61.12
POWDERMAN & BLASTER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$35.55	$9.65	$15.06	$0.00	$60.26
	12/01/2024	$36.75	$9.65	$15.06	$0.00	$61.46
	06/01/2025	$38.00	$9.65	$15.06	$0.00	$62.71
	12/01/2025	$39.24	$9.65	$15.06	$0.00	$63.95
	06/01/2026	$40.54	$9.65	$15.06	$0.00	$65.25
	12/01/2026	$41.83	$9.65	$15.06	$0.00	$66.54
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96
READY-MIX CONCRETE DRIVER *TEAMSTERS 404 - Construction Service (Northampton)*	05/01/2024	$26.14	$11.82	$7.25	$0.00	$45.21
RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2023	$33.88	$9.65	$16.84	$0.00	$60.37
ROLLER OPERATOR *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$38.42	$13.78	$15.15	$0.00	$67.35
ROOFER (Coal tar pitch) *ROOFERS LOCAL 248* For apprentice rates see "Apprentice- ROOFER"	07/16/2023	$38.91	$10.35	$18.00	$0.00	$67.26
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 248*	07/16/2023	$38.41	$10.35	$18.00	$0.00	$66.76

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ROOFER - Local 248*

Effective Date - 07/16/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$23.05	$10.35	$0.00	$0.00	$33.40
2	65	$24.97	$10.35	$18.00	$0.00	$53.32
3	70	$26.89	$10.35	$18.00	$0.00	$55.24
4	75	$28.81	$10.35	$18.00	$0.00	$57.16
5	80	$30.73	$10.35	$18.00	$0.00	$59.08
6	85	$32.65	$10.35	$18.00	$0.00	$61.00
7	90	$34.57	$10.35	$18.00	$0.00	$62.92
8	95	$36.49	$10.35	$18.00	$0.00	$64.84

Notes:

Steps are 750 hrs.Roofer(Tear Off)1:1; Same as above

Apprentice to Journeyworker Ratio:1:3

ROOFER SLATE / TILE / PRECAST CONCRETE *ROOFERS LOCAL 248* For apprentice rates see "Apprentice- ROOFER"	07/16/2023	$38.91	$10.35	$18.00	$0.00	$67.26
SCRAPER *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96
SELF-POWERED ROLLERS AND COMPACTORS (TAMPERS) *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$38.42	$13.78	$15.15	$0.00	$67.35
SELF-PROPELLED POWER BROOM *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$35.80	$13.78	$15.15	$0.00	$64.73
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 63*	07/01/2024	$40.98	$12.20	$18.74	$2.13	$74.05
	01/01/2025	$42.23	$12.20	$18.74	$2.13	$75.30

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SHEET METAL WORKER - Local 63*

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$18.44	$5.49	$4.86	$0.85	$29.64
2	50	$20.49	$6.10	$5.40	$0.94	$32.93
3	55	$22.54	$6.71	$9.71	$1.15	$40.11
4	60	$24.59	$7.32	$9.71	$1.23	$42.85
5	65	$26.64	$7.93	$9.71	$1.31	$45.59
6	70	$28.69	$8.54	$9.71	$1.39	$48.33
7	75	$30.74	$9.15	$9.71	$1.47	$51.07
8	80	$32.78	$9.76	$17.66	$1.78	$61.98
9	85	$34.83	$10.37	$17.66	$1.86	$64.72
10	90	$36.88	$10.98	$17.66	$1.94	$67.46

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$19.00	$5.49	$4.86	$0.85	$30.20
2	50	$21.12	$6.10	$5.40	$0.94	$33.56
3	55	$23.23	$6.71	$9.71	$1.15	$40.80
4	60	$25.34	$7.32	$9.71	$1.23	$43.60
5	65	$27.45	$7.93	$9.71	$1.31	$46.40
6	70	$29.56	$8.54	$9.71	$1.39	$49.20
7	75	$31.67	$9.15	$9.71	$1.47	$52.00
8	80	$33.78	$9.76	$17.66	$1.78	$62.98
9	85	$35.90	$10.37	$17.66	$1.86	$65.79
10	90	$38.01	$10.98	$17.66	$1.94	$68.59

Notes:

Apprentice to Journeyworker Ratio:1:3

SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2024	$40.24	$15.07	$18.67	$0.00	$73.98
	12/01/2024	$40.24	$15.07	$20.17	$0.00	$75.48
	01/01/2025	$40.24	$15.57	$20.17	$0.00	$75.98
	06/01/2025	$41.24	$15.57	$20.17	$0.00	$76.98
	12/01/2025	$41.24	$15.57	$21.78	$0.00	$78.59
	01/01/2026	$41.24	$16.17	$21.78	$0.00	$79.19
	06/01/2026	$42.24	$16.17	$21.78	$0.00	$80.19
	12/01/2026	$42.24	$16.17	$23.52	$0.00	$81.93
	01/01/2027	$42.24	$16.77	$23.52	$0.00	$82.53

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2024	$40.53	$15.07	$18.67	$0.00	$74.27
	12/01/2024	$40.53	$15.07	$20.17	$0.00	$75.77
	01/01/2025	$40.53	$15.57	$20.17	$0.00	$76.27
	06/01/2025	$41.53	$15.57	$20.17	$0.00	$77.27
	12/01/2025	$41.53	$15.57	$21.78	$0.00	$78.88
	01/01/2026	$41.53	$16.17	$21.78	$0.00	$79.48
	06/01/2026	$42.53	$16.17	$21.78	$0.00	$80.48
	12/01/2026	$42.53	$16.17	$23.52	$0.00	$82.22
	01/01/2027	$42.53	$16.77	$23.52	$0.00	$82.82
SPRINKLER FITTER *SPRINKLER FITTERS LOCAL 669*	04/01/2023	$47.43	$11.45	$16.61	$0.00	$75.49

Apprentice - *SPRINKLER FITTER - Local 669*

Effective Date - 04/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$21.34	$8.22	$0.00	$0.00	$29.56
2	50	$23.72	$8.22	$0.00	$0.00	$31.94
3	55	$26.09	$11.45	$7.20	$0.00	$44.74
4	60	$28.46	$11.45	$8.35	$0.00	$48.26
5	65	$30.83	$11.45	$8.35	$0.00	$50.63
6	70	$33.20	$11.45	$8.60	$0.00	$53.25
7	75	$35.57	$11.45	$8.60	$0.00	$55.62
8	80	$37.94	$11.45	$8.60	$0.00	$57.99
9	85	$40.32	$11.45	$8.60	$0.00	$60.37
10	90	$42.69	$11.45	$8.60	$0.00	$62.74

Notes:

Apprentice to Journeyworker Ratio:1:1

TELECOMMUNICATION TECHNICIAN *ELECTRICIANS LOCAL 7*	06/30/2024	$50.01	$13.00	$14.86	$0.00	$77.87
	12/29/2024	$51.06	$13.25	$15.06	$0.00	$79.37
	06/29/2025	$52.16	$13.50	$15.21	$0.00	$80.87
	12/28/2025	$53.26	$13.75	$15.36	$0.00	$82.37
	06/28/2026	$54.41	$14.00	$15.46	$0.00	$83.87
	01/03/2027	$55.56	$14.25	$15.56	$0.00	$85.37

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 7*

Effective Date - 06/30/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.00	$7.20	$0.60	$0.00	$27.80
2	45	$22.50	$7.20	$0.68	$0.00	$30.38
3	50	$25.01	$13.00	$7.40	$0.00	$45.41
4	55	$27.51	$13.00	$7.48	$0.00	$47.99
5	65	$32.51	$13.00	$9.64	$0.00	$55.15
6	70	$35.01	$13.00	$11.06	$0.00	$59.07

Effective Date - 12/29/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.42	$7.95	$0.60	$0.00	$28.97
2	45	$22.98	$7.95	$0.68	$0.00	$31.61
3	50	$25.53	$13.25	$7.40	$0.00	$46.18
4	55	$28.08	$13.25	$7.48	$0.00	$48.81
5	65	$33.19	$13.25	$9.64	$0.00	$56.08
6	70	$35.74	$13.25	$11.06	$0.00	$60.05

Notes:
Steps are 800 hours

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS *BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE*	08/01/2024	$63.44	$11.49	$23.59	$0.00	$98.52
	02/01/2025	$64.74	$11.49	$23.59	$0.00	$99.82
	08/01/2025	$66.89	$11.49	$23.59	$0.00	$101.97
	02/10/2026	$68.24	$11.49	$23.59	$0.00	$103.32
	08/01/2026	$70.44	$11.49	$23.59	$0.00	$105.52
	02/01/2027	$71.84	$11.49	$23.59	$0.00	$106.92

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TERRAZZO FINISHER-Local 3 Marble/Tile (Spr/Ptt)*

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.72	$11.49	$23.59	$0.00	$66.80
2	60	$38.06	$11.49	$23.59	$0.00	$73.14
3	70	$44.41	$11.49	$23.59	$0.00	$79.49
4	80	$50.75	$11.49	$23.59	$0.00	$85.83
5	90	$57.10	$11.49	$23.59	$0.00	$92.18

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$32.37	$11.49	$23.59	$0.00	$67.45
2	60	$38.84	$11.49	$23.59	$0.00	$73.92
3	70	$45.32	$11.49	$23.59	$0.00	$80.40
4	80	$51.79	$11.49	$23.59	$0.00	$86.87
5	90	$58.27	$11.49	$23.59	$0.00	$93.35

Notes:

Apprentice to Journeyworker Ratio:1:5

TERRAZZO MECHANIC *BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE*	08/01/2024	$64.52	$11.49	$23.56	$0.00	$99.57
	02/01/2025	$65.82	$11.49	$23.56	$0.00	$100.87
	08/01/2025	$67.97	$11.49	$23.56	$0.00	$103.02
	02/01/2026	$69.32	$11.49	$23.56	$0.00	$104.37
	08/01/2026	$71.52	$11.49	$23.56	$0.00	$106.57
	02/01/2027	$72.92	$11.49	$23.56	$0.00	$107.97

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TERRAZZO MECH - Local 3 Marble/Tile (Spr/Pitt)*

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$32.26	$11.49	$23.56	$0.00	$67.31
2	60	$38.71	$11.49	$23.56	$0.00	$73.76
3	70	$45.16	$11.49	$23.56	$0.00	$80.21
4	80	$51.62	$11.49	$23.56	$0.00	$86.67
5	90	$58.07	$11.49	$23.56	$0.00	$93.12

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$32.91	$11.49	$23.56	$0.00	$67.96
2	60	$39.49	$11.49	$23.56	$0.00	$74.54
3	70	$46.07	$11.49	$23.56	$0.00	$81.12
4	80	$52.66	$11.49	$23.56	$0.00	$87.71
5	90	$59.24	$11.49	$23.56	$0.00	$94.29

Notes:

Apprentice to Journeyworker Ratio:1:5

TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE*	06/01/2024	$49.81	$9.65	$18.22	$0.00	$77.68
	12/01/2024	$51.28	$9.65	$18.22	$0.00	$79.15
	06/01/2025	$52.78	$9.65	$18.22	$0.00	$80.65
	12/01/2025	$54.28	$9.65	$18.22	$0.00	$82.15
	06/01/2026	$55.83	$9.65	$18.22	$0.00	$83.70
	12/01/2026	$57.33	$9.65	$18.22	$0.00	$85.20
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE*	06/01/2024	$45.60	$9.65	$18.22	$0.00	$73.47
	12/01/2024	$47.07	$9.65	$18.22	$0.00	$74.94
	06/01/2025	$48.57	$9.65	$18.22	$0.00	$76.44
	12/01/2025	$50.07	$9.65	$18.22	$0.00	$77.94
	06/01/2026	$51.62	$9.65	$18.22	$0.00	$79.49
	12/01/2026	$53.12	$9.65	$18.22	$0.00	$80.99
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2024	$45.48	$9.65	$18.22	$0.00	$73.35
	12/01/2024	$46.95	$9.65	$18.22	$0.00	$74.82
	06/01/2025	$48.45	$9.65	$18.22	$0.00	$76.32
	12/01/2025	$49.95	$9.65	$18.22	$0.00	$77.82
	06/01/2026	$51.50	$9.65	$18.22	$0.00	$79.37
	12/01/2026	$53.00	$9.65	$18.22	$0.00	$80.87
For apprentice rates see "Apprentice- LABORER"						
TRACTORS *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$38.42	$13.78	$15.15	$0.00	$67.35
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2024	$40.82	$15.07	$18.67	$0.00	$74.56
	12/01/2024	$40.82	$15.07	$20.17	$0.00	$76.06
	01/01/2025	$40.82	$15.57	$20.17	$0.00	$76.56
	06/01/2025	$41.82	$15.57	$20.17	$0.00	$77.56
	12/01/2025	$41.82	$15.57	$21.78	$0.00	$79.17
	01/01/2026	$41.82	$16.17	$21.78	$0.00	$79.77
	06/01/2026	$42.82	$16.17	$21.78	$0.00	$80.77
	12/01/2026	$42.82	$16.17	$23.52	$0.00	$82.51
	01/01/2027	$42.82	$16.77	$23.52	$0.00	$83.11
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)*	06/01/2024	$57.71	$9.65	$19.00	$0.00	$86.36
	12/01/2024	$59.18	$9.65	$19.00	$0.00	$87.83
	06/01/2025	$60.68	$9.65	$19.00	$0.00	$89.33
	12/01/2025	$62.18	$9.65	$19.00	$0.00	$90.83
	06/01/2026	$63.73	$9.65	$19.00	$0.00	$92.38
	12/01/2026	$65.23	$9.65	$19.00	$0.00	$93.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	06/01/2024	$59.71	$9.65	$19.00	$0.00	$88.36
	12/01/2024	$61.18	$9.65	$19.00	$0.00	$89.83
	06/01/2025	$62.68	$9.65	$19.00	$0.00	$91.33
	12/01/2025	$64.18	$9.65	$19.00	$0.00	$92.83
	06/01/2026	$65.73	$9.65	$19.00	$0.00	$94.38
	12/01/2026	$67.23	$9.65	$19.00	$0.00	$95.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	06/01/2024	$49.78	$9.65	$19.00	$0.00	$78.43
	12/01/2024	$51.25	$9.65	$19.00	$0.00	$79.90
	06/01/2025	$52.75	$9.65	$19.00	$0.00	$81.40
	12/01/2025	$54.25	$9.65	$19.00	$0.00	$82.90
	06/01/2026	$55.80	$9.65	$19.00	$0.00	$84.45
	12/01/2026	$57.30	$9.65	$19.00	$0.00	$85.95
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	06/01/2024	$51.78	$9.65	$19.00	$0.00	$80.43
	12/01/2024	$53.25	$9.65	$19.00	$0.00	$81.90
	06/01/2025	$54.75	$9.65	$19.00	$0.00	$83.40
	12/01/2025	$56.25	$9.65	$19.00	$0.00	$84.90
	06/01/2026	$57.80	$9.65	$19.00	$0.00	$86.45
	12/01/2026	$59.30	$9.65	$19.00	$0.00	$87.95
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2024	$40.24	$15.07	$18.67	$0.00	$73.98
	12/01/2024	$40.24	$15.07	$20.17	$0.00	$75.48
	01/01/2025	$40.24	$15.57	$20.17	$0.00	$75.98
	06/01/2025	$41.24	$15.57	$20.17	$0.00	$76.98
	12/01/2025	$41.24	$15.57	$21.78	$0.00	$78.59
	01/01/2026	$41.24	$16.17	$21.78	$0.00	$79.19
	06/01/2026	$42.24	$16.17	$21.78	$0.00	$80.19
	12/01/2026	$42.24	$16.17	$23.52	$0.00	$81.93
	01/01/2027	$42.24	$16.77	$23.52	$0.00	$82.53

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
WAGON DRILL OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)*	12/01/2023	$34.38	$9.40	$16.59	$0.00	$60.37
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2024	$34.80	$9.65	$15.06	$0.00	$59.51
	12/01/2024	$36.00	$9.65	$15.06	$0.00	$60.71
	06/01/2025	$37.25	$9.65	$15.06	$0.00	$61.96
	12/01/2025	$38.49	$9.65	$15.06	$0.00	$63.20
	06/01/2026	$39.79	$9.65	$15.06	$0.00	$64.50
	12/01/2026	$41.08	$9.65	$15.06	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WATER METER INSTALLER *PLUMBERS & PIPEFITTERS LOCAL 104*	03/17/2024	$49.21	$9.55	$17.10	$0.00	$75.86
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Marine Drilling						
BLASTER *MARINE DRILLING*	01/01/2018	$41.82	$7.63	$3.60	$0.00	$53.05
BOAT CAPTAIN *MARINE DRILLING*	01/01/2018	$33.87	$7.63	$3.30	$0.00	$44.80
BOAT CAPTAIN / Over 1,000 hp *MARINE DRILLING*	01/01/2018	$38.06	$7.63	$3.60	$0.00	$49.29
CORE DRILLER *MARINE DRILLING*	01/01/2018	$31.43	$7.63	$2.90	$0.00	$41.96
CORE DRILLER HELPER *MARINE DRILLING*	01/01/2018	$28.47	$7.63	$3.00	$0.00	$39.10
DRILLER *MARINE DRILLING*	01/01/2018	$39.70	$7.63	$3.60	$0.00	$50.93
ENGINEER *MARINE DRILLING*	01/01/2018	$39.69	$7.63	$3.50	$0.00	$50.82
HELPER *MARINE DRILLING*	01/01/2018	$34.24	$7.63	$3.00	$0.00	$44.87
MACHINIST *MARINE DRILLING*	01/01/2018	$38.88	$7.63	$3.30	$0.00	$49.81
OILER - MARINE DRILLING *MARINE DRILLING*	01/01/2018	$34.24	$7.63	$3.00	$0.00	$44.87
TUG DECKHAND *MARINE DRILLING*	01/01/2018	$27.61	$7.63	$3.00	$0.00	$38.24
WELDER *MARINE DRILLING*	01/01/2018	$38.88	$7.63	$3.30	$0.00	$49.81
Op Eng Marine (Dredging Work)						
BOAT OPERATOR *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$29.26	$7.63	$3.30	$0.00	$40.19
CERTIFIED WELDER *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$31.09	$7.63	$3.60	$0.00	$42.32
CHIEF WELDER/ CHIEF MATE *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$33.02	$7.63	$3.60	$0.00	$44.25
DERRICK / SPIDER / SPILLBARGE OPERATOR *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$33.02	$7.63	$3.60	$0.00	$44.25
DRAG BARGE OPERATOR / WELDER / MATE *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$30.24	$7.63	$3.30	$0.00	$41.17

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ENGINEER / ELECTRICIAN *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$33.02	$7.63	$3.60	$0.00	$44.25
LICENSED BOAT OPERATOR *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$33.02	$7.63	$3.60	$0.00	$44.25
LICENSED TUG OPERATOR OVER 1000HP *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$38.18	$7.63	$3.60	$0.00	$49.41
MAINTENANCE ENGINEER *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$33.03	$7.63	$3.60	$0.00	$44.26
OILER - MARINE DIVISION *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$24.30	$7.63	$3.00	$0.00	$34.93
OPERATOR / LEVERMAN *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$38.18	$7.63	$3.60	$0.00	$49.41
RODMAN / SCOWMAN *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$24.30	$7.63	$3.00	$0.00	$34.93
SHOREMAN / DECKHAND *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$24.30	$7.63	$3.00	$0.00	$34.93
Outside Electrical - West						
EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42* For apprentice rates see "Apprentice- LINEMAN"	09/01/2019	$44.67	$8.00	$12.55	$0.00	$65.22
GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42* For apprentice rates see "Apprentice- LINEMAN"	09/01/2019	$30.58	$8.00	$5.48	$0.00	$44.06
GROUNDMAN / TRUCK DRIVER *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42* For apprentice rates see "Apprentice- LINEMAN"	09/01/2019	$39.97	$8.00	$10.96	$0.00	$58.93
HEAVY EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42* For apprentice rates see "Apprentice- LINEMAN"	09/01/2019	$47.01	$8.00	$13.22	$0.00	$68.23
JOURNEYMAN LINEMAN *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	09/01/2019	$51.71	$8.00	$15.55	$0.00	$75.26

Apprentice - *LINEMAN (Outside Electrical) - West Local 42*

Effective Date - 09/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$31.03	$8.00	$3.43	$0.00	$42.46
2	65	$33.61	$8.00	$3.51	$0.00	$45.12
3	70	$36.20	$8.00	$3.59	$0.00	$47.79
4	75	$38.78	$8.00	$5.16	$0.00	$51.94
5	80	$41.37	$8.00	$5.24	$0.00	$54.61
6	85	$43.95	$8.00	$5.32	$0.00	$57.27
7	90	$46.54	$8.00	$7.40	$0.00	$61.94

Notes:

Apprentice to Journeyworker Ratio:1:2

TELEDATA CABLE SPLICER *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	02/04/2019	$30.73	$4.70	$3.17	$0.00	$38.60

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TELEDATA LINEMAN/EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	02/04/2019	$28.93	$4.70	$3.14	$0.00	$36.77
TELEDATA WIREMAN/INSTALLER/TECHNICIAN *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	02/04/2019	$28.93	$4.70	$3.14	$0.00	$36.77
TRACTOR-TRAILER DRIVER *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	09/01/2019	$44.67	$8.00	$12.55	$0.00	$65.22

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)
Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.
*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.
**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

DOCUMENT 00870

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS
(EXECUTIVE ORDER 11246)
Revised April 9, 2019

1. As used in these specifications:

   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted:

   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority.

   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

   d. "Minority" includes:

      (i) Black (all persons having origins in any of the black African racial groups not of Hispanic origin);
      (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $ 10,000 the provisions of the specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in Paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

    a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

    b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

    c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

    d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

    e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

    f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

    g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

    h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables of affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11 The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as many be required by the Government and keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

APPENDIX A

The following goals and timetables for female utilization shall be included in all Federal and federally assisted construction contracts and subcontracts in excess of $ 10,000. The goals are applicable to the Contractor's aggregate on-site construction workforce whether or not part of that workforce is performing work on a Federal or federally-assisted construction contract or subcontract.

Area covered: Goal for Women apply nationwide

Goals and Timetables

Timetable	Goals (percent)
From Apr. 1, 1980 until further notice	6.9

APPENDIX B-80

Until further notice, the following goals for minority utilization in each construction craft and trade shall included in all Federal or federally assisted construction contracts and subcontracts in excess of $ 10,000 to be performed in the respective geographical areas. The goals are applicable to each nonexempt contractor's total on- site construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or nonfederally related project, contract or subcontract.

Construction contractors participating in an approved Hometown Plan (see 41 CFR 6-4.5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the area covered by the Hometown Plan. With regard to all their other covered construction work, such contractors are required to comply with the applicable SMSA or EA goal contained in this Appendix B-80.

Economic Areas

STATE:	Goals (percent)
MASSACHUSETTS	
004 Boston MA: SMSA Counties: 1123 Boston-Lowell-Brockton-Lawrence-Haverhill, MA-NH	4.0
MA Essex, MA Middlesex, MA Norfolk, MA Plymouth, MA Suffolk, NH Rockingham.	
5403 Fall River- New Bedford MA, Bristol	1.6
9243 Worcester-Fitchburg-Leominster, MA	1.6
6323 Springfield-Chicopee-Holyoke MA-CT MA Hampden, MA Hampshire	4.8
Non-SMSA Counties: MA Barnstable, MA Dukes, MA Nantucket	3.6
Non-SMSA Counties: MA Franklin	5.9

APPENDIX C

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin (including limited English proficiency), age, sex, disability, or low-income status in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. **Solicitations for Subcontractors, including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to nondiscrimination on the grounds of race, color, national origin (including limited English proficiency), age, sex, disability, or low-income status.

4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto, and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Massachusetts Department of Transportation (MassDOT) or FHWA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor will so certify to MassDOT or FHWA, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Nondiscrimination provisions of this contract, MassDOT will impose such contract sanctions as it or FHWA may determine to be appropriate, including, but not limited to:

    a. withholding payments to the contractor under the contract until the contractor complies; and/or
    b. cancelling, terminating, or suspending a control, in whole or in part.

6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as MassDOT or FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request MassDOT to enter into any litigation to protect the interests of MassDOT. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

APPENDIX D

During the performance of this contact, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor," which includes consultants) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

PERTINENT NON-DISCRIMINATION AUTHORITIES:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21

- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-Aid programs and projects)

- Federal-Aid Highway Act of 1973 (23 U.S.C. § 324 *et seq.*) (prohibits discrimination on the basis of sex)

- Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794 *et seq.*), as amended (prohibits discrimination on the basis of disability) and 49 CFR Part 27

- The Age Discrimination Act of 1975, as amended (42 U.S.C. § 6101 *et seq.*) (prohibits discrimination on the basis of age)

- Airport and Airway Improvement Act of 1982 (49 U.S.C. § 471, Section 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex)

- The Civil Rights Restoration Act of 1987 (PL 100-209) (broadened the scope, coverage, and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975, and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of Federal-Aid recipients, sub-recipients, and contractors, whether such programs or activities are Federally funded or not)

- Titles II and III of the Americans with Disabilities Act (42 U.S.C. §§ 12131-12189), as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38 (prohibits discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities)

- The Federal Aviation Administration's Non-Discrimination Statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex)

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations)

- Executive Order 13166, Improving Access to Services for People with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100)

- Title IX of the Education Amendments Act of 1972, as amended (20 U.S.C. 1681 *et seq*.) (prohibits discrimination on the basis of sex in education programs or activities)

*** END OF DOCUMENT ***

DOCUMENT 00875
TRAINEE SPECIAL PROVISIONS
Revised October, 2016

THE REQUIRED NUMBER OF TRAINEES TO BE TRAINED UNDER THIS CONTRACT WILL BE **1**

The contractor shall provide on-the job training aimed at developing full journeyworkers in the type of trade of job classification involved.

In the event that a contractor subcontracts a portion of the contract work, the General Contractor shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided, however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this training special provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeyworkers in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the contractor shall submit to the Massachusetts Department Of Transportation (MassDOT) for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the contractor shall specify the starting time for training in each of the classifications. The contractor will be credited for each trainee employed on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyworker status is a primary objective of the Training Special Provision. Accordingly, the contractor shall make every effort to enroll minority and women trainees (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that have been taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training.

No employee shall be trained under this Special Provision in any classification in which he or she has successfully completed a training course leading to journeyworker status or in which he or she has been employed as a journeyworker. The contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the contractor's records should document the finding in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Massachusetts Department Of Transportation and the Federal Highway Administration. The Massachusetts Department Of Transportation and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyworker status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather that clerk-typist or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc. where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Federal Highway Administration division office. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Reimbursement

Under these Training Special Provisions, reimbursement will be as follows:

The Contractor will only be reimbursed 80 cents for each hour of on the job training as specified in the approved Training Program.

The Contractor is advised and encouraged that it may train additional persons in excess of the number specified and will be reimbursed as stated above. Reimbursement will be made even though the contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the contractor from receiving other reimbursement.

If less than full training specified in the approved training programs is provided, payment to the contractor will be made at a rate of 80 cents for each hour of training completed under this contract. However, no payment shall be made to the contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyworker, is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this Training Special Provision.

Payment

Trainees will be paid:

1. Percentage (%) of the journeyworker's rate as provided in the existing programs approved by the Department of Labor or Transportation as of September 15, 1970.

2. For journeyworker programs submitted by the Contractor and approved by Massachusetts Department Of Transportation and the Federal Highway Administration at least 60 percent of the appropriate minimum journeyworker's rate specified in the contract for the first half of the training period, 75 percent for the third quarter if the training period, and 90 percent for the last quarter of the training period.

3. For skilled laborer programs, the minimum starting wage rate of unskilled laborer. At the conclusion of training, he or she will be paid the minimum wage rate of the Classification for programs submitted by the Contractor and approved by the Massachusetts Department Of Transportation and the Federal Highway Administration.

4. For the purposes of meeting the legal requirements of State Prevailing Wage Law, please be advised that no person may be paid the Apprentice wage rate as listed on a MA Prevailing Wage Rates schedule, unless that person and program is registered with the Department of Labor Standards/Division of Apprentice Standards (DLS/DAS). Any person or program not registered with DLS/DAS, regardless of whether or not they are registered with any other federal, state, local, or private entity must be paid the journeyworker’s rate for the trade.

The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily complete.

The contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

Form FHWA-1409, Federal-aid Highway Construction Contracting Semi Annual Training Report, shall be submitted as per instructions on the Form.

*** END OF DOCUMENT ***

DOCUMENT 00880

Revised January 12, 2022

DEPARTMENT OF LABOR

Employment Standards Administration

MINIMUM WAGES FOR FEDERAL AND FEDERALLY ASSISTED CONTRACTS

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"General Decision Number: MA20240007 07/05/2024

Superseded General Decision Number: MA20230007

State: Massachusetts

Construction Type: Highway

County: Franklin County in Massachusetts.

HIGHWAY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2024
1	01/19/2024
2	03/22/2024
3	05/31/2024
4	07/05/2024

* CARP0336-015 03/01/2024

	Rates	Fringes
CARPENTER	$ 57.20	31.04

ENGI0098-006 12/01/2016

	Rates	Fringes
Power equipment operators:		
(1) Backhoe/Excavator/Trackhoe	$ 33.68	23.96+A
(1) Loader	$ 33.68	23.96+A
(4) Roller	$ 32.54	23.96+A
Crane	$ 37.18	23.96+A

A. Paid Holidays: New year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day

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IRON0007-025 03/16/2024

	Rates	Fringes
IRONWORKER (REINFORCING AND STRUCTURAL)	$ 39.51	32.98

LABO0596-002 12/01/2021

	Rates	Fringes
LABORER		
Asphalt, Includes Raker, Shoveler, Spreader, and Distributor	$ 32.75	23.96
Common or General	$ 32.50	23.96
Guardrail Installation	$ 32.75	23.96
Landscape	$ 32.50	23.96

SUMA2014-003 01/11/2017

	Rates	Fringes
PAINTER: Spray (Linestriping)	$ 38.85	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

State Adopted Rate Identifiers

Classifications listed under the ""SA"" identifier indicate that the prevailing wage rate set by a state (or local) government was adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 01/03/2024 reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

"General Decision Number: MA20240010 07/05/2024

Superseded General Decision Number: MA20230010

State: Massachusetts

Construction Types: Heavy (Heavy and Marine)

Counties: Berkshire, Franklin, Hampden and Hampshire Counties in Massachusetts.

HEAVY CONSTRUCTION PROJECTS; AND MARINE CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2024
1	01/19/2024
2	02/09/2024
3	03/01/2024
4	03/22/2024
5	05/31/2024
6	07/05/2024

BOIL0029-001 01/01/2021

	Rates	Fringes
BOILERMAKER	$ 45.87	29.02

BRMA0001-005 08/01/2023

SPRINGFIELD CHAPTER

	Rates	Fringes
BRICKLAYER BRICKLAYERS; CEMENT MASONS; PLASTERERS; STONE MASONS; MARBLE, TILE & TERRAZZO WORKERS	$ 50.81	32.27

BRMA0001-007 08/01/2023

SPRINGFIELD/PITTSFIELD CHAPTER
BERKSHIRE COUNTY

	Rates	Fringes
BRICKLAYER		
BRICKLAYERS; CEMENT MASONS; PLASTERERS; STONE MASONS; MARBLE, TILE & TERRAZZO WORKERS	$ 50.81	32.27

CARP0056-004 08/01/2022

	Rates	Fringes
DIVER TENDER	$ 52.15	34.10
DIVER	$ 68.70	35.57

CARP0056-009 08/01/2020

	Rates	Fringes
PILEDRIVERMAN	$ 49.07	35.57

CARP0336-005 03/01/2024

FRANKLIN COUNTY (Erving, Orange, North Orange, and Warwick)

	Rates	Fringes
CARPENTER	$ 40.96	27.39

CARP0336-010 03/01/2024

BERKSHIRE

	Rates	Fringes
CARPENTER	$ 40.96	27.39

CARP0336-012 03/01/2024

HAMPDEN; HAMPSHIRE; AND FRANKLIN (Remainder of County)

	Rates	Fringes
CARPENTER	$ 40.96	27.39

CARP1121-004 01/01/2024

	Rates	Fringes
MILLWRIGHT	$ 41.20	32.99

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* ELEC0007-002 12/31/2023

HAMPDEN (Except Chester & Holyoke); HAMPSHIRE (Belchertown, Ware)

	Rates	Fringes
ELECTRICIAN	$ 49.01	28.21

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* ELEC0007-003 12/31/2023

BERKSHIRE; FRANKLIN; HAMPDEN (Chester, Holyoke); HAMPSHIRE (Except Belchertown, Ware)

	Rates	Fringes
ELECTRICIAN	$ 49.01	28.21

ENGI0098-007 12/01/2016

	Rates	Fringes
Power equipment operators:		
Group 1	$ 33.68	23.96+A
Group 2	$ 33.37	23.96+A
Group 3	$ 33.15	23.96+A
Group 4	$ 32.54	23.96+A
Group 5	$ 29.92	23.96+A
Group 6	$ 28.80	23.96+A
Group 7	$ 26.86	23.96+A
Group 8	$ 305.95	23.96+A

Group 9	$ 230.69	23.96+A
Group 10	$ 35.17	23.96+A
Group 11	$ 38.18	23.96+A
Group 12	$ 39.68	23.96+A
Group 13	$ 40.68	23.96+A
Group 14	$ 41.68	23.96+A
Group 15	$ 43.18	23.96+A

HAZARDOUS WASTE PREMIUM $2.00

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:
Group 8 and Group 9 are per day wages.
A. Paid Holidays: New year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day

POWER EQUIPMENT OPERATORS CLASSIFICATIONS
Group 1: Shovels; crawlers and truck cranes including all tower; self-propelled hydraulic cranes 10 tons and over; draglines; clam shells; cableways; shaft hoists; mucking machines derricks; backhoes; bulldozers; gradalls; elevating graders; pile drivers; concrete pavers; trenching machines; front end loaders- 5 1/2 cu yds and over; dual drum paver; automatic grader-excavator(C.M.I. or equal); scrapers towing pan or wagon; tandem dozers or push cats(2 units in tandem); shotcrete machine; tunnel boring machine; combination backhoe/loader 3/4 cu yd hoe or over; jet engine dryer; tree shredder; post hole digger; post hole hammer; post extractor; truck mounted concrete pump with boom; roto-mill; Grader; Horizontal Drilling Machine; John Henry Rock Drill and similar equipment.
Group 2: Rotary drill with mounted compressor; compressor house (3 to 6 compressors); rock and earth boring machines (excluding McCarthy and similar drills); front end loaders 4 cu yds to 5 1/2 cu yds); forklifts-7 ft lift and over 3 ton capacity; scraper 21 yds and over (struck load); sonic hammer console; reclaimers road planer/milling machine; cal tracks; ballast regulators; rail anchor machines; switch tampers, asphalt pavers; mechanic; welder and transfer machine.
Group 3: Combination backhoe/loader up to 3/4 cu yd; scrapers up to 21 cu yd (struck load, self propelled or tractor drawn); tireman; front end loaders up to 4 yds; well drillers; engineer or fireman on high pressure boiler; self-loading batch plant; well point operators electric pumps used in well point system; pumps, 16 inches and over (total discharge); compressor, one or two 900 cu ft and

over; powered grease truck; tunnel locomotives and dingys; grout pumps; hydraulic jacks; boom truck; hydraulic cranes-up to 10 ton.
Group 4: Asphalt rollers; self-powered rollers and compactors; tractor without blade drawing sheepsfoot roller; rubber tire roller; vibratory roller or other type of compactors including machines for pulverizing and aerating soil; york rake.
Group 5: Hoists; conveyors; power pavement breakers; self-powered concrete pavement finishing machines; two bag mixers with skip; McCarthy and similar drills; batch plants (not self loading); bulk cement plants; self-propelled material spreaders; three or more 10 KW light plants; 30 KW or more generators; power broom.
Group 6: Compressor (one or two) 315 cu ft to 900 cu ft; pumps 4 inches to 16 inches (total discharge).
Group 7: Compressors up to 315 cu ft; small mixers with skip; pumps up to 4 inches; power heaters; oiler; A-frame trucks; forklifts-up to 7 ft. lift and up to 3 ton capacity; hydro broom; stud welder.
Group 8: Truck crane crews
Group 9: Oiler
Group 10: Master Mechanic
Group 11: Boom lengths over 150 feet including jib
Group 12: Boom lengths over 200 feet including jib
Group 13: Boom lengths over 250 feet including jib
Group 14: Boom lengths over 300 feet including jib
Group 15: Boom lengths over 350 feet including jib

IRON0007-014 03/16/2024

BERKSHIRE (Becket, East Otis, Hinsdale, Monterey, New Marlboro, North Otis, Otis, Peru, Sandisfield, Savoy, Sheffield, Washington, Windsor); FRANKLIN; HAMPDEN; HAMPSHIRE

	Rates	Fringes
IRONWORKER	$ 39.51	32.98

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* IRON0012-003 07/01/2024

BERKSHIRE (Lee)

	Rates	Fringes
IRONWORKER	$ 38.50	28.46

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* IRON0012-004 07/01/2024

BERKSHIRE (Remainder of County)

	Rates	Fringes
Ironworkers:		
Sheeter	$ 38.75	28.46
Structural, Ornamental, Reinforcing, Fence Erector, Machinery Mover, Rigger, Rodman, Stone Derrickman	$ 38.50	28.46

LABO0022-002 12/01/2023

FRANKLIN (Orange, Warwick)

	Rates	Fringes
Laborers:		
GROUP 1	$ 37.86	27.59
GROUP 2	$ 38.11	27.59
GROUP 3	$ 38.61	27.59
GROUP 4	$ 38.86	27.59
GROUP 5	$ 38.61	27.59
GROUP 6	$ 39.86	27.59

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; carpenter tenders; cement finisher tenders, plasterer tenders

GROUP 2: Asphalt raker; fence and guard rail erector; laser beam operator; mason tenmder; pipelayer; pneumatic drill operator; pneumatic tool operator; wagon drill operatorm jackhammer operator, pavement breaker, carbide core drilling machine, chain saw operator, barco type jumping tampers, concrete pump, motorized mortar miner, ride-on motorized buggy

GROUP 3: Air track operator; block paver; rammer; curb setter, hydraulic and similar self-powered drills

GROUP 4: Blaster; powderman

GROUP 5: Precast floor and roof, plank erector

GROUP 6: Asbestos Abatement, Toxic and Hazardous waste laborers

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LABO0473-005 12/01/2021

FRANKLIN (Except Orange and Warrick); HAMPDEN and HAMPSHIRE COUNTIES (with the exception of Chesterfield, Cummington, Goshen, Middlefield, Plainfield, and Worthington)

	Rates	Fringes
Laborers:		
Group 1	$ 30.37	24.64
Group 2	$ 30.62	24.64
Group 3	$ 31.12	24.64
Group 4	$ 31.37	24.64
Group 5	$ 24.50	24.64
Group 6	$ 32.37	24.64

LABORERS CLASSIFICATIONS

Group 1: Carpenter tenders, cement finisher tenders, laborers, wrecking laborers

Group 2: Asphalt rakers, fence and guard rail erectors, laser beam operator, mason tender, pipelayer, pneumatic drill operator, pneumatic tool operator, wagon drill operator

Group 3: Air track operator, block pavers, rammers, curb setters

Group 4: Blasters, powdermen

Group 5: Flaggers

Group 6: Asbestos abatement, toxic and Hazardous waste laborers

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LABO0473-006 12/01/2021

BERKSHIRE; HAMPSHIRE COUNTIES (the towns of Chesterfield, Cummington, Goshen, Middlefield, Plainfield, and Worthington only)

	Rates	Fringes
Laborers:		
Group 1	$ 30.37	24.49
Group 2	$ 30.62	24.49
Group 3	$ 31.12	24.49
Group 4	$ 31.37	24.49
Group 5	$ 24.50	24.49
Group 6	$ 32.37	24.49

LABORERS CLASSIFICATIONS

Group 1: Carpenter tenders, cement finisher tenders, laborers, wrecking laborers

Group 2: Asphalt rakers, fence and guard rail erectors, laser beam operator, mason tender, pipelayer, pneumatic drill operator, pneumatic tool operator, wagon drill operator

Group 3: Air track operator, block pavers, rammers, curb setters

Group 4: Blasters, powdermen

Group 5: Flaggers

Group 6: Asbestos abatement, toxic and Hazardous waste laborers

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LABO1421-002 12/01/2021

	Rates	Fringes
Laborers:		
Group 1	$ 41.33	27.37
Group 2	$ 42.08	27.35
Group 3	$ 42.33	27.35
Group 4	$ 37.33	27.35
Group 5	$ 40.43	27.35
Group 6	$ 41.33	27.37

Group 1: Adzeman, Wrecking Laborer.
Group 2: Burners, Jackhammers.
Group 3: Small Backhoes, Loaders on tracks, Bobcat Type Loaders, Hydraulic ""Brock"" Type Hammer Operators, Concrete Cutting Saws.
Group 4: Yardman (Salvage Yard Only).
Group 5: Yardman, Burners, Sawyers.
Group 6: Asbestos, Lead Paint, Toxic and Hazardous Waste.

PAIN0035-010 01/01/2024

	Rates	Fringes
PAINTER		
NEW CONSTRUCTION:		
Brush, Taper	$ 37.43	35.60
Spray, Sandblast	$ 38.83	31.55
REPAINT:		
Bridge	$ 56.06	35.60
Brush, Taper	$ 34.75	31.55
Spray, Sandblast	$ 36.15	31.55

PLUM0004-003 03/01/2024

FRANKLIN (Orange)

	Rates	Fringes
Plumber and Steamfitter	$ 53.95	28.42

PLUM0104-004 03/17/2024

BERKSHIRE (Becket, Otis, Sandisfield); FRANKLIN (Except Monroe, Rowe, and the Western part of Charlemont); HAMPDEN; HAMPSHIRE

	Rates	Fringes
Plumbers and Pipefitters	$ 47.51	29.35

FOOTNOTE:
A. Two paid holidays, Independence Day and Labor Day, provided the employee has been employed seven days prior to the holiday by the same employer

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PLUM0104-009 03/17/2024

BERKSHIRE (Except Otis, Becket, Sandisfield); FRANKLIN (Monroe, Rowe and the Western part of Charlemont)

	Rates	Fringes
Plumber and Steamfitter	$ 47.51	29.35

FOOTNOTE FOR PLUMBERS & STEAMFITTERS:
A. Paid holidays: Independence Day and Labor Day, provided the employee has been employed seven days prior to the holiday by the same employer.

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* TEAM0379-001 06/01/2024

	Rates	Fringes
Truck drivers:		
Group 1	$ 39.78	35.24+a+b
Group 2	$ 39.95	35.24+a+b
Group 3	$ 40.02	35.24+a+b
Group 4	$ 40.14	35.24+a+b
Group 5	$ 40.24	35.24+a+b
Group 6	$ 40.53	35.24+a+b
Group 7	$ 40.82	35.24+a+b

POWER TRUCKS $.25 DIFFERENTIAL BY AXLE
TUNNEL WORK (UNDERGROUND ONLY) $.40 DIFFERENTIAL BY AXLE
HAZARDOUS MATERIALS (IN HOT ZONE ONLY) $2.00 PREMIUM

TRUCK DRIVERS CLASSIFICATIONS

Group 1: Station wagons; panel trucks; and pickup trucks

Group 2: Two axle equipment; & forklift operator

Group 3: Three axle equipment and tireman

Group 4: Four and Five Axle equipment

Group 5: Specialized earth moving equipment under 35 tons other than conventional type trucks; low bed; vachual; mechanics, paving restoration equipment

Group 6: Specialized earth moving equipment over 35 tons

Group 7: Trailers for earth moving equipment (double hookup)

FOOTNOTES:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day and Christmas Day

B. PAID VACATION: Employees with 4 months to 1 year of service receive 1/2 day's pay per month; 1 week vacation for 1 - 5 years of service; 2 weeks vacation for 5 - 10 years of service; and 3 weeks vacation for more than 10 years of service

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

State Adopted Rate Identifiers

Classifications listed under the ""SA"" identifier indicate that the prevailing wage rate set by a state (or local) government was adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 01/03/2024 reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

"General Decision Number: MA20240006 01/05/2024

Superseded General Decision Number: MA20230006

State: Massachusetts

Construction Type: Heavy Dredging

Counties: Massachusetts Statewide.
STATEWIDE

Massacusetts All Dredging, except self-propelled hopper dredges, on the Atlantic Coast & tributary waters emptying into the Atlantic Ocean.

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification Number 0 | Publication Date 01/05/2024

ENGI0025-001 10/01/2023

STATEWIDE

	Rates	Fringes
Dredging:		
CLASS A1	$ 45.26	15.17+a+b
CLASS A2	$ 40.33	14.82+a+b
CLASS B1	$ 39.14	14.74+a+b
CLASS B2	$ 36.84	14.58+a+b
CLASS C1	$ 35.83	14.26+a+b
CLASS C2	$ 34.68	14.18+a+b
CLASS D	$ 28.81	13.77+a+b

CLASSIFICATIONS:
CLASS A1: Deck Captain; Mechanical Dredge Operator, Leverman, Licensed Tug Operator over 1000 HP.
CLASS A2: Crane Operator (360 swing).
CLASS B1: Derrick Operator (180 swing), Spider/Spill Barge Operator, Engineer, Electrician, Chief Welder, Chief Mate, Fill Placer, Operator II, Maintenance Engineer, Licensed Boat Operator, Licensed Crew Boat Operator.
CLASS B2: Certified Welder.
CLASS C1: Mate, Drag Barge Operator, Assistant Fill Placer, Welder, Steward.
CLASS C2: Boat Operator.
CLASS D: Oiler, Deckhand, Shoreman, Rodman, Scowman, Cook, Messman, Porter/Janitor.

INCENTIVE PAY: (Add to Hourly Rate)
Operator (NCCCO License/Certification) $1.80 Licensed Tug Operator over 1000 HP (Assigned as Master) (USCG licensed Master of Towing Vessels (MOTV) $1.80; Licensed Boat Operator (Assigned as lead boat captain) USCG licensed boat operator $1.30; Engineer (QMED and Tankerman endorsement or licensed engineer (USCG) $1.80
Oiler (QMED and Tankerman endorsement (USCG) $1.80; All classifications (Tankerman endorsement only) USCG $1.55; Deckhand or Mate (AB with Lifeboatman endorsement (USCG) $1.80; All classifications (lifeboatman endorsement only (USCG) $1.55; Welder (ABS certification) $1.55

FOOTNOTES APPLICABLE TO ABOVE CRAFTS:
a. PAID HOLIDAYS: New Year's Day, Martin Luther King, Jr.'s Birthday, Memorial Day, Good Friday, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day
b. VACATION: Eight percent (8%) of the straight time rate, multiplied by the total hours worked.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

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A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

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DOCUMENT A00801

SPECIAL PROVISIONS

CONWAY
Federal Aid Project No. HIP(BR)-003S(779)X
Bridge Replacement, C-20-004, North Poland Road over Poland Brook

Labor participation goals for this Project shall be 15.3% for minorities and 6.9% for women for each job category. The goals are applicable to both Contractor's and Subcontractor's on-site construction workforce. Refer to Document 00820 for details.

SCOPE OF WORK

The work under this Contract includes the replacement of Bridge No. C-20-004 North Poland Road over Poland Brook. The work includes removing and stacking the existing temporary Acrow bridge superstructure; removing and disposing of the existing bridge abutments, piers, and temporary bridge abutments; installing permanent sheeting; installing precast concrete piles, abutments, wingwalls, New England Deck Bulb Tee (NEDBT) bridge superstructure, approach slabs, and highway guardrail transitions; and installing metal bridge rail. The work also includes temporary water control, excavation, riprap slope protection, full depth roadway construction, milling and overlay, pavement markings, the provisions of safety controls and signing for construction operations, and other incidental work included in the contract documents.

Artesian conditions were encountered at this site. A NO GO BELOW elevation of 747.0 has been identified on the plans.

All work under this Contract shall be done in conformance with the *2024 Standard Specifications for Highways and Bridges*, the *Supplemental Specifications* contained in this book, the *2017 Construction Standard Details*, the *Traffic Management Plans and Detail Drawings*, *MassDOT Work Zone Safety Temporary Traffic Control,* the *1990 Standard Drawings for Signs and Supports*; the *2015 Overhead Signal Structure and Foundation Standard Drawings*, the *2009 Manual on Uniform Traffic Control Devices (MUTCD) with Revisions 1, 2, and 3 and the November 2022 Massachusetts Amendments to the MUTCD*; the *1968 Standard Drawings for Traffic Signals and Highway Lighting*; *The American Standard for Nursery Stock*; the Plans and these Special Provisions.

SUBSECTION 7.05 INSURANCE REQUIREMENTS
B. Public Liability Insurance

The insurance requirements set forth in this subsection are in addition to the requirements of the Standard Specifications and supersede all other requirements.

Paragraphs 1 and 2

The Massachusetts Department of Transportation and applicable railroads shall be named as additional insureds.

CONTRACTOR QUESTIONS AND ADDENDUM ACKNOWLEDGEMENTS

Prospective bidders are required to submit all questions to the Construction Contracts Engineer by 3:00 P.M. on the Tuesday of the previous week before the scheduled bid opening date. Any questions received after this time will not be considered for review by the Department.

Contractors should email questions and addendum acknowledgements to the following email address massdotspecifications@dot.state.ma.us The MassDOT project file number and municipality is to be placed in the subject line.

HOLIDAY WORK RESTRICTIONS
(Supplementing Subsection 7.09)

The District Highway Director (DHD) may authorize work to continue during these specified time periods if it is determined by the District that the work will not negatively impact the traveling public. DHD may allow work in those areas on a case by case basis and where work is behind barrier and will not impact traffic

Below are the holiday work restrictions:

New Years Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the day before until the normal start of business on the next subsequent business day. No work on local roadways on the holiday without permission by the DHD and the local police chief.

Martin Luther King's Birthday (Federal Holiday)
No work restrictions due to traffic concerns, however work on local roadways requires permission by the DHD and local police chief.

President's Day (Federal Holiday)
No work restrictions due to traffic concerns, however work on local roadways requires permission by the DHD and local police chief.

Evacuation Day (Suffolk County State Holiday)
No work restrictions due to traffic concerns.

HOLIDAY WORK RESTRICTIONS (Continued)

Patriot's Day (State Holiday)
Work restrictions will be in place for Districts 3 and 6 along the entire Boston Marathon route and any other locations that the DHD in those districts determine are warranted so as to not to impact the marathon. All other districts work restrictions will be as per DHD.

Mother's Day
No work on Western Turnpike and Metropolitan Highway System from 5:00 AM on the Friday before, until the normal start of business on the following day.

Memorial Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the Friday before, until the normal start of business on the following day.

Bunker Hill Day (Suffolk County State Holiday)
No work restrictions due to traffic concerns.

Juneteenth
No work restrictions due to traffic concerns, however work on local roadways requires permission by the DHD and local police chief.

Independence Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the day before until the normal start of business on the next subsequent business day. No work on local roadways on the holiday without permission by the DHD and the local police chief.

Labor Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the Friday before, until the normal start of business on the following day.

Columbus Day (Federal Holiday)
No work on major arterials from 5:00 AM on the Friday before, until the normal start of business on the following day

Veterans' Day (Federal Holiday)
No work restrictions due to traffic concerns.

Thanksgiving Day (Federal Holiday)
No work on major arterials from 5:00 AM two days before until the normal start of business on the following Monday.

Christmas Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the day before until the normal start of business on the next subsequent business day.

WORK SCHEDULE

(Supplementing Subsection 8.02)

The work schedule under this contract shall conform to the relevant provisions of Subsection 7.09 of the Standards Specifications and the following:

Except as specified below, work on this project is restricted to (1) 8-hour shift per day, 5 days a week, Monday through Friday, between the hours of 7:00 AM and 3:30 PM, with the Prime Contractor and all Subcontractors working on the same shift.

To complete Milestone #03, Open Bridge C-20-004, as defined in the Contractual Milestones Section, work hours may be extended to (1) 10-hour shift per day, 6 days a week, Monday through Saturday, between the hours of 7:00 AM to 5:30 PM during the North Poland Road full closure period. The date for Milestone #03 is predicated on the Contractor working these extended shifts, along with working two crews for the construction of each abutment simultaneously. The Contractor shall take full advantage of extended shifts to mitigate delays in achieving Milestone #03. The Department will not participate in any acceleration required to meet project milestones regardless of the cause of the delay. The contractor is expected to recover all delays regardless of the cause.

North Poland Road, within the project limits, shall only be fully closed to pedestrian and vehicle traffic during the period defined by Access Restrain AR#01 and Completion Milestone #MS03. Outside of this period temporary single vehicle lane closures will be permitted under Police Detail control upon approval of the Engineer.

CONTRACTUAL MILESTONES

This Contract contains the following Contractual Milestones that shall be included in the Contractor's Baseline Contract Progress Schedule submission. The Contractor shall identify the completion of the work pertaining to each Contractual Milestone through the inclusion of a Finish Milestone in the Baseline Contract Progress Schedule.

Milestones:

MS #01 – Contractor Field Completion: The Contractor shall achieve **Contractor Field Completion** within **388 Calendar Days after NTP**.

Contractor Field Completion is defined as: the completion of all physical contract work, including the completion of the punch list work, and the Contractor has fully de-mobilized from the jobsite.

CONTRACTUAL MILESTONE (Continued)

MS #02 – Substantial Completion: The Contractor shall achieve **Substantial Completion** within **364 Calendar Days after NTP.**

Substantial Completion is defined as: A walkthrough of the entire contract Work has been performed by the Resident Engineer. A Punch List has been generated and the Work required by contract, including paper work, has been completed, except for work having a contract price of less than one percent of the adjusted total contract price, including overruns underruns and all contract amendments. All material submittals have been received by the District Materials Lab.

MS #03 – Full Beneficial Use: The Contractor shall achieve **Full Beneficial Use** within **343 Calendar Days after NTP.**

Full Beneficial Use is defined as: The majority of the contract work has been completed and the asset(s) has been opened for full multi-modal transportation use, except for limited contract work items that do not materially impair or hinder the intended public use of the transportation facility. All anticipated lane takings have been completed, except for minor, short-term work items.

Additionally, the final pavement surface course and pavement markings are not required to be completed for this milestone.

MS#04 – Milestone #04, Open Bridge C-20-004: The contractor shall open the bridge to traffic by September 26, 2025. The Contractor shall complete all work associated with **Milestone #4**, including, but not limited to:

1. The existing bridge has been dismantled and the dismantling work has been accepted by the Engineer.

2. The new bridge has been completed and accepted by the Engineer; except for any work remaining that can be completed with only temporary reductions of traffic flow to a single lane during working hours.

3. All safety appurtenances are in place and accepted by the Engineer.

4. The bridge and its approach roadway sections are open to traffic in the final planned configuration with no restrictions, except for those in Item 2 above.

The Contractor is hereby notified that working up to 6 ten-hour days per week, excluding Sundays, and working with two crews on the construction of both abutments simultaneously are anticipated to be required to meet **MS#04** for this project. Additional measures, including but not limited to preparing a mockup to validate bond strength of membrane waterproofing for bridge decks on concrete aged less than 28 days per Section 965.45 of the Standard Specifications may be required. Such measures have been taken into account in setting the completion date for this milestone.

ACCESS RESTRAINTS

This contract will contain Access Restraints to provide an anticipated start date for certain portions of the Work that are restrained by traffic control requirements. With respect to utilities, the Contract Time (duration) has considered these portions of the utility work and has been developed with the initial information that has been provided by the Utility Party, and accepted by MassDOT. The Contractor shall be required to communicate and coordinate with all affected Utilities and may be required to perform support aspects of the utility relocation (as noted in the Contract Documents) well in advance of the start of the applicable utility relocation.

The Contractor must clearly identify all aspects of this work in the preparation of the Construction Schedule and throughout the contract duration.

This contract contains the following utility Access Restraints that are to be included in the Contractor's Baseline Schedule submission:

AR#01 – Access Restraint #01: The Contractor will be restricted from dismantling the existing temporary bridge superstructure until Eversource, Comcast, and Verizon have relocated their overhead utilities to their temporary alignment.

AR#02 – Access Restraint #02: The Contractor will be restricted from closing North Poland Road to vehicular and pedestrian traffic and performing demolition work on the bridge until after the final day of either the Union 38 or the Frontier Regional School Districts' 2024-2025 school year, whichever is later. The final day of these school years are scheduled for June 11, 2025, assuming no weather-related closures. The Contractor is advised that the scheduled final day may fluctuate during the school year depending on the number of weather-related closures that occur during the year.

AR#03 – Access Restraint #03: The Contractor will be restricted from performing in-water work between April 1 and July 31 of any year, with the exception that installation of temporary cofferdams for channelizing the flow of Poland River may occur between July 1 and July 15.

SUBSECTION 8.02 SCHEDULE OF OPERATIONS

Replace this subsection with the following:

An integrated cost and schedule controls program shall be implemented by the Contractor to track and document the progress of the Work from Notice to Proceed (NTP) through the Contractor Field Completion (CFC) Milestone. The Contractor's schedules will be used by the Engineer to monitor project progress, plan the level-of-effort required by the Department's work force and consultants and as a critical decision-making tool. Accordingly, the Contractor shall ensure that it complies fully with the requirements specified herein and that its schedules are both accurate and updated as required by the specification throughout the life of the project. Detailed requirements are provided in Division II, Section 722 Construction Scheduling.

COMPLIANCE WITH THE NATIONAL DEFENSE AUTHORIZATION ACT

(Supplementing Subsection 7.01)

On all projects, the "Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment" Regulation (2 CFR 200.216) prohibits the Contractor from using or furnishing the following telecommunications equipment or services:

- Telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).
- For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).
- Telecommunications or video surveillance services provided by such entities or using such equipment.
- Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

This prohibition applies to all products manufactured by the aforementioned companies, including any individual components or parts.

By submitting a bid on a project, the Contractor certifies that all work will be in compliance with the terms of 2 CFR 200.216. The Contractor shall submit a COC indicating compliance with the above provisions for all telecommunications equipment or services included in the Contract.

Payment for the item in which the materials are incorporated may be withheld until these COCs are received. Any cost involved in furnishing the certificate(s) shall be borne by the Contractor.

EQUIVALENT SINGLE AXLE LOADS (ESALS)

The estimated traffic level to be used for SUPERPAVE HMA mixture designs for this contract, expressed in Equivalent Single Axle Loads (ESALs) for the design travel lane over a 20-year period, is 22,000 18-kip (80-kn) ESALs.

MATERIAL OPTIONS

The Contractor shall inform the Engineer of his option prior to the installation of the material. Once the option is designated, all material for the option item(s) shall remain the same throughout the job.

OPTIONS

Item Number	Item Description	Unit
234.12	12 Inch Drainage Pipe-Option	Foot

Pipe Options
Reinforced Concrete Pipe
Corrugated Plastic (Polyethylene) Pipe
Corrugated Plastic (Polypropylene) Pipe

NORTHERN LONG-EARED BAT PROTECTION

The U.S. Fish and Wildlife Service (USFWS) has listed the northern long-eared bat (NLEB) as endangered under the Endangered Species Act (ESA) and the following requirements exist to protect the bat and its habitat. This project has been consulted with the USFWS through the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and Federal Transit Administration (FTA) Programmatic Biological Opinion for Transportation Projects in the Range of the Indiana Bat and Northern Long-Eared Bat revised February 5, 2018.

On July 8-14, 2022, Normandeau Associates Inc., on behalf of MassDOT Highway Division Environmental Services, conducted a northern long-eared bat summer presence/absence survey using acoustic detection methods, in accordance with the 2022 survey guidelines. The survey did not detect northern long-eared bat, and as stated within the survey guidelines, the survey is valid for five years. Due to the 5-year validity of the negative presence/absence survey, it is recommended that the contractor conduct all activities that could result in stressors to the bats such as tree removal/trimming, bridge and/or structure removal/maintenance, lighting, or use of percussive, by July 8, 2027. If additional stressor producing work is proposed by the Contractor past this date, additional review is required by the MassDOT Highway Division's Environmental Services Section, and additional review and restrictions may be required by the USFWS.

Due to the negative survey results, the project is eligible for a May Affect, Not Likely to Adversely Affect (NLAA) determination, with Avoidance and Minimizations Measures (AMMs), in accordance with the FHWA, FRA and FTA Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat. On behalf of FHWA, the lead federal agency for Section 7 consultation, MassDOT submitted a Programmatic Consultation for Transportation Projects affecting NLEB or Indiana Bat to the USFWS through the Information for Planning and Consultation (IPaC) webpage and generated a NLAA documentation letter (see **Document A00871 USFWS NLAA**). Therefore, the project has completed Section 7 consultation through the Endangered Species Act, and the AMMs listed below.

NORTHERN LONG-EARED BAT PROTECTION (Continued)

General AMM

- The Contractor shall ensure all personnel working in on the project site are aware of all environmental commitments related to NLEB, including all applicable AMMs. NLEB Bat information (https://www.fws.gov/midwest/endangered/mammals/nleb/) shall be made available to all personnel.

Tree Removal AMMs

- *If additional cutting is proposed by the Contractor that is outside the scope of this contract, additional review is required by the MassDOT Highway Division's Environmental Services Section, and additional review and restrictions may be required by the USFWS.*

Bridge AMM

- On July 12, 2022, Normandeau Associates Inc., on behalf of MassDOT Highway Division Environmental Services, conducted a northern long-eared bat bridge/structure bat assessment, in accordance with the USFWS guidelines. The assessment did not find presence of, or evidence of use by bats, and as stated within the guidelines, the assessment is valid for two years. If bridge work is not complete before July 12, 2024, assessment of the bridge for the presence of, or evidence of use by, bats shall be completed by contractor/consultant/DOT prior to continuing bridge work. The Contractor shall notify the MassDOT Wildlife Unit no later than fourteen (14) days prior to July 12, 2024, to provide adequate time for inspection. If bats are found to be present, or, if there is evidence of bat usage, work at the bridge shall not commence until after the MassDOT Wildlife Unit has completed coordination with the US Fish and Wildlife Service to determine the appropriate follow up or mitigation actions.

Hibernacula AMMs

- For projects located within karst areas, on-site personnel will use best management practices, secondary containment measures, or other standard spill prevention and countermeasures to avoid impacts to possible hibernacula. Where practicable, a 300 foot buffer will be employed to separate fueling areas and other major containment risk activities from caves, sinkholes, losing streams, and springs in karst topography.

EMERALD ASH BORER ADVISORY

To the extent possible, all trees and brush shall be disposed on site, typically chipped and spread in place. When trees or brush must be removed, such as in urban, or otherwise populated areas, Contractor shall identify proposed location for disposal, and provide written notification to the Engineer for approval. Disposal shall be in city or town of project, or at minimum, within county, of construction operations.

BIDDERS LIST

Pursuant to the provisions of 49 CFR Part 26.11 all official bidders will be required to report the names, addresses and telephone numbers of all firms that submitted bids or quotes in connection with this project. Failure to comply with a written request for this information within 15 business days may result in a recommendation to the Prequalification Committee that prequalification status be suspended until the information is received.

The Department will survey all firms that have submitted bids or quotes during the previous year prior to setting the annual goal and shall request that each firm report its age and gross receipts for the year.

BUILD AMERICA BUY AMERICA PREFERENCE

On Federally-aid projects the Buy America (23.CFR § 635.410) and Build America, Buy America Act (Pub. L. No. 117-58, §§ 70901-52). requires the following,

(1) all iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, must occur in the United States. Foreign steel and iron can be used if the cost of the materials does not exceed 0.1% of the total Contract cost or $2,500, whichever is greater. The action of applying a coating to a covered material (i.e., steel and iron) is deemed a manufacturing process subject to Buy America. Coating includes epoxy coating, galvanizing, painting and any other coating that protects or enhances the value of a material subject to requirements of Build America, Buy America. Steel used for temporary support of excavation, including H piles, soldier piles, and sheeting when the steel is required to be left in place is subject to requirements of Build America, Buy America. Temporary steel, shall remain in place when it falls within the influence zone of the soil supporting any structure or railroad tracks.

(2) all manufactured products used in the project are produced in the United States—this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and

BUILD AMERICA BUY AMERICA PREFERENCE (Continued)

(3) all construction materials are manufactured in the United States—this means that all manufacturing processes for the construction material occurred in the United States. "Construction materials" includes an article, material, or supply—other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives—that is or consists primarily of:

- non-ferrous metals,
- plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables),
- glass (including optic glass),
- lumber; or
- drywall.

The Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project but are not an integral part of the structure or permanently affixed to the infrastructure project.

NOTE: The requirements for manufactured products indicated in paragraph (2) above are not in effect for this contract.

CONTAMINATED SOIL

Soil to be removed from the project area shall not be assumed to be uncontaminated and must be evaluated prior to off-site management for potential contamination with hazardous materials. No soil may be disposed of off-site without proper assessment by the contractor and approval from the Engineer, District Environmental Engineer (DEE), or the project designer.

SOIL STOCKPILING DIRECTIVE P-22-001

Any stockpiling of soil must be performed in compliance with Policy Directive P-22-001, Off-Site Stockpiling of Soil from MassDOT Construction Projects. This directive limits the allowable locations for off-site stockpiling of soil generated during MassDOT projects and includes various requirements that must be satisfied by the contractor prior to off-site stockpiling.

GENERAL REQUIREMENTS FOR DEMOLITION AND WORK INVOLVING PAINTED STEEL

(02/06/2020)

Demolition and work involving painted steel shall conform to the requirements of Subsection 961 of the Standard Specifications.

Work Involving Painted Steel.

Hazardous materials shall be removed in the immediate area of any intended welding, heating, saw cutting or burning of steel. Hazardous material removal is required to allow the demolition of structural steel, railings, drainage systems, utility supports, steel lamp posts, etc.

The contractor shall assume that the coatings on the steel contain lead (Pb), unless otherwise determined by testing. The contractor shall certify in writing to the Engineer the results of all testing, and shall also certify that any lead (Pb) coated steel removed from the project was not reused or buried, but was sent to a scrap metal recycling facility.

Implement and maintain programs and procedures, which comply with the requirements of this specification and all applicable standards and regulations. Comply with all applicable regulations even if the regulation is not specifically referenced herein. If a state or local regulation is more restrictive than the regulation of this specification, follow the more restrictive requirements.

This requirement is intended only for the demolition and preparation prior to repair and does not include provisions for recoating of steel.

Environmental

All applicable portions of Subsections 961.65 “Worker Protection” and 961.66 “Environmental Protection and Monitoring” shall be followed when performing this work.

During chemical stripping a hand washing facility may be used in lieu of a decontamination/changing facility.

Hazardous material shall be collected during the disassembly and disposed of as outlined in Subsection 961.68 “Handling of Hazardous Waste and Reporting Release Programs”.

The applicable submittals shall be according to Subsection 961.69 “Submittals”.

GENERAL REQUIREMENTS FOR DEMOLITION AND WORK INVOLVING PAINTED STEEL (Continued)

Cleaning/Removal

Cutting Or Burning Of Steel

All surfaces to be welded, heated, saw cut or burned shall be cleaned so as to remove all contaminants and/or hazardous materials, which could be discharged to the environment as a function of the subsequent operations.

Lead paint shall be removed in its entirety in an area prescribed by a 6 inch (15 cm) minimum offset from the required work. The paint removal operation may be dry abrasive blasting, wet abrasive blasting or chemical stripping.

Proper level of containment shall be used when performing this work in accordance with Subsection 961.67 "Containment". Full containment is not required during chemical stripping operation however; the Contractor shall install proper shielding and/or tarpaulins under the chemical stripping operations in order to catch all debris generated during this procedure. A cleaned area must be inspected and approved before the demolition operations are started.

During cleaning operations the Contractor shall be required to furnish and erect temporary floodlights illuminating the steel surface at a minimum of 30-foot candles. This lighting shall be used in areas where there is insufficient lighting for proper cleaning operations and inspection. The Contractor shall supply electrical power.

The Contractor shall provide support for interim and final inspection of the bridge during cleaning operations. This support shall include the necessary traffic controls and safe access to the work.

Mechanical Disassembly Of Steel

All surfaces to be mechanically disassembled by shear cutting or removing bolts or rivets shall not require deleading. When shear cutting or removing bolts or rivets, the Contractor shall not use any method that will cause dust and/or particles to be emitted and/or dispersed into the environment to an extent that would expose the workers above the Action Levels of 30µg/m3.

For purposes of limiting the lead (Pb) dust, the Contractor will be required to dampen the lead paint work areas.

The contractor shall install a proper shielding and/or tarpaulins under all lead-paint-coated surfaces to be shear cut or bolts or rivets ordered removed in order to catch any loose lead paint chips, dust or particles.

NOTICE TO OWNERS OF UTILITIES
(Supplementing Subsection 7.13)

Written notice shall be given by the Contractor to all public service corporations or municipal and State officials owning or having charge of publicly or privately owned utilities of his intention to commence operations affecting such utilities at least one (1) week in advance of the commencement of such operations. The Contractor shall, at the same time, file a copy of such notice with the Engineer. The Contractor shall ensure that all affected utilities / agencies are notified.

The following website lists the names and addresses of the utilities may be affected, but the completeness of the list is not guaranteed:

https://www.mass.gov/info-details/utility-contacts-by-district-and-municipality

Select District 1
Select Conway

Town officials are shown at website http://www.mass.gov

From "YOUR GOVERNMENT" Tab, select "Cities and Towns", Then select the link of "City and town websites", then select alphabetically the required Town.

The following is the name and addresses of the agency which may be affected and must be notified. Completeness is not guaranteed by the Department. The Contractor shall assure that all affected agencies are notified.

Municipality	Pole Set Responsibility
CONWAY	Western Massachusetts Electric

District Utility/Constructability Engineer

Franklin County
MassDOT District 1

Mark Page
857-368-1033
Mark.Page@dot.state.ma.us

ELECTRIC

Eversource Electric West
300 Cadwell Drive
Springfield, MA 01104

Nicholas Langone
413-787-9554
Nicholas.Langone@eversource.com

TELEPHONE

Verizon
385 Myles Standish Blvd.
Taunton, MA 02780

Karen Mealey
774-409-3160
karen.m.mealey@verizon.com

NOTICE TO OWNERS OF UTILITIES

CABLE

Comcast Cable Corporation
PO Box 6505
5 Omni Way
Chelmsford, MA 01824

Wendy Brown
978-848-5163
Wendy_Brown@comcast.com

DPW

Conway Highway Department
PO Box 240
Conway, MA 01341

Ron Sweet
413-369-4696
highway@townofconway.com

No additional compensation will be allowed for any delays, inconvenience, or damage sustained by him due to any interference by said utilities.

The Contractor shall coordinate his/her work with the work required to be performed by any private utility owner for this project. No additional compensation or time extensions shall be allowed for delays as a result of work required to be performed by a private utility owner.

If a pole needs to be held by the utility in order to sustain them securely in place during placement of (drainage structures, pipe, etc.), the Contractor will be solely responsible for all costs charged by the utility owner for this service. All costs in connection shall be included in the unit prices for the various items.

EVERSOURCE EMERGENCY TELEPHONE NUMBERS

ELECTRIC:
Outage/ Emergency: 800-592-2000 or 844-726-7562
New Service: 1-888-633-3797 (1-888-need pwr)
Customer Support: 1-800-340-9822

PIGEON WASTE

The Contractor shall remove and dispose of the pigeon waste and any other debris accumulated on the steel members and bridge seats in areas where work is being performed. Pigeon waste and debris material contaminants will require special handling and disposal in accordance with all Federal, state, and local requirements. No separate payment will be made for removal and disposal of pigeon waste. Cost shall be incidental to the contract pay items.

WOOD TURTLE (Glyptemys insculpta) PROTECTION PLAN

General

This section outlines the requirements of the Natural Heritage and Endangered Species Program (NHESP) of the Division of Fisheries and Wildlife (DFW) for projects that occur within Wood Turtle Habitat. The requirements consist of monitoring and protecting turtles during the replacement of the North Poland Road over Poland Brook in the Town of Conway, Massachusetts.

One Time Sweeps – Prior to Vegetation Clearing and In-water Cofferdam Installation

The Turtle Monitor (the Monitor) shall be a MassDOT biologist (David J. Paulson, (857) 262-3378, david.j.paulson@dot.state.ma.us; or a representative from MassDOT Wildlife and Endangered Species Unit) approved by the Natural Heritage and Endangered Species Program (NHESP). The Monitor shall obtain a scientific collecting permit from the NHESP to handle wood turtles. The Monitor shall visit the site prior to the start of work, and the Contractor and/or Resident Engineer shall coordinate this site visit with the Monitor at least 60 days prior to construction commencement. The Monitor shall sweep the site prior to any site clearing, grubbing, earth disturbance, or site preparations. The Monitor shall inspect vegetation within 200' of the stream, prior to the establishment of the limit of work line and Turtle Exclusion Fence Barrier.

In addition, the Monitor shall provide a sweep of the site prior to any work in water. The Monitor shall inspect all areas of land under water where cofferdams are to be installed, paying close attention to overhanging banks and in water coarse woody debris.

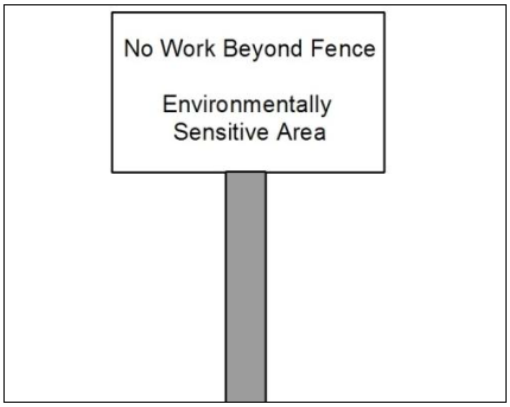
The Monitor shall visually sweep the described areas immediately before machines enter the area and relocate any turtles to suitable habitat immediately beyond the construction site. The Monitor shall provide contact information to the project supervisor in the event a wood turtle is discovered on-site. The Monitor may visit the site on only one day if the vegetation clearing and in-water work are initiated on the same day. Upon completion of the monitoring, the Monitor shall provide the NHESP with a summary of activities at the construction site. This report shall include the number and duration of visits and rare species observation forms for all state-listed species encountered. In the event of finding an injured turtle, the turtle shall be transported to a suitable veterinarian. In the event of finding a turtle with a radio transmitter, the NHESP and the contact on the transmitter shall be alerted immediately.

All state-listed species encountered in or near the project shall be reported to the NHESP through a Rare Animal/Plan Observation Report with the required supporting materials within 10 days of the observation. No state-listed species may be removed from the project site unless under the direct supervision of the Monitor or the NHESP.

WOOD TURTLE (Glyptemys insculpta) PROTECTION PLAN (Continued)

Establishment of a Limit of Work Barrier

Following the sweep of the work site, a limit of work barrier shall be installed. This line shall consist of staked compost filter tubes and Turtle Exclusion Fence Barrier (silt fence as the outer boundary) and shall contain signage clearly identifying it as the limits of work in all four quadrants. Refer to the attached sketch for the approximate location of the Turtle Exclusion Fence Barrier.



Example limit of work sign.

Installation of the barrier must be conducted using methods that result in a minimum of disturbance (i.e., hand-dug, "2-man" trencher or auger). It is not appropriate to clear large access paths prior to sweeps for turtle. No clearing may occur outside the limit of work approved by the NHESP without additional review and approval by the NHESP.

1. The barrier must be composed of at least 2 1/2 feet of vertical barrier above ground and an additional 4-6 inches buried below ground.
2. The face of the material must be relatively smooth. Materials commonly used are staked at 6 - 10 foot intervals and include tightly woven geotextile, aluminum flashing, or other such materials stapled or tacked to stakes. Loosely woven geotextile fabrics, hay/straw bales, wattles or tubular materials are not generally sufficient.
3. The bottom of the silt fencing must be carefully buried in a 4-6 inch deep trench. The trench must be backfilled and compacted. If it is not possible to dig a trench, then the bottom of the barrier must be affixed to the surface.
4. If project phasing and the traffic management plan allow, the barrier shall only include a single gap at each limit of the project large enough for vehicle passage to access the construction area. These gaps must be closed each night during the turtle active season (March 15 – October 31) with a gate and/or silt fence barrier, and the bottom of the silt barrier weighted down with a solid wood post or sand bags. A solid wooden, plastic or metal turtle barrier gate may be furnished by the contractor in order to close the gap locations. The turtle barrier gate must be keyed into the barrier so that turtles cannot enter the construction area.
5. If hay or straw bales are to be used with silt fencing, they shall be installed on the work-side of the silt fence to avoid turtles using these to breach the barrier.
6. Once installed, the barrier shall be taut between the stakes. Slumps or loose materials will undermine the effectiveness of the barrier. In some circumstances, geotextile fabrics may need to be reinforced with backer material to ensure integrity. Backer material is typically similar to hardware cloth.

WOOD TURTLE (Glyptemys insculpta) PROTECTION PLAN (Continued)

Once per week, a person familiar with silt barrier maintenance and installation shall inspect the barrier and facilitate any repairs or alterations. The limit of work barrier should remain taut between stakes and any holes along the bottom repaired. MassDOT shall provide the NHESP with the name and contact information of the Resident Engineer responsible for coordinating necessary sweeps and maintaining appropriate barriers.

Construction Worker Training:
The Monitor shall provide to the construction foreperson wood turtle identification and handling pamphlets. All construction, landscaping, and other sub-contractors associated with the Project shall be informed in writing of the likely presence of State-listed Species on the Property and what measures (observation and injury protection) should be implemented to minimize direct harm to State-listed Species.

Further, no wildlife shall be removed from the Property without approval of a qualified wildlife biologist or the Division except as necessary to receive veterinary treatment in the case of harm during construction.

This protocol may require only one to three days of labor, including field surveys and correspondence with the NHESP.

There will be no payment for the work conducted by the Turtle Monitor, as the Monitor will be provided to the Contractor as a free service by MassDOT.

Installation of a limit of work barrier, turtle barrier gates, and limit of work signage shall be considered incidental under ITEM 767.121 SEDIMENT CONTROL BARRIER.

TURTLE PROTECTION PLAN SHEET

Refer to the Turtle Protection Plan Sheet in Document A00803.

ENVIRONMENTAL PERMITTING

The proposed work occurs in jurisdictional wetland resources subject to section 401 or section 404 of the Clean Water Act; therefore, a Water Quality Certification from the Massachusetts Department of Environmental Protection and/or authorization from the US Army Corps of Engineers has been obtained. The Contractor is advised that all terms and conditions within said permits shall be strictly adhered to. The proposed work qualifies for the bridge exemption authorized in the Transportation Bond Bill and is therefore not subject to the Massachusetts Wetlands Protection Act, the Massachusetts Public Waterfront Act (Chapter 91), or the Massachusetts Environmental Policy Act.

ENVIRONMENTAL PERMITTING (Continued)

If Contractor erection, demolition, storage, or other procedures not originally allowed by existing environmental permits require work to occur in or otherwise impact water or wetland resource areas, the Contractor is advised that no associated work can occur until all required environmental permits have been either amended or obtained allowing such work. The Contractor must notify the MassDOT Highway Division District 1 Highway Director and Resident Engineer in writing at least 60 days prior to commencement of the proposed activity. All environmental submittals, including any contact with Local, State, or Federal environmental agencies, must be coordinated through the MassDOT Highway Division District 1 Environmental Engineer. The Contractor is expected to fully cooperate with requests for information and provide same in a timely manner. The Contractor is further advised that the Department will not entertain a delay claim due to the time required to modify or obtain the environmental permits.

Army Corps of Engineers Permit

Work under this project is subject to Section 404 of the Federal Clean Water Act, 33 U.S.C. 1251 *et seq* and is authorized under the Department of the Army General Permits for Massachusetts (GPs), dated June 2, 2023, which are issued by the New England District of the U.S. Army Corps of Engineers (Corps). Activities subject to the GPs qualify for Self-Verification provided that 1) the activity meets the terms and conditions of applicable GPs and General Conditions (GCs), and 2) a Pre-Construction Notification (PCN) is submitted to the Corps. A PCN listing the applicable GPs (GP-23) for the work under this project was submitted to the Corps. The GPs are to be considered part of this contract and a copy of the entire GPs document, PCN authorization and all associated plans/attachments shall be on-site while activities regulated by the GPs are being performed.

The Contractor is hereby notified that he/she will be responsible and held accountable for performing any/all work necessary to satisfy and comply with the entire GPs document. The Contractor is advised that no additional compensation will be allowed for work required to establish, achieve, and maintain compliance with the GPs, as payment for the work shall be included in the various bid items, unless specified elsewhere. This work may include, but is not limited to, the following: the hiring and paying for the services of a Professional Biologist, Botanist, Wetland Scientist, Engineer, Landscape Architect, etc.; preparation and submission of as-built plans; wetland flagging; wetland replication monitoring reports, etc.

DEP – Water Quality Certification

This project is subject to Section 401 of the Federal Clean Water Act and has been issued a Water Quality Certification ("WQC") by the Department of Environmental Protection. The WQC and Application are to be considered part of this contract and a copy of the WQC and all plans/attachments shall be on-site while activities regulated by the WQC are being performed. The Contractor's attention is directed to the fact that special conditions and other requirements are associated with this WQC and Application. It is the Contractor's responsibility to be aware of and comply with these conditions and requirements and plan his/her work and schedule accordingly. **The Contractor is hereby notified that he/she will be responsible and held accountable for performing any/all work necessary to satisfy and comply with the entire WQC and Application.**

ENVIRONMENTAL PERMITTING (Continued)

Arrangements to view the WQC and/or Application can be made by calling Amer Raza at (857) 368-1035. If the Contractor wishes to obtain copies, s/he shall do so at his own expense. The Contractor is advised that no additional compensation will be allowed for work required to establish, achieve, and maintain compliance with the WQC and Application, as payment for the work shall be included in the various bid items, unless otherwise specified. This work may include, but is not limited to, the following: preparation and submission of as-built plans; wetland flagging; wetland replication monitoring reports; preparation of the construction period erosion, sedimentation, and pollution prevention plan (CP/PP); etc.

SUBSECTION 8.14 UTILITY COORDINATION, DOCUMENTATION, AND MONITORING RESPONSIBILITIES

A. GENERAL

In accordance with the provisions of Section 8.00 Prosecution and Progress, utility coordination is a critical aspect to this Contract. This section defines the responsibility of the Contractor and MassDOT, with regard to the initial utility relocation plan and changes that occur as the prosecution of the Work progresses. The Engineer, with assistance from the Contractor shall coordinate with Utility companies that are impacted by the Contractor's operations. To support this effort, the Contractor shall provide routine and accurate schedule updates, provide notification of delays, and provide documentation of the steps taken to resolve any conflicts for the temporary and/or permanent relocations of the impacted utilities. The Contractor shall provide copies to the Engineer of the Contractor communication with the Utility companies, including but not limited to:

- Providing advanced notice, for all utility-related meetings initiated by the Contractor.
- Providing meeting minutes for all utility-related meetings that the Contractor attends.
- Providing all test pit records.
- Request for Early Utility work requirements of this section (see below).
- Notification letters for any proposed changes to Utility start dates and/or sequencing.
- Written notification to the Engineer of all apparent utility delays within seven (7) Calendar Days after a recognized delay to actual work in the field – either caused by a Utility or the Contractor.
- Any communication, initiated by the Contractor, associated with additional Right-of-Way needs in support of utility work.
- Submission of completed Utility Completion Forms.

B. PROJECT UTILITY COORDINATION (PUC) FORM

The utility schedule and sequence information provided in the Project Utility Coordination Form (if applicable) is the best available information at the time of the bid and has been considered in setting the contract duration. The Contractor shall use all of this information in developing the bid price and the Baseline Schedule Submission, inclusive of the individual utility durations sequencing requirements, and any work that has been noted as potentially concurrent utility installations.

C. INITIATION OF UTILITY WORK

The Engineer will issue all initial notice-to-proceed dates to each Utility company based on either the:

1) Contractor's accepted Baseline Schedule
2) An approved Early Utility Request in the form of an Early Utility sub-net schedule (in accordance with the requirements of this Subsection)
3) An approved Proposal Schedule

C.1 - BASELINE SCHEDULE – UTILITY BASIS

The Contractor shall provide a Baseline Schedule submission in accordance with the requirements of Subsection 8.02 and inclusive of all of the information provided in the PUC Form that has been issued in the Contract documents. This is to include the utility durations, sequencing of work, allowable concurrent work, and all applicable considerations that have been depicted on the PUC Form.

SUBSECTION 8.14 (Continued)

C.2 – EARLY UTILITY REQUEST – (aka SUBNET SCHEDULE) PRIOR TO THE BASELINE

All early utility work is defined as any anticipated/required utility relocations that need to occur prior to the Baseline Schedule acceptance. In all cases of proposed early utility relocation, the Contractor shall present all known information at the pre-construction conference in the form of a 'sub-net' schedule showing when each early utility activity needs to be issued a notice-to-proceed. The Contractor shall provide advance notification of this intent to request early utility work in writing at or prior to the Pre-Construction meeting. Prior to officially requesting approval for early utility work, the Contractor shall also coordinate with MassDOT and all utility companies (private, state or municipal) which may be impacted by the Contract. If this request is acceptable to the Utilities and to MassDOT, the Engineer will issue a notice-to-proceed to the affected Utilities, based on these accepted dates.

C.3 – PROPOSAL SCHEDULE - CHANGES TO THE PUC FORM

If the Contractor intends to submit a schedule (in accordance with MassDOT Standard Specifications, Division I, Subsection 8.02) that contains durations or sequencing that vary from those provided in the Project Utility Coordination (PUC) Form, the Contactor must submit this as an intended change, in the form of a Proposal Schedule and in accordance with MassDOT Standard Specifications, Division I, Subsection 8.02. These proposed changes are subject to the approval of the Engineer and the impacted utilities, in the form of this Proposal Schedule and a proposed revision to the PUC form. The Contractor shall not proceed with any changes of this type without written authorization from the Engineer, that references the approved Proposal Schedule and PUC form changes. The submission of the Baseline Schedule should not include any of these types of proposed utility changes and should not delay the submission of the Baseline Schedule. As a prerequisite to the Proposal Schedule submission, and in advance of the utility notification(s) period, the Contractor shall coordinate the proposed utility changes with the Engineer and the utility companies, to develop a mutually agreed upon schedule, prior to the start of construction.

D. UTILITY DELAYS

The Contractor shall notify the Engineer upon becoming aware that a Utility owner is not advancing the work in accordance with the approved utility schedule. Such notice shall be provided to the Engineer no later than seven (7) calendar days after the occurrence of the event that the Contractor believes to be a utility delay. After such notice, the Engineer and the Contractor shall continue to diligently seek the Utility Owner's cooperation in performing their scope of Work.

In order to demonstrate that a critical path delay has been caused by a third-party Utility, the Contractor must demonstrate, through the requirements of the monthly Progress Schedule submissions and the supporting contract records associated with Subsection 8.02, 8.10 and 8.14, that the delays were beyond the control of the Contractor.

SUBSECTION 8.14 (Continued)

All documentation provided in this section is subject to the review and verification of the Engineer and, if required, the Utility Owner. In accordance with MassDOT Specifications, Division I, Subsection 8.10, a Time Extension will be granted for a delay caused by a Utility, only if the actual duration of the utility work is in excess of that shown on the Project Utility Coordination Form, and only if;

1) proper Notification of Delay was provided to MassDOT in accordance with the time requirements that are specified in this Section
2) the utility delay is a critical path impact to the Baseline Schedule (or most recently approved Progress Schedule)

E. LOCATION OF UTILITIES

The locations of existing utilities are shown on the Contract drawings as an approximation only. The Contractor shall perform a pre-construction utility survey, including any required test pits, to determine the location of all known utilities no later than thirty (30) calendar days before commencing physical site work in the affected area.

F. POST UTILITY SURVEY – NOTIFICATION

Following completion of a utility survey of existing locations, the Contractor will be responsible to notify the Engineer of any known conflicts associated with the actual location of utilities prior to the start of the work. The Engineer and the Contractor will coordinate with any utility whose assets are to be affected by the Work of this Contract. A partial list of utility contact information is provided in the Project Utility Coordination Form.

G. MEETINGS AND COOPERATION WITH UTILITY OWNERS

The Contractor shall notify the Engineer in advance of any meeting they initiate with a Utility Owner's representative to allow MassDOT to participate in the meeting if needed.

Prior to the Pre-Construction Meeting, the Contractor should meet with all Utility Owners who will be required to perform utility relocations within the first 6 months of the project, to update the affected utilities of the Project Utility Coordination Form and all other applicable Contract requirements that impact the Utilities. The Contractor shall copy the Engineer on any correspondence between the Utility Owner and the Contractor.

H. FORCE ACCOUNT / UTILITY MONITORING REQUIREMENTS

The Engineer will be responsible for recording daily Utility work force reports. The start, suspension, re-start, and completion dates of each of the Utilities, within each phase of the utility relocation work, will be monitored and agreed to by the Engineer and the Contractor as the work progresses.

I. ACCESS AND INSPECTION

The Contractor shall be responsible for allowing Utility owners access to their own utilities to perform the relocations and/or inspections. The Contractor shall schedule their work accordingly so as not to delay or prevent each utility from maintaining their relocation schedule.

SECTION 722
CONSTRUCTION SCHEDULING

DESCRIPTION

722.20 General

The Contractor's approach to prosecution of the Work shall be disclosed to the Department by submission of a Critical Path Method (CPM) schedule and a cost/resource loaded Construction Schedule when required in this Subsection. These requirements are in addition to, and not in limitation of, requirements imposed in other sections.

The requirements for scheduling submissions are established based on the Project Value at the time of the bid and are designated as Type A, B, C or D. The definitions of these Schedule Requirement Types are summarized below. Complete descriptions of all detailed requirements are established elsewhere in this specification.

Type A – for all Site-Specific Contracts with a Project Value over $20 Million

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Resource-Loading
- Resources Graphic Reporting
- Cash Flow Projections from the CPM
- Cash Flow Charts
- Cost-loaded CPM
- Contractor-furnished CPM software, computer and training

Type B – for all Site-Specific Contracts with a Project Value between $10 Million and $20 Million

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Cost-loaded CPM
- Resource-Loading
- Monthly Projected Spending Report (PSR)
- Contractor-furnished CPM software, computer and training

SECTION 722 (Continued)

Type C – for all Site-Specific Contracts with a Project Value between $3 Million and $10 Million

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Monthly Projected Spending Report (PSR)
- Contractor-furnished CPM software, computer and training

Type D - for all contracts with a Project Value less than $3 Million; various locations contracts of any dollar amount; contracts with durations less than one-hundred and eighty (180) Calendar Days; and other contracts as determined by the Engineer.

- Bar chart schedule updated monthly or at the request of the Engineer (See Section 722.62.B - Bar Charts.)
- Monthly Projected Spending Report (PSR) (See Section 722.62.F - Projected Spending Reports.)

MATERIALS, EQUIPMENT, PERSONNEL

722.40 General

A. Software Requirements (Types A, B and C)

The Contractor shall use Primavera P6 computer scheduling software.

In addition to the requirements of Section 740 – Engineer's Field Office and Equipment, the Contractor shall provide to the Department one (1) copy of the scheduling software, one (1) software license and one (1) computer capable of running the scheduling software for the duration of the Contract. This computer and software shall be installed in the Engineer's Field Office within twenty-eight (28) Calendar Days after Notice to Proceed. The computer and software shall be maintained and serviced as recommended by the computer manufacturer and/or as required by the Engineer during the duration of the Contract at no additional cost to the Department. The Contractor shall provide professional training in the basic use of the software for up to eight (8) Department employees. The trainer shall be approved by the Engineer. This training shall be provided within twenty-eight (28) Calendar Days after Notice to Proceed.

B. Scheduler Requirements

For all schedule types, if the Contractor plans to use outside scheduling services, the scheduler shall be approved as a subcontractor by the Engineer.

For Type A, B and C Schedules the name of the Contractor's Project Scheduler together with his/her qualifications shall be submitted to the Department for approval by the Engineer within seven (7) Calendar Days after NTP. The Project Scheduler shall have a minimum of five [5] years of project CPM scheduling experience, three [3] years of which shall be on projects of similar scope and value as the project for which the Project Scheduler is being proposed. References shall be provided from past projects that can attest to the capabilities of the Project Scheduler.

SECTION 722 (Continued)

CONSTRUCTION METHODS

722.60 General

A. Schedule Planning Session
(Types A, B and C)

The Contractor shall conduct a schedule planning session within seven (7) Calendar Days after the Contractor receives the NTP and prior to submission of the Baseline Schedule. This session will be attended by the Department and its consultants. During this session, the Contractor shall present its planned approach to the project including, but not limited to:

1. the Work to be performed by the Contractor and its subcontractors;
2. the planned construction sequence and phasing; planned crew sizes;
3. summary of equipment types, sizes, and numbers to be used for each work activity;
4. all early work related to third party utilities;
5. identification of the most critical submittals and projected submission timelines;
6. estimated durations of major work activities;
7. the anticipated Critical Path of the project and a summary of the activities on that Critical Path;
8. a summary of the most difficult schedule challenges the Contractor is anticipating and how it plans to manage and control those challenges;
9. a summary of the anticipated quarterly cash flow over the life of the project.

This will be an interactive session and the Contractor shall answer all questions that the Department and its consultants may have. The Contractor shall provide a minimum of five (5) copies of a written summary of the information presented and discussed during the session to the Engineer. The Contractor's Baseline Schedule and accompanying Schedule Narrative shall incorporate the information discussed at this Schedule Planning Session.

B. Schedule Reviews by the Department (All Types)

1. Baseline Schedule Reviews
   The Engineer will respond to the Baseline Schedule Submission within thirty (30) Calendar Days of receipt providing comments, questions and/or disposition that either accepts the schedule or requires revision and resubmittal. Baseline Schedules shall be resubmitted within fifteen (15) Calendar Days after receipt of the Engineer's comments.

2. Contract Progress Schedule / Monthly Update Reviews
   The Engineer will respond to each submittal within twenty one (21) Calendar Days. Schedules shall be resubmitted by the Contractor within five (5) Calendar Days after receipt of the Engineer's comments.

   Failure to submit schedules as and when required could result in the withholding of full or partial pay estimate payments by the Engineer.

SECTION 722 (Continued)

722.61 Schedule Content and Preparation Requirements
(Types A, B and C unless otherwise noted)

Each Contract Progress Schedule shall fully conform to these requirements.

A. LOGIC

The schedules shall divide the Work into activities with appropriate logic ties to show:

1. conformance with the requirements of this Section and Division I, Subsection 8.02 - Schedule of Operations
2. the Contractor's overall approach to the planning, scheduling and execution of the Work
3. conformance with any additional sequences of Work required by the Contract Documents, including, but not limited to, Subsection 8.03 - Prosecution of Work and Subsection 8.06 – Limitations of Operations.

B. ACTIVITIES

The schedules shall clearly define the progression of the Work from NTP to Contractor Field Completion (CFC) by using separate activities for each of the following items:

1. NTP
2. Each component of the Work defined by specific activities
3. Detailed activities to satisfy permit requirements
4. Procurement of fabricated materials and equipment with long lead times, including time for review and approval of submittals required before purchasing
5. The preparation and submission of shop drawings, procedures and other required submittals, with a planned duration that is to be demonstrated to the Engineer as reasonable
6. The review and return of shop drawings, procedures and other required submittals, approved or with comments, the duration of which shall be thirty (30) Calendar Days, unless otherwise specified or as approved by the Engineer
7. Interfaces with adjacent work, utility companies, other public agencies, sensitive abutters, and/or any other third party work affecting the Contract
8. The Critical Path, clearly defined and organized
9. Float shall be clearly identified
10. Access Restraints – restrictions on access to areas of the Work that are defined by the Department in the bid package, in Subsection 8.06 – Limitations of Operations or elsewhere in the Contract
11. Milestones listed in Subsection 8.03 - Prosecution of Work or elsewhere in the Contract Documents
12. Subcontractor approvals at fifteen (15) Calendar Days from submittal to response
13. Full Beneficial Use (FBU) Contract Milestone per the requirements of Subsection 8.03 - Prosecution of Work
14. Contractor’s request for validation of FBU (ready to open to traffic)
15. The Department’s confirmation of completed work to allow for FBU

SECTION 722 (Continued)

16. Substantial Completion Contract Milestone per the requirements of Subsections 7.15 - Claims Against Contractors for Payment of Labor, Materials and Other Purposes and 8.03 - Prosecution of Work
17. Contractor's request for validation of Substantial Completion
18. Punchlist Completion Period of at least thirty (30) Calendar Days per the requirements of Subsections 5.11 - Final Acceptance, 7.15 - Claims Against Contractors for Payment of Labor, Materials and Other Purposes and 8.03 - Prosecution of Work
19. Contractor confirmation that all punchlist work and documentation has been completed
20. Physical Completion of the Work Contract Milestone per the requirements of Subsections 5.11 - Final Acceptance and 8.03 - Prosecution of Work
21. Documentation Completion per the requirements of Subsections 5.11 - Final Acceptance and 8.03 - Prosecution of Work
22. Contractor Field Completion Contract Milestone per the requirements of Subsections 5.11 - Final Acceptance and 8.03 - Prosecution of Work
23. Utility work to be performed in accordance with the Project Utility Coordination (PUC) Form as provided in Section 8.14 - Utilities Coordination, Documentation and Monitoring Responsibilities
24. Traffic work zone set-up and removal, night work and phasing
25. Early Utility Relocation (by others) that has been identified in the Contract
26. Right-of-Way (ROW) takings that have been identified in the Contract
27. Material Certifications
28. Work Breakdown Structure in accordance with the MassDOT-Highway Division Contractor Construction Schedule Toolkit located on the MassDOT-Highway Division website at: https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit
29. For Type A and B Contracts only: All items to be paid, including all Unit Price and Lump Sum pay items, shall be identified by activity. This shall include all non-construction activities such as engineering work; purchase of permanent materials and equipment, purchase of structural steel stock, equipment procurement, equipment delivery to the site or storage location and the representative amount of overhead/indirect costs that was included in the Contractor's Bid Prices.

C. EARLY AND LATE DATES

Early Dates shall be based on proceeding with the Work or a designated part of the Work exactly on the date when the corresponding Contract Time commences. Late Dates shall be based on completing the Work or a designated part of the Work exactly on the corresponding Contract Time, even if the Contractor anticipates early completion.

SECTION 722 (Continued)

D. DURATIONS

Activity durations shall be in Work Days. Planned Original Durations shall be established with consideration to resources and production rates that correspond to the Contractor's Bid Price. Within all of the Department-required schedules, the Contractor shall plan the Work using durations for all physical construction activities of no less than one (1) Work Day and no greater than fourteen (14) Work Days, unless approved by the Engineer as part of the Baseline Schedule Review.

Should there be an activity with a duration that is determined by the Engineer to be unreasonable, the Contractor will be asked to provide a basis of the duration using bid documents, historic production rates for similar work, or other form of validation that is acceptable to the Engineer. Should the Contractor and the Engineer be unable to agree on reasonable activity durations, the Engineer will, at a minimum, note the disagreement in the Baseline Schedule Review along with a duration the Engineer considers reasonable and the basis for that duration. A schedule that contains a substantial number of activities with durations that are deemed unreasonable by the Engineer will not be accepted.

E. MATERIALS ON HAND (for Types A and B only)

The Contractor shall identify in the Baseline Schedule all items of permanent materials (Materials On Hand) for which the Contractor intends to request payment prior to the incorporation of such items into the Work.

F. ACTIVITY DESCRIPTIONS

The Contractor shall use activity descriptions in all schedules that clearly describe the work to be performed using a combination of words, structure numbers, station numbers, bid item numbers, work breakdown structure (WBS) and/or elevations in a concise and compact label as specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located on the MassDOT-Highway Division website at:

https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit

G. ACTIVITY IDENTIFICATION NUMBERS

The Contractor shall use the activity identification numbering system specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located online at the address above.

H. ACTIVITY CODES

The Contractor shall use the activity codes specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located online at the address above.

I. CALENDARS

Different calendars may be created and assigned to all activities or to individual activities. Calendars define the available hours of work in each Calendar Day, holidays and general or project-specific non-Work Days such as Fish Migration Periods, time of year (TOY) restrictions and/or area roadway restrictions.

SECTION 722 (Continued)

Examples of special calendars include, but are not limited to:

- Winter Shutdown Period, specific work is required by separate special provision to be performed during the winter. See Special Provision 8.03 (if applicable)
- Peak traffic hours on heavily traveled roadways. This shall be from 6:30 am to 9:30 am and from 3:30 pm to 7:00 pm, unless specified differently elsewhere in the Contract.
- Special requirements by sensitive abutters, railroads, utilities and/or other state agencies as defined in the Contract.
- Cape Cod and the Islands Summer Roadway Work Restrictions: A general restriction against highway and bridge construction is enforced between Memorial Day and Labor Day, unless otherwise directed by the Engineer. Refer to the Project Special Provisions for specific restrictions.
- Cape Ann Summer Roadway Work Restrictions: While there are no general restrictions for Cape Ann as there are for Cape Cod and the Islands, project-specific restrictions may be enforced. Refer to the Project Special Provisions for specific restrictions.
- Turtle and/or Fish Migration Periods and/or other in-water work restrictions: Refer to the Project Special Provisions for specific restrictions.
- Working over Waterways Restricted Periods: Refer to the Project Special Provisions for specific restrictions.
- Night-time paving and striping operations, traffic and temperature restrictions: Refer to the Project Special Provisions for specific restrictions.
- Utility Restrictions shall be as specified within the Contract.

J. FLOAT

For the calculation of float in the CPM schedule, the setting for *Retained Logic* is required for all schedule submissions, starting with the Baseline Schedule Submission. Should the Contractor have a reason to propose that an alternative calculation setting such as *Progress Override* be used, the Contractor shall obtain the Engineer's approval prior to modifying to this setting.

K. COST AND RESOURCE LOADING (Types A and B only)

For all Type A and B Schedules, the Contractor shall provide a cost and resource-loaded schedule with an accurate allocation of the costs and resources necessary to complete the Work. The costs and resources shall be assigned to all schedule activities in order to enable the Contractor to efficiently execute the Contract requirements and the Engineer to validate the original plan, monitor progress, provide cash flow projections and analyze delays.

1. Each schedule activity shall have an assigned cost that accurately represents the value of the Work. Each schedule activity shall have its resources assigned to it by craft and the anticipated hours to accomplish the work. Each schedule activity's equipment resources shall be assigned to it by equipment type and hours operated. Front-loading or other unbalancing of the cost distribution will not be permitted.
2. The sum of the cost of all schedule activities shall be equal to the Contractor's Bid Price.
3. Indicating the labor hours per individual, per day, by craft and equipment hours/day will be acceptable.

SECTION 722 (Continued)

4. The Engineer reserves the right to use the cost-loading as a means to resolve changes, disputes, time entitlement evaluations, increases or decreases in the scope of Work, unit price renegotiations and/or claims.
5. For all Type A and B Schedules, all subnets, fragnets, Proposal Schedules, and Recovery Schedules shall be cost and resource- loaded to help to quickly validate and monitor the duration of the Work to be performed.
6. For Type A Schedules, cost-loading of the schedule will also be used for cash flow projection purposes.
7. The cost-loading of each activity shall indicate the portion of the cost for that activity that is applicable to a specific bid item (cost account.) The total cost for each cost account must equal the bid item price.
8. For Type A Schedules, each month, the Contractor will be paid using the Cost-loaded CPM activities for Lump Sum payment items. This requirement supersedes any requirements elsewhere in this Contract regarding partial payments of schedule-of-values for all Lump Sum items.

L. NOT TO BE USED IN THE CONTRACTOR'S CPM SCHEDULE

1. Milestones or constraint dates not specified in the Contract
2. Scheduled work not required for the accomplishment of a Contract Milestone
3. Use of activity durations, logic ties and/or sequences deemed unreasonable by the Engineer
4. Delayed starts of follow-on trades
5. Float suppression techniques

722.62 Submittal Requirements

All schedules shall be prepared and submitted in accordance with the requirements listed below.

Each monthly Contract Progress Schedule submittal shall be uniquely identified.

Except as stated elsewhere in this subsection, schedule submittals shall include each of the documents listed below, prepared in two formats, for distribution as follows:

a. four (4) compact discs (CD); one (1) each for the Office of Project Controls and Performance Oversight (O-PC&PO), the Boston Construction Section Office, the District Construction Office and the Resident Engineer's Office. Additional copies shall be required if the work is performed in more than one district.
b. two (2) hard copies plotted in color on 24" X 36" paper; one (1) copy each for the District Construction Office and the Resident Engineer's Office. No copies for the O-PC&PO and the Boston Construction Section Office. Additional copies shall be required if the work is performed in more than one district.

SECTION 722 (Continued)

A. Narratives

A written narrative shall be submitted with every schedule submittal. The narrative shall:

1. itemize and describe the flow of work for all activities on the Critical Path in a format that includes any changes made to the schedule since the previous Contract Progress Schedule / Monthly Update or the Baseline Schedule, whichever is most recent;
2. provide a description of any specification requirements that are not being followed. Identify those that are improvements and those that are not considered to be meeting the requirements;
3. provide all references to any Notice of Delay that has been issued, within the time period of the Contract Progress Schedule Update, by letter to the Engineer. Note that any Notice of Delay that is not issued by letter will not be recognized by the Engineer. See Subsection 722.64.A - Notice of Delay;
4. provide a description of each third-party utility's planned vs. actual progress and note any that are trending late or are late per the durations and commitments as provided in the PUC Form; provide a description of the five (5) most important responses needed from the Department and the need date for the responses in order to maintain the current Schedule of Record;
5. provide a description of all critical issues that are not within the control of the Contractor or the Department (third party) and any impact they had or may have on the Critical Path;
6. provide a description of any possible considerations to improve the probability of completing the project early or on-time;
7. compare Early and Late Dates for activities on the Critical Path and describe reasons for changes in the top three (3) most critical paths ;
8. describe the Contractor's plan, approach, methodologies and resources to be employed for completing the various operations and elements of the Work for the top three (3) most critical paths. For update schedules, describe and propose changes to those plans and verify that a Proposal Schedule is not required;
9. describe, in general, the need for shifts that are not 5 days/week, 8 hours/day, the holidays that are inserted into each calendar and a tabulation of each calendar that has been used in the schedule;
10. describe any out-of-sequence logic and provide an explanation of why each out-of-sequence activity does not require a correction, if one has not been provided, and an adequate demonstration that these changes represent the basis of how these activities will be built, including considerations for resources, dependencies and previously-approved production rates;
11. identify any possible duration increases resulting from actual or anticipated unit price item quantity overruns as compared to the baseline duration, with a corresponding suggestion to mitigate any possible delays to the Critical Path. If the delay is anticipated to impact the Critical Path, refer to Subsections 4.06 - Increased or Decreased Contract Quantities and 8.10 - Determination and Extension of Contract Time for Completion and submit a letter to the Engineer notifying of a potential delay;
12. include a schedule log consisting of the name of the schedule, the data date and the date submitted.

SECTION 722 (Continued)

B. Bar Charts (Types A, B, C and D)

One (1) time-scaled bar chart containing all activities shall be prepared and submitted using a scale that yields readable plots and that meets the requirements of Subsection 722.61 - Schedule Content and Preparation Requirements Activities shall be linked by logic ties and shown on their Early Dates. Critical Paths shall be highlighted and Total Float shall be shown for all activities.

A second time-scaled bar chart shall also be prepared containing only the Critical Path or, if the Critical Path is not the longest path, the Longest Path using a scale that yields readable plots and that meets the requirements of Subsection 722.61 - Schedule Content and Preparation Requirements. Activities shall be linked by logic ties and shown on their Early Dates. Total Float shall be shown for all activities.

Bar Charts shall be printed in color and submitted on 11" X 17" paper or, if approved by the Engineer, as a .pdf file.

C. Detailed Activity Schedule Comparisons

A Detailed Activity Schedule Comparison (DASC) is a simple reporting tool in the format of a graphical report that will provide Resident Engineers with immediate, timely and up-to-date information. The DASC consists of an updated bar chart that overlays the current time period's bar chart onto the previous time period's bar chart for an easily-read comparison of progress during the present and previous reporting periods. The DASC shall be prepared and submitted in accordance with the instructions contained in the Construction Schedule Toolkit located on the MassDOT-Highway Division website at:

https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit

The reports described in Subsections D, E and F below shall be submitted with all of the schedules listed in Subsection722.20 - General:

D. Activity Cost Report and Monthly Cash Flow Projections (Type A only)

With each Contractor Quantity Estimate (CQE), the Contractor shall submit an Activity Cost Report and Cash Flow Projection that includes all activities grouped by Contract Bid Item.

The Activity Cost Report shall be generated from the Schedule of Record and shall be the basis of the Monthly Cash Flow Projection. Within each contract Bid Item, activities shall be sequenced by ascending activity identification number and shall show:

1. activity ID and description,
2. forecast start and finish dates for each activity and,
3. when submitted as a revised schedule, actual start and finish dates for each completed activity.

For Unit Price pay items, in addition to the above, estimates to complete and any variance to the estimated Contract quantity shall be shown.

E. Resource Graphs (Type A only)

Monthly and cumulative resource graphs for the remaining Contract period using the Early Dates and Late Dates in the Contract Progress Schedule shall be included as part of each schedule submittal.

SECTION 722 (Continued)

F. Projected Spending Reports (Types B, C and D)

A Projected Spending Report (PSR) shall be prepared and submitted in accordance with the instructions listed at the end of this section. The PSR shall indicate the monthly spending (cash flow) projection for each month from NTP to Contractor Field Completion (CFC). Each month's actual spending shall be calculated using all CQEs paid during that month. If the difference between the Contractor's monthly projections vs. the actual spending is greater than 10%, the Contractor's monthly spending projection shall be revised and resubmitted within fifteen (15) Calendar Days.

The Projected Spending Report (PSR) shall be depicted in a tabular format and printed in color on 11 x 17-sized paper or larger as approved by the Engineer. For additional instructions and a template for preparing the Projected Spending Report (PSR), refer to the Contractor's Construction Schedule Toolkit located on the MassDOT-Highway Division website at: https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit or consult with the District Construction Scheduler.

722.63. Progress Schedule Requirements

A. Baseline Schedule

The Baseline Schedule shall be due thirty (30) Calendar Days after Notice to Proceed (NTP.) The Baseline Schedule shall only reflect the Work awarded to the Contractor and shall not include any additional work involving Extra Work Orders or any other type of alleged delay. The Baseline Schedule shall be prepared and submitted in accordance with Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements. Once the Baseline Schedule has been accepted by the Engineer, with or without comments, it shall represent the as-planned schedule for the Work and become the Contract Progress Schedule of Record until such time as the schedule is updated or revised under Subsections 722.63.C - Contract Progress Schedules / Monthly Updates, 722.64.C - Recovery Schedules and 722.64.D - Proposal Schedules.

The Cost and Resource-Loading information (Types A and B only) shall be provided by the Contractor within forty-five (45) Calendar Days after NTP.

The Engineer's review comments on the Baseline Schedule and the Contractor's responses to them will be maintained for the duration of the Contract and will be used by the Engineer to monitor the Contractor's work progress by comparing it to the Contract Progress Schedule / Monthly Update.

B. Interim Progress-Only Schedule Submissions

The first monthly update of the Contract Progress Schedule/Monthly Update is due within seventy (70) Calendar Days after Notice to Proceed (NTP.) The Baseline Schedule review period ends at sixty (60) Calendar Days after NTP, see Subsection 722.60.B - Schedule Reviews by the Department. If the Baseline Schedule has not been accepted within sixty (60) Calendar Days after NTP, an Interim Progress-Only Schedule shall be due within seventy (70) Calendar Days after NTP. The purpose of the Interim Progress-Only Schedule is to document the actual progress of all activities, including non-construction activities, from NTP until the Baseline Schedule is accepted.

SECTION 722 (Continued)

C. Contract Progress Schedules / Monthly Updates (Types A, B, C and D)

The first Contract Progress Schedule shall be submitted by the Contractor no later than seventy (70) Calendar Days after NTP. The data date for this first Progress Schedule shall be sixty (60) Calendar Days after NTP. Subsequent Progress Schedules shall be submitted monthly.

Each Contract Progress Schedule shall reflect progress up to the data date. Updated progress shall be limited to as-built sequencing and as-built dates for completed and in-progress activities. As-built data shall include actual start dates, remaining Work Days and actual finish dates for each activity, but shall not change any activity descriptions, the Original Durations, or the Original Resources (as planned at the time of bid), without the acceptance of the Engineer. If any activities have been completed out-of-sequence, the Contractor shall propose new logic ties for affected in-progress and future activities that accurately reflect the previously-approved sequencing. Alternatively, the Contractor may submit to the Engineer for approval an explanation of why an out-of-sequence activity does not require a correction and an adequate demonstration that the changes accurately represent how the activities will be built, including considerations for resources, dependencies and previously approved production rates. Once approved by the Engineer, the Contractor may incorporate the changes in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

No revisions to logic ties; sequence, description or duration of future activities; or planned resource costs shall be made without prior approval by the Engineer.

Any proposed logic changes for in-progress or future activities shall be submitted to the Engineer for approval before being incorporated into a Contract Progress Schedule. The logic changes must be submitted using a Proposal Schedule or a schedule fragnet submission. Once approved by the Engineer, the Contractor may incorporate the logic in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

For any proposed changes to the original sequence, description or duration of future activities, the Contractor shall submit to the Engineer for approval an explanation of how the proposed description or duration change reflects how the activity will be progressed, including considerations for resources and previously approved production rates. Any description or duration change that does not accurately reflect how the activity will be progressed will not be approved by the Engineer. Once approved by the Engineer, the Contractor may incorporate the changes in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

Except as otherwise designated by a Contract Modification, no Contract Progress Schedule that extends performance beyond the Contract Time and/or beyond any Contract Milestone shall be approved by the Engineer. The Contractor shall submit a Recovery Schedule if any Contract Progress Schedule/Monthly Update indicates a failure to meet the Contract Dates.

D. Short-Term Construction Schedule

The Contractor shall provide a Short-Term Construction Schedule that details daily work activities, including any multiple shift work that the Contractor intends to conduct, in a bar chart format. The daily activities shall directly correspond to the Contract Progress Schedule activities, with a matching reference to the activity identification number in the Contract Progress Schedule, and may be at a greater level of detail.

SECTION 722 (Continued)

The Short-Term Construction Schedule shall be submitted every two weeks. It shall display all work for a thirty-five (35) Calendar Day period consisting of completed work for the two (2) week period prior and all planned work for the following three (3) week period. The initial submission shall be provided no later than thirty (30) Calendar Days after NTP or as required by the Engineer.

The Contractor shall be prepared to discuss the Short-Term Construction Schedule, in detail, with the Engineer in order to coordinate field inspection staff requirements, the schedule of work affecting abutters and any corresponding work with affected utilities. Short-Term Construction Schedules shall be prepared and submitted in accordance with Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements.

Failure to submit Short-Term Construction Schedules every two (2) weeks may result in withholding of full or partial payments by the Engineer.

722.64 Impacted Schedule Requirements

A. Notice of Delay

The Contractor shall notify the Engineer in writing, with copies to the District and State Construction Engineers, within three (3) Calendar Days of the start of any delays to the Critical Path that are caused by actions or inactions that were not within the control of the Contractor. Delay notifications that are not provided in a letter to the Engineer, such as a delay notification in the schedule narrative, will not be recognized as contractual notice in the determination of any Time Extension related to the impacts to the work associated with this specific alleged delay. Should such delay continue for more than one (1) week, the Contractor shall note it in the Schedule Narrative until the delay is no longer impacting the Critical Path for the completion of the Contract Milestones. The Engineer will evaluate the alleged delay and its impact and will respond to the Contractor within ten (10) Calendar Days after receipt of a notice of delay.

B. Time Entitlement Analysis

A Time Entitlement Analysis (TEA) shall consist of a descriptive narrative, prepared in accordance with Subsection 722.62.A - Narratives, and an as-built CPM schedule, which may be in the form of a schedule fragnet (that has been developed from the project's Contract Progress Schedule of Record, and illustrates the impact of a delay to the Critical Path, Contract Milestones and/or Contract Completion Date as required in Subsection 8.10 - Determination and Extension of Contract Time for Completion. TEAs shall also be used to determine the schedule impact of proposed Extra Work Orders (EWO) as also required in Subsection 8.10.

TEAs shall be prepared and submitted in accordance with the requirements of Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements and shall be based on the Contract Progress Schedule of Record applicable at the start of the delay or impact from an EWO. A TEA fragnet must start with a specific new activity describing the work contained in either a Notice of Delay previously submitted to the Department per Subsection 722.64.A - Notice of Delay or an EWO.

SECTION 722 (Continued)

TEAs shall be submitted:

1. as part of any Extra Work Order that may impact Contract Time,
2. with a request for a Time Extension,
3. within fourteen (14) Calendar Days after a request for a TEA by the Engineer for any other reason.

A TEA shall be submitted to the Engineer before any Time Extension is granted to the Contractor. Time Extensions will not be granted unless the TEA accurately reflects an evaluation of all past delays and the actual events that occurred that impacted the Critical Path. The TEA must also demonstrate a plan for the efficient completion of all of the remaining work through an optimized CPM Schedule. The analysis shall include all delays, including Contractor-caused delays, and shall be subdivided into timeframes and causes of delays.

TEAs shall incorporate any proposed activities, logic ties, resource considerations, and activity costs required to most efficiently demonstrate the schedule impacts in addition to detailing all impacts to existing activities, logic ties, the Critical Path, Contract Milestones and the Contract Completion Date. In addition, TEAs shall accurately reflect any changes made to activities, logic ties, restraints and activity costs, necessitated by an Extra Work Order or other schedule impact, for the completion of the remaining work. The Contractor shall provide TEAs that demonstrate that all delays have been mitigated to the fullest extent possible without requiring an Equitable Adjustment to the original bid basis.

All TEAs shall clearly indicate any overtime hours, additional shifts and the resource that are proposed to be incorporated in the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts. The Engineer shall have the right to require that overtime hours and/or additional shifts be used to minimize the duration of Time Extensions if it is determined to be in the best interest of the Department to do so.

When accepted, the changes included in a TEA shall be incorporated into the next Contract Progress Schedule per the requirements of Subsection 722.63.C - Contract Progress Schedules / Monthly Updates.

During the review of any TEA, all Contract Progress Schedules shall continue to be submitted as required.

The Engineer may request that the Contractor prepare a Proposal Schedule or a Recovery Schedule to further mitigate any delays that are shown in the accepted TEA/Contract Progress Schedule.

C. Recovery Schedules

The Contractor shall promptly report to the Engineer all schedule delays during the prosecution of the Work. Except as otherwise designated by a Contract Modification, no Contract Progress Schedule that extends performance beyond the Contract Time and/or beyond any Contract Milestone shall be approved by the Engineer. The Contractor shall submit a Recovery Schedule within fourteen (14) Calendar Days of a Contract Progress Schedule submission that shows failure to meet the Contract Dates. This requirement is critical to the Department's ability to make informed decisions regarding Contract Time and costs.

SECTION 722 (Continued)

During the prosecution of the Work, should the Contractor's progress on a critical operation clearly not meet anticipated production, without cause by fault of the Department, or should a critical activity or series of activities not be staffed in accordance with the Contractor's approved Baseline Schedule resource planning, the Contractor shall be obligated to recover such delay. Recovery Schedules shall be prepared and submitted in accordance with Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements within fourteen (14) Calendar Days of any of the cases listed above.

Recovery Schedules shall clearly indicate any proposed overtime hours, additional shifts, and the resources that are proposed to be incorporated in to the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts and shall have the right to require that overtime hours and/or additional shifts be used to minimize the duration of Time Extensions, without additional compensation for any Contractor delays, if it is determined to be in the best interest of the Department to do so.

During the review of any Recovery Schedule, all Contract Progress Schedules shall continue to be required every month.

The Engineer may request that the Contractor prepare a Recovery Schedule to further mitigate any delays that are shown in an accepted TEA/Contract Progress Schedule.

Changes represented in accepted Recovery Schedules shall be incorporated into the next Contract Progress Schedule.

D. Proposal Schedules

A Proposal Schedule is an alternative schedule used to evaluate proposed changes to the Contract scope or significant alternatives to previously approved approaches to complete the Work, which may include changes to activity durations, logic and sequence. For Types A and B Schedules, the Proposal Schedule shall be cost and resource-loaded.

A Proposal Schedule may be requested by the Department at any time or may be offered by the Contractor. The Engineer may request that the Contractor prepare a Proposal Schedule to further mitigate any delays that are shown in an accepted TEA/Contract Progress Schedule.

The Contractor shall submit the Proposal Schedule within thirty (30) Calendar Days of a request from the Department.

The Proposal Schedule shall not be considered a Schedule of Record until the logic, durations, narrative and basis of the Proposal Schedule have been accepted by the Engineer. If the Proposal Schedule took the form of a fragnet, it must be incorporated into the Contract Progress Schedule of Record showing the current progress of all other activities and the impacts/results of the changes made by the Proposal Schedule before the Proposal Schedule is accepted by the Department.

Proposal Schedules shall clearly indicate any proposed overtime hours, additional shifts, and the resources that are proposed to be incorporated in the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts.

Changes represented in accepted Proposal Schedules shall be incorporated into the next Contract Progress Schedule. During the review of any Proposal Schedule, all Contract Progress Schedules shall continue to be required every month.

SECTION 722 (Continued)

E. Disputes (Types A, B, C and D)

All schedules shall be submitted, reviewed, dispositioned and accepted in the timely manner specified herein so as to provide the greatest possible benefit to the execution of this Contract.

Any dispute concerning the acceptance of a schedule or any other question of fact arising under this subsection shall be determined by the Engineer. Pending resolution of any dispute, the last schedule accepted by the Engineer will remain the Contract Schedule of Record.

COMPENSATION

722.80 Method of Measurement and Basis of Payment (Types A, B, C and D)

The Special Provisions will specify the fixed-price amount to be paid to the Contractor for the Project Schedule requirements contained herein. Each bidder shall include this lump-sum, fixed-price bid item amount in his/her bid. Failure to do so may be grounds for the rejection of the bid.

All required schedule-related work, including, but not limited to computers, computer software, the planning and coordination with utilities, training, schedule preparation and schedule submittals will be paid for under the fixed price amount.

This fixed price amount is for payment purposes only and is separate from what the Department considers to be the Contractor's General Condition costs. If the Contractor deems it necessary to include additional costs to provide all of the requirements of this section, these additional costs shall be included in the Contractor's overall bid price.

Twenty percent (20%) of this pay item will be paid upon the Engineer's acceptance of the Contractor's Baseline Schedule, prepared and submitted in accordance with Subsection 722.63.A.

The remaining eighty percent (80%) of this pay item will be paid in equal monthly installments distributed across the Contract Duration from Notice to Proceed (NTP) to Contractor Field Completion (CFC), less the 2 months required for the submittal and review of the Baseline Schedule in accordance with the following formula:

$$\text{Monthly Payment} = \frac{\text{Remaining Fixed Price amount (80\% of Item 100.)}}{\text{Contract Duration in whole months} - 2 \text{ months}}$$

The timely and accurate submission of the Baseline Schedule is critical to the Contract and the Department's ability to make informed decisions. Only payments under Item 740 - Engineer's Field Office and Item 748 – Mobilization will be made until the Baseline Schedule is accepted by the Engineer.

SECTION 722 (Continued)

No payment for any other pay item will be processed beyond seventy-five (75) Calendar Days from Notice to Proceed (NTP) until the Baseline Schedule is accepted by the Engineer. Until the Engineer's acceptance of the Baseline Schedule, the combined total of all payments made to the Contractor will be limited to an amount no greater than the total price for Item 748 - Mobilization or 3% of the contract price, whichever is less.

All Contract Progress Schedule Updates submitted later than ten (10) Calendar Days after the CQE (Contract Quantity Estimate) completion date, or greater than forty (40) Calendar Days from the Data Date of the previous submission, will be deemed to be no longer useful and will not qualify for payment. Late submittal of missed Contract Progress Monthly Updates will not result in recovery of the previously forfeited portion of the Schedule of Operations Fixed Price Payment Item.

Failure to submit schedules as and when required may result in the forfeiture of that portion of the Schedule of Operations Fixed Price Payment and/or the withholding of the full or partial CQE payments by the Engineer.

Failure to submit schedules that are acceptable to the Engineer may result in the forfeiture of that portion of the Schedule of Operations Fixed Price Payment and/or the withholding of the full or partial CQE payments by the Engineer.

The Schedule of Operations pay item will be adjusted to pay for only the actual quantity of schedules that have been submitted in accordance with this section.

The Contractor's failure or refusal to comply with the requirements of this Section shall be reasonable evidence that the Contractor is not prosecuting the Work with due diligence and may result in the withholding of full or partial payments by the Engineer.

Should there be a Time Extension granted to the Contractor, the Engineer may provide an Equitable Adjustment for additional Contract Progress Schedule Updates at intervals directed by the Engineer. Item 100. will be the basis for this Equitable Adjustment.

722.82 Payment Items

100.	SCHEDULE OF OPERATIONS - FIXED PRICE $_____	LUMP SUM

ITEM 102.2 TREE TRIMMING LUMP SUM

The work under this Item shall conform to the relevant provisions of Subsection 101 of the Standard Specifications and the following.

The work consists of removing all dead, dying, broken and certain other limbs and branches as described hereinafter and the removal of all stubs of limbs and branches from all designated trees located within the limits work in this contract and the satisfactory disposal of all such removed debris. Also include coordination and trimming of trees for proposed utility pole, overhead wires and guy wires for relocated utilities for the project.

All pruning and tree work shall be in conformance with the most current version of the American National Standards Institute (ANSI) Standard Z-133.1 and A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance.

All work under this item will be performed or supervised by the Massachusetts Certified Arborist.

Contractor shall be required to provide a crew, consisting of a bucket truck with operator and grounds man for pruning and removal. The minimum crew shall consist of the following: a supervisor and three tree-trimmers/laborers. The crew shall be equipped with all necessary equipment needed to complete the work including, but not limited to, pickup trucks, chippers, gas powered chain saws, hand saws, loppers, shears, pruners, branch trimmers, ladders, tree-climbing equipment, etc. Fuel for equipment shall also be considered incidental to this item.

SUBMITTALS

Prior to start of work, the Contractor shall submit to the Engineer the name, certification number and resume of the Massachusetts Certified Arborist referenced herein. Cost for Certified Arborist for all activities pertaining to these Items shall be incidental to this item.

Incidental to this item, the Contractor shall provide to the Engineer one (1) copy of the most current version of the American National Standards Institute (ANSI) Standard Z-133.1 and A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance, Part 1: Pruning. These references shall be kept by the Engineer at his office for the length of the Contract.

DECSCRIPTION OF WORK

TREE: Shall be defined as having a diameter of 4 inches or over, measured at a point 3 feet above the average ground.

LIMBS AND BRANCHES: Shall be defined as wood having a diameter of ½ inch or over and wood that has a diameter of less than ½ inch shall be considered a TWIG.

A DYING LIMB OR BRANCH: May have live growth at some point, but shall be removed if found to be in an unhealthy condition.

ITEM 202.2 (Continued)

Need to remove all limbs required by Western Mass. Electric Company. Trimmings would typically provide a minimum 10' clearance to their closest conductor. (Conductors will be on the center of the proposed pole line and 5' in each direction on crossarms.)

While it is not the intent that every dead, dying and/or broken twig be removed from trees requiring trimming, the tree worker will be required to remove all such twigs accessible in the areas of the tree in which he/she is working.

If directed by the Engineer, specific trees or parts thereof which are so located that damage may result from dropping shall be reduced by rope or cable lowering.

Tree shaping may be required on trees, where up-branching done under this contract has distorted the natural symmetry of the tree. Tree shaping shall consist of the removal of limbs and branches from other locations of the tree where removal is desirable to restore natural symmetry.

All sucker growth on all tree trunks within the limits of the contract shall be removed from the ground level to the beginning of the main branch system.

Recognized tree surgery practices direct that all limbs and branches which require removal and all stubs regardless of age be cut NEARLY flush, either to a union with the next larger sound limb, or branch, or NEARLY flush to the trunk of the tree.

By cutting NEARLY, but not quite, flush with the trunk, limb or branch, the "collar" is left at the top of the wound (in the crotch of the union). This will permit the callus growth to cover the wound in a shorter period of time.

BASIS OF PAYMENT

Item 102.2 will be paid for at the Contract unit price per Lump Sum, which price shall include all labor, materials, equipment, apparatus, tools, including the services of a certified arborist, and incidental costs required to complete the work.

ITEM 102.3 HERBICIDE TREATMENT OF INVASIVE PLANTS HOUR

This work must be performed by persons who meet the qualifications below and are approved by the Landscape Design Section.

Work under this item consists of herbicide treatment of invasive plants currently existing within the project limits and as directed. An Invasive Plant Management Strategy (IPMS) shall be submitted to the Engineer for review and approval and the IPMS shall be implemented on-site. The IPMS shall be measured and paid for under Item 102.33 Invasive Plant Management Strategy.

Work under this item shall be coordinated with work and schedule for Selective Clearing, Clearing and Grubbing, Mowing, Tree Removal, Planting, and Wetland Mitigation items.

Payment is per hour on-site and shall be compensation for a minimum crew of 2 licensed applicators, 2 back-pack sprayers and mist-blowers, a properly equipped spray truck with spray hoses, and a tank with sufficient capacity for a full day of work. If there is only one applicator, hourly payment shall be adjusted to 50 percent of the unit price. This item is not intended for manual removal of plants.

Management of plants determined to have been introduced to the site via imported loam, compost, mulch, plants, equipment, or other construction activities will be the Contractor's responsibility and at the Contractor's expense.

Herbicide shall be applied during daytime hours only.

Measures to prevent the introduction of invasive plant species to the site and to address introduction due to construction-related activities shall be covered under the Standard Specifications, Division I - Subsections 7.01(D) Plant Pest Control and 7.13 Protection and Restoration of Property as amended in these Special Provisions.

Plant species targeted for management under this item shall be as determined in the field per the site walk and as specified in the IPMS.

The definition of invasive plant species shall be as described by Massachusetts Invasive Plant Advisory Group (MIPAG): "non-native species that have spread into native or minimally managed plant systems in Massachusetts, causing economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems."

Control of invasive plants shall begin immediately with the initiation of construction activities and prior to any clearing or site disturbance. Treatment areas shall include stockpile locations and may, upon approval of the Engineer, extend outside the project limit. Treatment shall be done each consecutive year for the duration of the contract unless specified otherwise in the IMPS or unless directed otherwise by the MassDOT invasive species contact. Work shall be done during the growing season from May – October unless otherwise specified in the IPMS.

ITEM 102.3 (Continued)

Areas identified for vegetation control measures shall be as shown on the plans and as determined in the field by the Engineer and a MassDOT Landscape Architect. Contact at MassDOT Landscape Design Section may be contacted at: robbin.bergfors@dot.state.ma.us.

QUALIFICATIONS

The applicators shall submit and meet the qualifications outlined below. A list of contractors specializing in invasive management and approved by MassDOT Landscape Design Section is available on the following website: https://www.mass.gov/lists/landscape-design-and-roadside-maintenance under Invasive Plant Management.

Requirements

1. Company must provide proof of qualifications by providing the following:
    a. Narrative describing company, its expertise and experience with invasive plant control.
    b. Demonstrate experience with herbicide treatment as part of restorations and in sensitive areas.
    c. Describe company's technical qualifications and past performance.

2. Company must meet licensing requirements:
    a. All crew applicators must have a Massachusetts Commercial Applicator License (CORE).
    b. At least one or more applicator must have a ROW certification, if required for work.
    c. Company must provide name(s) of applicator(s) and Applicator License/Certification number for all contractor crew leaders working on the project.
    d. Company must provide documentation of any warnings, penalties or fines received in the last three (3) years.

3. Company must provide proof of experience with invasive plant control and include following:
    a. At least five (5) references from prior invasive plant control work completed in last five (5) years. Provide contact information including address, phone number and email.
    b. Provide a summary of each of these projects including nature of the problem, specific invasive vegetation treated, dates and period of treatment, methodologies used, and summary of success or not in terms of meeting performance objectives. Include summary of equipment used.
    c. Photo documentation of these projects.
    d. GPS coordinates of project locations, if available.

4. Crew leader must have expertise with invasive plant control and provide the following:
    a. Have held Core license for at least five (5) years.
    b. Resume listing five (5) or more years of experience applying pesticides with the company or with another company specializing in vegetation management.

ITEM 102.3 (Continued)

SUBMITTALS

No work shall begin without approval of the submittals.

Submittals include the following items:

Invasive Plant Management Strategy (IPMS)

At least thirty (30) days prior to proposed treatment the IPMS shall be submitted for approval by the Engineer and MassDOT Landscape Architect. All chemicals, methods and work done under this item shall be consistent with the IPMS. The IPMS shall be as described under Item 102.33.

Herbicide Use Report

Within two (2) weeks after each application, the Contractor shall provide to the Engineer a completed and signed MassDOT Herbicide Use Report (Document A00810).

Photo Documentation

Digital photos with date and time of herbicide application work may be required and shall be submitted upon request.

MATERIALS

All proposed herbicides shall be as approved in the IPMS. Herbicides shall be labeled for the method of treatment and shall meet all federal, state and local regulation requirements. Application rates will depend on herbicide proposed and shall be per the manufacturer's label for specific application.

METHODS

All methods used shall be as approved in the IPMS which shall be determined during the Initial Site Walk as described under Item 102.33 Invasive Plant Management Strategy.

The Contractor shall be responsible for marking delineated areas and plants to be preserved, removed, or otherwise treated. Fencing or other materials needed for marking and delineating protected areas shall be incidental to this item.

The Contractor shall notify the Engineer a minimum of 3 days prior to date of expected herbicide application. Applicators shall notify the Engineer upon arriving on-site and upon leaving the site.

ITEM 102.3 (Continued)

Herbicide Applications

All herbicide application shall conform to Massachusetts Pesticide Laws and Regulations per the Massachusetts Department of Agricultural Resources (MDAR) Pesticide Bureau.

Mixing, applying and/or disposing of herbicides shall always be in accordance with instructions on their labels and all applicable federal, state, and local regulations. Mixing shall not occur within sensitive areas, wetlands, or buffer zones.

Contractor shall not spray 2 hours prior to precipitation, during rain, or during windy conditions. The Contractor shall be responsible for monitoring weather conditions and adjusting the work schedule as appropriate for the herbicide and application method to be used.

Targeted vegetation shall be identified and marked prior to treatment. Plants treated by foliar spray, injection or glove application or other methods that leave standing vegetation, as opposed to cut-stump application, shall remain clearly marked for identification through the contract period.

Desirable vegetation shall be protected from both spray and other physical damage.

Contractor is responsible for any damage to vegetation not designated for removal or treatment. Vegetation damaged shall be restored. Cost of replacement plants and/or restoration shall be borne by the Contractor.

Contractor shall ensure that the public does not enter a work area while herbicide application or spraying is underway.

Disposal Of Invasive Plant Material

All material to be cleared shall become the property of the Contractor. The satisfactory disposal of all cleared plant material (seeds, roots, woody vegetation, associated soils, etc.) shall be the Contractor's responsibility.

The Contractor shall take measures to prevent viable plant material from leading to further infestations (seeds, roots, woody material, etc.) while stockpiled, in transit, or at final disposal locations. All precautions shall be taken to avoid contamination of natural landscapes with invasive plants or invasive plant material.

Chipping, shredding, or on-site burning of plant material must be approved by the Engineer and included in the IMPS.

For plant material taken to an incinerating facility per the IPMS, a receipt from that facility shall be submitted to the Engineer as proof of disposal.

ITEM 102.3 (Continued)

Where feasible, it is preferable to dispose of plants on-site or to bury them on-site with on-going monitoring for re-sprouting. Disposal locations and methods must be approved and included in the IPMS. Site work such as grading and seeding to stabilize and restore disposal area shall be incidental to this item.

The Contractor shall be responsible for treating or otherwise managing areas of re-growth due to improper disposal. Treatment shall be at the Contractor's expense.

Follow-Up Treatment

Plants and areas shall be re-treated as necessary and as appropriate to the time of year. Treatment shall be for the duration of the contract and per the IPMS.

MEASURE OF SUCCESS

The expectation is a minimum of 85-95 percent control achieved after the first treatment, depending on plants targeted and extent of population, and based on the expectations laid out in the IPMS. The expectation for the contract duration is 95-100% eradication by the end of the treatment period, unless otherwise specified in the IPMS.

METHOD OF MEASUREMENT

Item 102.3 will be measured for payment by the Hour of crew time spent on the project doing actual herbicide application work. A crew shall be defined as a minimum of two licensed applicators each equipped with (at minimum) back-pack sprayer and mist blower. The crew shall also have a properly equipped spray truck with hoses and a tank with sufficient capacity for a full day of work.

BASIS OF PAYMENT

Item 102.3 will be paid at the contract unit price per Hour, which price shall include all labor, materials, equipment, tools, and all incidentals required to complete the work.

Payment will be based upon time spent on the project doing actual work and shall not include travel time to and from the Contractor's place of business and shall also not include time for investigative field trips.

If there is only one applicator, hourly payment shall be adjusted to 50 percent of the unit price.

The Invasive Plant Management Strategy will be paid for under Item 102.33.

ITEM 102.33 INVASIVE PLANT MANAGEMENT STRATEGY HOUR

This item consists of providing an Invasive Plant Management Strategy (IPMS) for the control of invasive plants currently existing on the project site and/or as directed and shall be coordinated with Item 102.3 Herbicide Treatment of Invasive Plants. The IPMS shall be submitted for review and approval and the IPMS shall be implemented on-site.

Herbicide treatment for invasive plants shall be as described under Item 102.3 Herbicide Treatment of Invasive Plants and shall be compensated per that Item.

Work under this item shall be coordinated with work and schedule for Selective Clearing, Clearing and Grubbing, Mowing, Tree Removal, Planting, and Wetland Mitigation as relevant to the project.

Individual attending the site walk and determining the Invasive Plant Management Strategy must demonstrate expertise with vegetation management and invasive plant control and submit qualifications as described below.

QUALIFICATIONS

Individual shall be from the same company as that providing services for Item 102.3 Herbicide Treatment of Invasive Plants and shall submit the following, if not submitted under Item 102.3:

- Submit copy of current Core license.
- Submit a resume listing five (5) or more years of experience managing invasive plants with a company specializing in vegetation management.
- References shall be submitted if requested.

SUBMITTALS

Task Summary & Reports

For measurement of payment, the contractor shall submit the total sum and a breakdown of hours for the tasks performed. At a minimum, the tasks shall include the Initial Site Walk, the IPMS Written Report, and if necessary to accommodate project or site changes, a Follow-up Site Inspection and accompanying IPMS Amendment.

Interim Site Monitoring Reports and/or a Final Report shall be submitted if requested by the MassDOT Landscape Design contact. The MassDOT Landscape Design contact must be notified to attend the final walk through when a Final Report has been requested.

Invasive Plant Management Strategy (IPMS)

At least thirty (30) days prior to construction activities and/or any proposed treatment, submit a written IPMS proposal for approval by the Engineer and MassDOT Landscape Architect. All chemicals and methods proposed shall be consistent with applicable Massachusetts Wetlands Protection Act Order of Conditions.

ITEM 102.33 (Continued)

The IPMS shall be completed in coordination with the Roadway Contractor and the Engineer and shall include the following as appropriate to the project:

I. Project Information
- a. Company writing IPMS and performing herbicide application.
- b. Date of site walk
- c. Attendees at site walk
- d. Expected end date of contract and expected last treatment (month/season)

II. Brief Description of Conditions
- a. Provide a free-hand sketch on construction plans or aerial image showing species, location, and as relevant, show or note extent of population as relevant to Strategy (i.e., population extends off ROW preventing eradication, small population and eradication deemed feasible within contract schedule, etc.).

III. Coordination with Roadway Contractor regarding other work
- a. Tree Work: Note coordination to be implemented with tree removal, clearing, and clearing and grubbing as applicable to the project.
- b. Wetland Mitigation - Include management proposed for wetland mitigation areas in the IPMS, if and as required.
- c. Planting: If there will be planting in areas proposed for treatment, propose treatment and schedule to avoid herbicide damage to plants.
- d. Mowing: If coordination is required with state mowers, note need in IPMS.

IV. Soil Management
- a. Provide specifics on how soil with invasive plant roots (in particular) or seeds will be handled (i.e., separate stockpiles, plant material will be buried on-site, re-used on-site, disposed off site and if so, where?).
- b. Show stockpile locations on plan and include treatment schedule.
- c. Note measures that will be implemented to avoid spread through equipment, including how and where equipment will be cleaned.

V. Invasive Plant Treatment & Management
- a. Proposed chemical and methods of treatment for each species or area.
- b. Time of treatment based on target plant species.
- c. Submit product label including application methods and rates (entire MSDS information need not be submitted if available online).
- d. Proposed performance metrics or measure of treatment success if different from that specified under Item 102.3.
- e. Method for disposing invasive plant material. This includes material that may result in spread (i.e., seeds, roots) and material that has been treated and/or is not viable (foliage, dead wood, etc.). Methods may include grinding in place, stockpiling and treating, and incinerating offsite.
- f. Expected follow-up treatment for duration of contract.

VI. Monitoring Schedule if requested by MassDOT.

Note: The IPMS is critical for identifying pre-construction conditions as well as strategies for minimizing import or spread of invasive plants. Failure to provide an approved IPMS may jeopardize this item, in which case, the contractor will be responsible for management of invasive plants found on-site at no cost to the contract.

ITEM 102.33 (Continued)

Photo Documentation

Digital photos with date and time verification shall be provided with the IPMS and with any follow-up monitoring or reporting.

METHODS

Initial Site Walk

Prior to any construction activities and soil disturbance, the Contractor shall walk the site with the Engineer and the MassDOT Landscape Architect to determine the IPMS. During the site walk the Contractor shall identify limits of work and, as necessary, mark locations of areas designated for treatment and individual plants targeted for treatment or removal. The Contractor shall be responsible for marking delineated areas and plants to be preserved, removed, or otherwise treated. Fencing or other materials needed for marking and delineating protected areas shall be incidental to this item.

IPMS Follow-up Amendment

The IPMS may be amended to address additional concerns or adjust to conditions if required by the MassDOT Landscape Architect. The amended IPMS shall be submitted to the Engineer and MassDOT Landscape Architect for approval at least fourteen (14) days prior to any proposed treatment.

Interim Site Monitoring Inspection Reports

If required by the MassDOT Landscape Architect and Engineer, Interim Site Monitoring and an accompanying report shall be conducted.

Final Inspection

A final inspection and report documenting the status of the invasive control may be required for regulatory purposes or for instances where control will be continued by others. The report shall include photo documentation of pre-construction (existing) and post-treatment conditions, notations on a plan or aerial image of area treated, summary of treatment performed, and control achieved.

METHOD OF MEASUREMENT

Item 102.33 will be measured for payment by the Hour. The basis for measurement shall be per the completion of tasks as approved under the Task Summary submittal.

BASIS OF PAYMENT

Item 102.33 will be paid at the contract unit price per Hour, which price shall include all labor, materials, equipment, tools, and all incidentals required to complete the work.

Payment shall not include travel time to and from the Contractor's place of business.

ITEM 115.11 DEMOLITION OF BRIDGE NO. C-20-004 LUMP SUM

The work under this Item shall conform to the relevant provisions of Subsection 112 of the Standard Specifications and the following:

The work includes furnishing all labor, materials and equipment necessary to perform demolition of the existing North Poland Road Bridge substructure, including temporary bridge substructure, as shown on the Plans, or as directed by the Engineer. Except as specified, all material and debris shall become the property of the Contractor, and shall be recycled, reused or disposed of in accordance with all applicable local, state and federal requirements.

Removal of the existing temporary bridge superstructure is covered under Item 993.11.

The Contractor shall demolish, remove, and dispose of the substructure including but not limited to the following major items: temporary abutments; existing abutments; existing piers; piles; and other miscellaneous items.

The contractor shall remove and dispose of the abandoned piezometer pipes adjacent to the abutments.

The Department makes no assurances regarding the presented conditions, dimensions, and materials of the existing structure as shown on the Plans. The Contractor shall verify all existing conditions and construction features of the structure to be demolished, as necessary, for the proper planning and completion of the work. The Contractor shall base its bid on his/her own findings.

The Contractor shall be solely responsible for maintaining the stability of the existing structure at all times during the demolition including bracing of the existing deck or beams as required. The Contractor shall prepare and submit a plan indicating the proposed demolition procedures and methods to be used including equipment, tools, devices, bracing, crane capacity and location, schedule of operations, methods of utility protection, traffic management procedures, etc., to the Engineer for approval. The requirements for equipment and all procedures utilized shall be in conformance with the intent of Subsection 960.61, Steel Erection of the Supplemental Specifications. The submittal shall include drawings and calculations of all loads and selection of crane and lifting devices. The demolition procedures and any necessary calculations and drawings shall be stamped by a Professional Structural Engineer registered in Massachusetts, certifying that all existing structural members are suitably braced and supported throughout the demolition process.

No debris, tools or incidental equipment of any kind shall be permitted to fall into the water below. Any material that accidentally falls into the water shall be removed immediately. All debris shall be promptly removed and satisfactorily disposed of by the Contractor at his/her own expense.

ITEM 115.11 (Continued)

At least 30 days prior to the start of demolition work, notify the Engineer and each Utility having services connection to, or immediately adjacent to, or overhead of, the structure to be demolished. The Contractor shall exercise caution in the areas of any existing utilities to avoid damage to such.

BASIS OF PAYMENT

Item 115.1 will be paid for at the Contract LUMP SUM bid price, which price constitutes full payment for all labor, transportation, equipment, tools, disposal fees, and all incidental costs required to complete the work as specified above, as shown on the Plans or as directed by the Engineer.

The Contractor will make his own investigation of the structure to be demolished including the materials that are part of the structure. All costs for permits, dump fees, etcetera, shall be included in the bid price of the demolition item.

Removals and disposals of any materials that are not specifically listed for payment under another bid Item shall be included under this Item without additional compensation.

ITEM 151.9 STREAMBED RESTORATION LUMP SUM

This work shall consist of removing, stockpiling, and replacing river bed material in the proposed bridge replacement and the upstream and downstream approaches in the limits of work. The streambed restoration shall replicate the existing natural channel bed outside the work area in terms of material, roughness, shape, profile, and appearance. The ultimate product will, to the extent possible, replicate the function and appearance of the natural stream channel, as illustrated by photo-documentation herein (Figures A).

The Contractor shall coordinate with his/her sub-contractors to ensure all required equipment is available on-site to complete the work in this manner. The streambed restoration is required to comply with environmental permits issued for the project. MassDOT Environmental Services will provide a Fluvial Geomorphologist (Geomorphologist) to provide a pre-construction meeting, on-site oversight during construction, and assistance during streambed restoration construction to ensure the restoration is constructed as shown on the Plans, as required by these Special Provisions and in accordance with permit requirements.

At least 30 days prior to the commencement of construction, the Contractor shall coordinate with David Paulson (MassDOT Wetlands & Wildlife Unit Supervisor, (508) 389-6366 / david.j.paulson@state.ma.us) to set up an initial (virtual or in person) meeting with MassDOT's Geomorphologist, Contractor, and Engineer. At this meeting, the Geomorphologist will provide an overview of the restoration work. The Contractor should be prepared to discuss the anticipated means, methods, and schedule.

Process Approval:

In lieu of a mockup, the Contractor shall schedule an onsite meeting to discuss the streambed restoration with the Geomorphologist and respective parties from MassDOT. The Geomorphologist shall be onsite during initial streambed restoration. The Contractor shall provide the Geomorphologist adequate access to observe, direct, and inspect the channel restoration work throughout the duration of the removal, stockpile, and reinstallation of the existing streambed material. If material is being brought to the site for streambed restoration, the Contractor shall provide the Geomorphologist with photographs to see the material.

MATERIAL

The top 2 feet of streambed material excavated from the existing streambed shall be removed and stockpiled to facilitate reinstallation and replication of the natural streambed. The excavated streambed material below the top 2 feet shall be stockpiled and reused to fill the voids in the proposed riprap placed below the top streambed restoration layer.

ITEM 151.9 (Continued)

In the event that the excavated material is not suitable or there is not enough available suitable material, additional streambed restoration material shall be locally sourced that matches the composition of the existing native river bed. The following gradation shall be used as a guide. The channel is a cobble and gravel riffle-pool channel. The median grain size (D50) is approximately 93 mm (small cobble).

Stream Bed Material Gradation

Particle	Percent (%) Composition
Boulder	15
Cobble	60
Gravel	25
Sand	0

The streambed material shall be approved by the Engineer and Geomorphologist prior to use.

CONSTRUCTION

Channel

The streambed material shall be reinstalled over dumped riprap, as depicted on the plans, to an average thickness of 2.0 feet, with variations in thickness as necessary to replicate existing channel conditions. The initial placement of streambed material shall fill / choke the voids in the underlying riprap. Fill voids by shaking stone with the teeth of an excavator bucket, hand tamping with metal tamping rods, and by spraying water to settle fines between large stones. Plate compactors shall not be used. The purpose of filling the voids is to prevent subsurface flow where surface water disappears into large voids between the stone fill below the channel bed surface during low flow conditions. The final streambed shape and appearance shall be finalized in the field as directed by the Geomorphologist.

Reinstallation of the stockpiled streambed material shall be placed on top of the riprap to restore streambed habitat and fish passage. The streambed materials shall be installed during normal low water conditions behind cofferdams in accordance with the environmental permits.

Completion

Once all material has been placed in the stream channel and approved by the Geomorphologist and Engineer, the Contractor shall remove the cofferdams in such a way as to slowly wet the stream to minimize the initial sediment pulse. Every attempt shall be made to minimize the downstream movement of sediment.

The final streambed shall maintain the general configuration of the existing streambed bedform and there shall be minimal subsurface flow upon final inspection by the Engineer and Geomorphologist. The project must be passable by fish and other aquatic organisms following construction.

ITEM 151.9 (Continued)

The streambed restoration to be measured for payment will be the complete and accepted work for restoration of the streambed within the limits shown on the Plans as approved by the Engineer and Geomorphologist.

BASIS OF PAYMENT

Item 151.9 will be paid for on a lump sum basis. Payment will be full compensation for excavating, stockpiling, transporting, and placing the material specified and for furnishing all labor, tools, equipment, testing, and incidentals necessary to complete the work.

The Geomorphologist will be provided by MassDOT at no cost to the Contractor.

FIGURES

Figure A: Existing Streambed Material Upstream of Bridge

ITEM 180.01 ENVIRONMENTAL HEALTH AND SAFETY PROGRAM LUMP SUM

The work shall consist of ensuring the health and safety of the Contractor's employees and subcontracting personnel, the Engineer, their representatives, the environment, and public welfare from any on-site chemical contamination present in air, soil, water and sediment.

The Contractor shall prepare and implement a site-specific Environmental Health and Safety Plan (EHASP) which has been approved and stamped by a Certified Industrial Hygienist (CIH) and includes the preparer's name and work experience. The EHASP shall include appropriate components required by OSHA Standard 29 CFR 1910.120(b) and the Massachusetts Contingency plan (MCP) 310 CMR 40.0018 and must comply with all applicable state and federal laws, regulations, standards and guidelines, and provide a degree of protection and training appropriate for implementation on the project. The EHASP shall be a dynamic document with provision for change to reflect new information, new practices or procedures, changing site environmental conditions or other situations which may affect site workers and the public. The EHASP shall be developed and implemented independently from the standard construction HASP required to work on all MassDOT construction projects.

Health and safety procedures provided by the Contractor shall comply with all the appropriate regulations that address employee working conditions, including but not limited to standards established by OSHA and National Institute for Occupational Safety and Health (NIOSH). Equipment used for the purpose of health and safety shall be approved by and meet pertinent standards and specifications of the appropriate regulatory agencies.

A copy of the most up-to-date version of the EHASP shall be maintained on-site at all times by the Contractor. The on-site copy shall contain the signature of the Engineer and each on-site employee of the MassDOT, Contractor, and Subcontractors involved with on-site activities. The employee's signature on the EHASP shall be deemed prima facie evidence that the employee has read and understands the plan. Updated copies of signature sheets shall be submitted to the Engineer.

The EHASP shall specify a Contractor Site Safety and Health Officer responsible for implementation of the EHASP and to oversee all construction activities, including handling, storage, sampling and transport, which require contact with or exposure to potentially hazardous materials.

The level of protection, required to ensure the health and safety of on-site personnel will be stipulated in the EHASP. The Site Safety and Health Officer shall implement the EHASP based on changing site and weather conditions, type of operation or activity, chemical compounds identified on-site, concentration of the chemicals, air monitoring data, physical state of the hazardous materials, potential duration of exposure to hazardous materials, dexterity required to perform work, decontamination procedures, necessary personnel and type of equipment to be utilized.

ITEM 180.01 (Continued)

During implementation of the EHASP, a daily log shall be kept by the Site Safety and Health Officer and a copy shall be provided weekly to the Engineer. This log shall be used to record a description of the weather conditions, levels of personal protection being employed, screening data and any other information relevant to on-site environmental safety conditions. The Site Safety and Health Officer shall sign and date the daily log.

Method of Measurement and Basis of Payment

Preparation and implementation of the Environmental Health and Safety Program, including the monitoring, protection and storage of all contaminated materials, as well as subsequent modifications to the EHASP, will be measured and paid for at the Lump Sum Bid Price.

Payment of 50% of the Environmental Health and Safety Program contract price will be made upon the initial acceptance of the EHASP by the Engineer. Payment of the remaining 50% of the Environmental Health and Safety Program contract price will be made upon completion of the work. The bid price shall include preparation and implementation of the EHASP as well as the cost for its enforcement by the Site Safety and Health Officer along with any necessary revisions and updates. The work of implementing the Environmental Health and Safety Program includes work involving, but not limited to, the monitoring, protection, and storage of all contaminated materials.

ITEM 180.02 PERSONAL PROTECTION LEVEL C UPGRADE HOUR

The work shall consist of providing appropriate personal protective equipment (PPE) for all personnel in an area either containing or suspected of containing a hazardous environment.

Contingencies for upgrading the level of protection for on-site workers will be identified in the EHASP and the Contractor shall have the capability to implement the personal protection upgrade in a timely manner. The protective equipment and its use shall be in compliance with the EHASP and all appropriate regulations and/or standards for employee working conditions.

Personal Protection Level C Upgrade will be measured and paid only upon upgrade to Level C and will be at the contract unit price, per hour, per worker, required in Level C personal protection. No payment will be made to the Contractor to provide Level D PPE.

ITEM 180.03 LICENSED SITE PROFESSIONAL SERVICES HOUR

Within limited areas of the project site, soils, sediments and/or groundwater may be contaminated. A Licensed Site Professional (LSP) shall be required to provide the services necessary to comply with the requirements of the MCP. These services may include sampling, analysis and characterization of potentially contaminated media, preparation of Immediate Response Action (IRA) Plans, Utility-Related Abatement Measure (URAM) and Release Abatement Measure (RAM) Plans, Imminent Hazard Evaluations, status reports, transmittal forms, release notification forms, risk assessments, completion statements, and related documents required pursuant to the Massachusetts Contingency Plan (MCP). LSP hours related to the characterization and disposal of contaminated soil and/or sediment are incidental to the disposal items. An estimate of LSP services to be provided shall be submitted to the Engineer for approval before any LSP activity begins.

The name and qualifications of the LSP and all environmental technicians to be assigned to the project shall be submitted to the Engineer for approval at least four weeks prior to initial site activities. The LSP shall have a current, valid license issued by the Massachusetts Board of Registration of Hazardous Waste Site Cleanup Professionals. The LSP shall have significant experience in the oversight of MCP activities at active construction sites. Qualification packages for the LSP and each technician shall include a resume, all recent work assignments with responsibilities identified (previous 5 years), and applicable training and certifications. A list of all Notices of Noncompliance, Notice of Audit Findings and Enforcement Orders issued by the DEP shall be submitted for all work assignments listed for the LSP and environmental technicians.

The LSP shall evaluate soil and/or sediment with discoloration, odor, and presence of petroleum liquid or sheening on the groundwater surface, or any abnormal gas or materials in the ground which are known or suspected to be oil or hazardous materials. Excavated soil and sediment which is suspected of petroleum contamination shall be field screened using the jar headspace procedures according to established DEP Guidance. All field screening equipment must be pre-approved by the Engineer. The LSP shall ensure proper on site calibration of all field screening instrumentation.

The Engineer shall be contacted immediately when observations or any field screening results verify contamination requiring further analysis, and/or enhanced management of suspect soil and/or sediment. Any enhanced management of contaminated soil to ensure proper stockpiling and storage is incidental to the LSP Services item. The LSP shall adequately characterize subsurface conditions prior to backfill in areas where contaminated material has been excavated. The Engineer shall approve the locations of the testing sites prior to the sampling.

ITEM 180.03 (Continued)

Contaminated soil, sediment and/or groundwater shall be handled in accordance with all applicable state and federal statutes, regulations and policies. The LSP shall adequately characterize contaminated media for comparison to the requirements of the MCP. The Contractor and the LSP shall be aware of the reporting requirements for releases of oil and/or other hazardous material (OHM) as set forth in federal and state laws and regulations, and shall both be held responsible for performing the work in accordance with all applicable Federal and State laws and regulations. The LSP shall maintain written records in a clear and concise format which tracks the excavation, stockpiling, analysis and reuse/disposal of all suspect contaminated soils, sediments and groundwater. These records shall be up-to-date and available to the Engineer on a bi-weekly basis. The LSP shall review and summarize the laboratory data from any analyses performed on contaminated media. A report shall be delivered to the Engineer outlining the material sampling methods, laboratory analysis results and proposed course of action. The laboratory report together with Chain of Custody forms for all analytical results shall be submitted to the Engineer within 14 days after completion of such analyses.

The LSP and Contractor shall be held responsible for the submission of all MCP-related documents to the Engineer at least 14 days in advance of any timeframe specified in the MCP and for the timely submission of data and tracking information as noted within this Item. All documents prepared under this Item must be reviewed and signed by the approved LSP. The Contractor and LSP shall be responsible for all fines, penalties and enforcement requirements imposed by applicable regulatory agencies for failure to meet regulatory and contract timeframes. No compensation will be provided for such fines, penalties and enforcement actions.

The Contractor and the LSP shall be aware of the reporting requirements for releases of oil and/or other hazardous material (OHM) as set forth in federal and state laws and regulations, and shall both be held responsible for performing the work in accordance with all applicable Federal and State laws and regulations.

If the Contractor causes a release of OHM, the Contractor shall be responsible for assessing and remediating the release in accordance with all pertinent State and Federal regulations, including securing the services of a LSP, at his own expense.

The LSP shall coordinate all activities involving both MassDOT and the DEP through the Engineer. Any notification of release shall be approved by the Department before submittal to the DEP, except if an imminent hazard condition exists as defined in 309 CMR 4.03(4)(b).

ITEM 180.03 (Continued)

Laboratory Testing in Support of LSP Services

Laboratory testing provides for analytical testing in support of LSP services related to maintaining MCP compliance, such as delineating the extent and type of contamination present. Sampling and testing for disposal purposes are not included.

In order to maintain compliance with the MCP or other regulatory requirements, the LSP shall request approval from the Engineer to obtain samples from various locations and depths within the project area and to perform laboratory analyses on those samples. The samples shall be delivered to a DEP-certified laboratory using proper chain-of-custody documentation for analyses which, depending upon site conditions and suspected and/or identified contaminants of concern, may include, but are not limited to, metals, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, polycyclic aromatic hydrocarbons (PAHs), extractable petroleum hydrocarbons (EPHs) and volatile petroleum hydrocarbons (VPHs). Subsequent testing, depending upon initial results, may be required for Toxicity Characteristic Leaching Procedure (TCLP) analyses (EPA Method 1311) for metals.

Method of Measurement and Basis of Payment

LSP Services for work under this item will be measured per person, per hour of service provided by LSP, Environmental Technicians and other approved personnel. Travel time shall not be included in the billable hours. LSP hours related to soil/sediment disposal (disposal characterization, landfill acceptance, disposal package preparation, etc.) shall be incidental to disposal items.

The quantity and type of laboratory tests must be approved by the Engineer beforehand. The contractor will be reimbursed upon satisfactory written evidence of payment. The contractor may be required to obtain cost estimates from three DEP certified laboratories for the Engineer to choose the service provider. Laboratory testing related to soil/sediment disposal (disposal characterization, landfill acceptance, disposal package preparation, etc.) shall be incidental to disposal items.

LSP Services will be paid at the Contractor bid price for each hour, or fraction thereof, spent to perform the work as described above. The bid price shall be a blended rate that includes the cost of the LSP, environmental technicians and other personnel, the performance of all work tasks and field screening, including required equipment, materials and instrumentation, and production of all documentation described above. All requests for payment must be accompanied by the following information: the names of the personnel associated with the work charged under LSP Services, dates and hours worked, work conducted, including, where appropriate, locations as identified on the construction plans, and a copy of the field diary for the dates submitted.

Laboratory Testing will be reimbursed upon receipt of paid invoices for testing approved by the Engineer.

ITEM 181.11	**DISPOSAL OF UNREGULATED SOIL**	**TON**
ITEM 181.12	**DISPOSAL OF REGULATED SOIL IN-STATE FACILITY**	**TON**
ITEM 181.13	**DISPOSAL OF REGULATED SOIL OUT-OF-STATE FACILITY**	**TON**
ITEM 181.14	**DISPOSAL OF HAZARDOUS WASTE**	**TON**

The work under these Items shall include the transportation and disposal of contaminated material excavated, or excavated and stockpiled. It shall also include the cost of any additional laboratory analyses required by a particular disposal facility beyond the standard disposal test set.

Excavation of existing subsurface materials may include the excavation of contaminated soils. The Contractor shall be responsible for the proper coordination of characterization, transport and disposal, recycling or reuse of contaminated soils. Disposal, recycling or reuse will be referred to as "disposal" for the purposes of this specification. However, regardless of the use of the term herein, there will be no compensation under these items for reuse within the project limits. The Contractor will be responsible for coordinating the activities necessary for characterization, transport and disposal of contaminated soils. Such coordination will include the Engineer and his/her designee overseeing management of contaminated materials. Contaminated soils must be disposed of in a manner appropriate for the soil classification as described below and in accordance with the applicable laws of local, state and federal authorities. The Contractor shall be responsible for identifying disposal facility (ies) licensed to accept the class of contaminated soils to be managed and assure that the facility can accept the anticipated volume of soil contemplated by the project. The Contractor shall be responsible for hiring a Licensed Site Professional (LSP) and all ancillary professional services including laboratories as needed for this work. The Contractor will be responsible for obtaining all permits, approvals, manifests, waste profiles, Bills of Lading, etc. subject to the approval of the Engineer prior to the removal of the contaminated soil from the site. The Contractor and LSP shall prepare and submit to the Engineer for approval all documents required under the Massachusetts Contingency Plan (MCP) and related laws and environmental regulations to conduct characterization, transport, and disposal of contaminated materials.

CLASSES OF CONTAMINATED SOILS

The Contractor and its LSP shall determine if soil excavated or soil to be excavated is unregulated soil or contaminated soil as defined in this section. Such materials shall be given a designation for purposes of reuse or disposal based on the criteria of the MCP. Soils and sediments which are not suitable for reuse will be given a designation for purposes of off-site disposal based on the characterization data and disposal facility license requirements. The Classes of Contaminated Soils are defined as follows:

ITEMS 181.11 through 181.14 (Continued)

UNREGULATED SOIL consists of soil, fill and dredged material with measured levels of oil and hazardous material (OHM) contamination at concentrations below the applicable Reportable Concentrations (RCs) presented in the MCP. Unregulated soil consists of material which may be reused (or otherwise disposed) as fill within the Commonwealth of Massachusetts subject to the non-degradation criteria of the MCP (310 CMR 40.0032(3), in a restricted manner, such that they are sent to a location with equal or higher concentrations of similar contaminants. Disposal areas include licensed disposal facilities, approved industrial settings in areas which will be capped or covered with pavement or loamed and seeded, and for purposes of this project should be reused as fill within the project site construction corridor whenever possible. The material cannot be placed in residential and/or environmentally sensitive (e.g. wetlands) areas. Under no circumstances shall contaminated soils be placed in an uncontaminated or less contaminated area (including the area above the groundwater table if this area shows no sign of contamination).

The Contractor shall submit to MassDOT the proposed disposal location for unregulated soils for approval. If such a disposal location is not a licensed disposal facility, the Contractor shall submit to the Engineer analytical data to characterize the disposal area sufficiently to verify that the unregulated material generated within the MassDOT construction project limits is equal to or less than the contaminant levels at the disposal site and meets the non-degradation requirements of the MCP. In addition, the Contractor shall provide written confirmation from the owner of the proposed disposal location that they have been provided with the analytical data for both the materials to be disposed as well as the disposal site characterization and that s/he agrees to accept this material. A Material Shipping Record or Bill of Lading, as appropriate, shall be used to track the off-site disposal of unregulated soil and a copy, signed by the disposal facility or property owner, shall be provided to the Engineer in order to document legal disposal of the unregulated material.

The cost of on-site disposal of unregulated soil within the project area will be considered incidental to the item of work to which it pertains.

ITEMS 181.11 through 181.14 (Continued)

REGULATED SOIL consists of materials containing measurable levels of OHM that are equal to or exceed the applicable Reportable Concentrations for the site as defined by the MCP, 310 CMR 40.0000. Regulated soil which meets the MCP reuse criteria of the applicable soil/groundwater category for this project area may be reused on site provided that it meets the appropriate geotechnical criteria established by the Engineer. Regulated Soil may be reused (as daily or intermediate cover or pre-cap contouring material) or disposed (as buried waste) at lined landfills within the Commonwealth of Massachusetts or at an unlined landfill that is approved by the Massachusetts Department of Environmental Protection (DEP) for accepting such material, in accordance with DEP Policy #COMM-97-001, or at a similar out-of-state facility. It should be noted that soils which exceed the levels and criteria for disposal at in-state landfills, as outlined in COMM-97-001, may be shipped to an in-state landfill, but require approval from the DEP Division of Solid Waste Management and receiving facility. An additional management alternative for this material is recycling into asphalt. Regulated Soils may also be recycled at a DEP approved recycling facility possessing a Class A recycling permit subject to acceptance by the facility and compliance with DEP Policy #BWSC-94-400. Regulated Soil removed from the site for disposal or treatment must be removed via an LSP approved Bill of Lading, Manifest or applicable material tracking form. This type of facility shall be approved/permitted by the State in which it operates to accept the class of contaminated soil in accordance with all applicable local, state and federal regulations.

HAZARDOUS WASTE consists of materials which must be disposed of at a facility permitted and operated in full compliance with Federal Regulation 40 CFR 260-265, Massachusetts Regulation 310 CMR 30.000, Toxic Substances Control Act (TSCA) regulations, or the equivalent regulations of other states, and all other applicable local, state, and federal regulations. All excavated materials classified as hazardous waste shall be disposed of at an out-of-state permitted facility. This facility shall be a RCRA hazardous waste or TSCA facility, or RCRA hazardous waste incinerator. This type of facility shall be approved/permitted by the State in which it operates to accept hazardous waste in accordance with all applicable local, state and federal regulations and shall be permitted to accept all contamination which may be present in the soil excavate. The Contractor shall ensure that, when needed, the facility can accept TSCA waste materials i.e. polychlorinated biphenyls (PCBs). Hazardous waste must be removed from the site for disposal or treatment via an LSP approved Manifest.

MONITORING/SAMPLING/TESTING REQUIREMENTS

The Contractor shall be responsible for monitoring, sampling and testing during and following excavation of contaminated soils to determine the specific class of contaminated material. Monitoring, sampling and testing frequency and techniques should be performed in accordance with Item 180.03 – LSP Services. Additional sampling and analysis may be necessary to meet the requirements of the disposal facility license. The cost of such additional sampling and analysis shall be included in the bid cost for the applicable disposal items. The Contractor shall obtain sufficient information to demonstrate that the contaminated soil meets the disposal criteria set by the receiving facility that will accept the material.

ITEMS 181.11 through 181.14 (Continued)

No excavated material will be permanently placed on-site or removed for off-site disposal until the results of chemical analyses have been received and the materials have been properly classified. The Contractor shall submit to the Engineer results of field and laboratory chemical analyses tests within seven days after their completion, accompanied by the classification of the material determined by the Contractor, and the intended disposition of the material. The Contractor shall submit to the Engineer for review all plans and documents relevant to LSP services, including but not limited to, all documents that must be submitted to the DEP.

WASTE TRACKING:

Copies of the fully executed Weight Slips/Bills of Lading/ Manifests/Material Shipping Records or other material tracking form received by the Contractor from each disposal facility and for each load disposed of at that facility, shall be submitted to Engineer and the Contractor's LSP within three days of receipt by the Contractor. The Contractor is responsible for preparing and submitting such documents for review and signature by the LSP or other appropriate person with signatory authority, three days in advance of transporting soil off-site. The Contractor shall furnish a form attached to each manifest or other material tracking form for all material removed off-site, certifying that the material was delivered to the site approved for the class of material. If the proposed disposition of the material is for reuse within the project construction corridor, the Contractor shall cooperate with MassDOT to obtain a suitable representative sample(s) of the material to establish its structural characteristics in order to meet the applicable structural requirements as fill for the project.

All material transported off-site shall be loaded by the Contractor into properly licensed and permitted vehicles and transported directly to the selected disposal or recycling facility and be accompanied by the applicable shipping paper. At a minimum, truck bodies must be structurally sound with sealed tail gates, and trucks shall be lined and loads covered with a liner, which shall be placed to form a continuous waterproof tarpaulin to protect the load from wind and rain.

DECONTAMINATION OF EQUIPMENT

Tools and equipment which are to be taken from and reused off site shall be decontaminated in accordance with applicable local, state and federal regulations. This requirement shall include, but not be limited to, all tools, heavy machinery and excavating and hauling equipment used during excavation, stockpiling and handling of contaminated material. Decontamination of equipment is considered incidental to the applicable excavation item.

ITEMS 181.11 through 181.14 (Continued)

REGULATORY REQUIREMENTS

The Contractor shall be responsible for adhering to regulations, specifications and recognized standard practices related to contaminated material handling during excavation and disposal activities. MassDOT shall not be responsible at any time for the Contractor's violation of pertinent State or Federal regulations or endangerment of laborers and others. The Contractor shall comply with all rules, regulations, laws, permits and ordinances of all authorities having jurisdiction including, but not limited to, Massachusetts DEP, the U.S. Environmental Protection Agency (EPA), Federal Department of Transportation (DOT), Massachusetts Water Resources Authority (MWRA), the Commonwealth of Massachusetts and other applicable local, state and federal agencies governing the disposal of contaminated soils.

All labor, materials, equipment and services necessary to make the work comply with such regulations shall be provided by the Contractor without additional cost to MassDOT. Whenever there is a conflict or overlap within the regulations, the most stringent provisions shall apply. The Contractor shall reimburse MassDOT for all costs it incurs, including penalties and/or for fines, as a result of the Contractor's failure to adhere to the regulations, specifications, recognized standard practices, etc., that relate to contaminated material handling, transportation and disposal.

SUBMITTALS

I. Summary of Sampling Results, Classification of Material and Proposed Disposal Option.

The following information, presented in tabular format, must be submitted to the Engineer for review and approval prior to any reuse on-site or disposal off-site. This requirement is on-going throughout the project duration. At least two weeks prior to the start of any excavation activity, the Contractor shall submit a tracking template to be used to present the information as stipulated below. Excavation will not begin until the format is acceptable to MassDOT.

Characterization Reports will be submitted for all soil, sediment, debris and groundwater characterized through the sampling and analysis program. Each report will include a site plan which identifies the sampling locations represented in the Report. The Construction Plan sheets may be used as a baseplan to record this information.

The Sampling Results will be presented in tabular format. Each sample will be identified by appropriate identification matching the sample identification shown on the Chain of Custody Record. The sample must also be identified by location (e.g. grid number or stockpile number). For each sample, the following information must be listed: the classification (unregulated, regulated, etc.), proposed disposal option for the stockpile or unit of material represented, and, all analytical results.

ITEMS 181.11 through 181.14 (Continued)

Each Characterization Report will include the laboratory analytical report and Chain of Custody Record for the samples included in the Report.

II. Stockpiling, Transport, and Disposal.

At least two weeks prior to the start of any excavation activity, the Contractor shall submit, in writing, the following for review and shall not begin excavation activity until the entire submittal is acceptable to MassDOT.

Excavation and Stockpiling Protocol:
Provide a written description of the management protocols for performing excavation and stockpiling and/or direct loading for transport, referencing the locations and methods of excavating and stockpiling excavated material.

Disposal and Recycling Facilities:

1. Provide the name, address, applicable licenses and approved waste profile for disposal and/or recycling location(s) where contaminated soil will be disposed. Present information substantiating the suitability of proposed sites to receive classifications of materials intended to be disposed there, including the ability of the facility to accept anticipated volumes of material.

2. Provide a summary of the history of compliance actions for each disposal/recycling facility proposed to be used by the Contractor. The compliance history shall include a comprehensive list of any state or federal citations, notices of non-compliance, consent decrees or violations relative to the management of waste (including remediation waste) at the facility. Material should not be sent to facilities which are actively considered by the DEP, USEPA or other responsible agency to be in violation of federal, state or local hazardous waste or hazardous material regulations. MassDOT reserves the right to reject any facility on the basis of poor compliance history.

Transportation:
The name, address, applicable license and insurance certificates of the licensed hauler(s) and equipment and handling methods to be used in excavation, segregation, transport, disposal or recycling.

III. Material Tracking and Analytical Documentation for Reuse/Disposal.

The following documents are required for all excavation, reuse and disposal operations and shall be in the format described. At least two weeks prior to the start of any excavation or demolition activity, the Contractor shall submit the tracking templates required to present the information as stipulated below. Excavation or demolition will not begin until the format is acceptable to MassDOT.

ITEMS 181.11 through 181.14 (Continued)

All soils, sediments and demolition debris must be tracked from the point of excavation to stockpiling to onsite treatment/processing operations to off-site disposal or onsite reuse as applicable.

Demolition Debris:
Demolition debris must be tracked if the debris is stockpiled at a location other than the point of origin or if treatment or material processing is conducted. Identification of locations will be based on the station-offset of the location. The tracking table will identify date and point of generation, any field screening such as PID or dust monitoring, visual observations/comments, quantity, and stockpile ID/processing operation location. For each unit of material tracked, the table will also track reuse of the material on-site, providing reuse date, location of reuse as defined by start and end station, width of reuse location by offset, the fill elevation range, quantity, and finish grade for said location. For demolition debris which is not reused on site, the table will also track disposal of the material as defined by disposal date, quantity and disposal facility. The table must provide a reference to any analytical data generated for the material.

Soil/Sediment:
Soil excavation will be identified based on the station-offset of the excavation location limits. The tracking table will identify date and point of generation, any field screening such as PID or dust monitoring, visual observations, quantity, and stockpile number/location. For each unit of material tracked, the table will also track reuse of the material on-site and disposal of the material off-site using the same categories identified for demolition debris above.

BASIS OF PAYMENT AND METHOD OF MEASUREMENT
Disposal of contaminated soil shall be measured for payment by the Ton of actual and verified weight of contaminated materials removed and disposed of. The quantities will be determined only by weight slips issued by and signed by the disposal facility. The most cost-effective, legal disposal method shall be used. The work of the LSP for disposal under all of these items shall be incidental to the work with no additional compensation.

ITEM 181.11 Measurement for Disposal of Unregulated Soil shall be under the Contract Unit Price by the weight, in tons, of contaminated materials removed from the site and transported to and disposed of at an approved location or licensed facility, and includes any and all costs for approvals, permits, fees and taxes, additional testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

ITEM 181.12 Measurement for Disposal of Regulated Soil – In-State Facility shall be under the Contract Unit Price by the weight in tons of contaminated materials removed from the site and transported to and disposed of at an approved in-state facility, and includes any and all costs for approvals, permits, fees and taxes, testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

ITEMS 181.11 through 181.14 (Continued)

ITEM 181.13 Measurement for Disposal of Regulated Soil - Out-of-State Facility shall be under the Contract Unit Price by the weight in tons of contaminated materials removed from the site and transported to and disposed of at an approved out-of-state facility, and includes any and all costs for approvals, permits, fees and taxes, testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

ITEM 181.14 Measurement for Disposal of Hazardous Waste shall be under the Contract Unit Price by the weight in tons of hazardous waste removed from the site and transported to and disposed of at the licensed hazardous waste facility, and includes any and all costs for approvals, permits, fees and taxes, testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

ITEM 184.1 DISPOSAL OF TREATED WOOD PRODUCTS TON
(Rev 08/09/2016)

Work under this item shall include the transportation and disposal of all treated existing wood product as directed by the Engineer.

The timber components of the existing structure are suspected to be treated with creosote, pentachlorophenol and/or CCA. This item shall include all costs for sampling, laboratory testing, loading, transportation and disposal of the treated wood. The Contractor is required to submit disposal manifests to the Engineer prior to the completion of the project. All aspects of this Item are to be completed in accordance with state and federal regulations.

Compensation

Measurement and payment will be by the weight, in tons, of treated timber transported and accepted at a licensed facility. The work shall be considered full compensation for all labor, tools, equipment, materials, testing, loading, transportation, approvals, and permits necessary for the completion of the work.

ITEM 201. CATCH BASIN EACH

ITEM 205.1 LEACHING BASIN - 6 FOOT DIAMETER EACH

The work under these Items shall conform to the relevant provisions of Section 200 of the Standard Specifications, and the following:

Item 201. shall be constructed as shown in MassDOT Standard Drawing E 201.4.0 with 4-foot sump (deep sump).

Item 205.1 shall be a precast concrete structure constructed as shown on the detail provided in the construction drawings and in accordance with applicable Subsections of Subsection 201 of the Standard Specifications.

Alternate top slab sections shall be substituted for conical sections in areas of low cover. It shall be the responsibility of the Contractor to determine the appropriate type of top and top slab thickness for each location. Alternate top slabs shall have a minimum 28 day compressive strength of 4000 psi and shall be reinforeced for AASHTO H-20 loadng with ASTM A 615 Grade 60 steel. Shop drawings and design calculations shall be stamped by a Massachusetts Structural Engineer. No additional payment will be made for alternate top slab sections.

Frames shall be set using clay brick (3 courses allowed for) in a full mortar bed. Cement brick will not be allowed.

Concrete collars for new structures shall be High Early Strength cement concrete. The Contractor shall submit a mix design for High Early Strength concrete to the Engineer for approval. The dimensions of the concrete collars shall be as shown on MassDOT Construction Standard Drawing E 202.9.0. Concrete collars shall be incidental to the item of work to which they pertain.

The concrete collars shall be placed up to a height that allows for the placement of a minimum of 3 inches of Hot Mix Asphalt above the collar.

Catch basins shall be placed on 6” crushed stone (M2.01.4) foundation as directed by the Engineer.

Leaching basins shall be provided with 12” of crushed stone (M2.01.4) used for the percolation bed below and around the structure and geotextile fabric for subsurface drainage (M9.50.0) shall be provided on all sides as shown on detail.

METHOD OF MEASUREMENT

Items 201 and 205.1 will be measured for payment respectively by Each structure installed, complete in place. The unit Each will be based on a standard unit having a depth of 6.5 ft as measured vertically at the center of the structure from the top of the grating or cover to the top of the floor. When the measured depth exceeds the standard unit, the number of units paid for will be in the proportion of the measured depth to the standard depth down to 9 ft. Basins having a depth less than this standard unit will be counted as one unit.

ITEMS 201. and 205.1 (Continued)

BASIS OF PAYMENT

Item 201. and Item 205.1 will be paid for at the respective Contract unit prices per Each, which price shall be full compensation for labor, materials, equipment, tools, sawcut, excavation, and other incidentals necessary to satisfactorily complete the work.

Payment for the concrete collars shall be included in the contract unit price of the structure involved.

The crushed stone for percolation bed and foundation shall be paid for under Item 156.

Extra depth excavation below the proposed bottom of structure to obtain a stable foundation will be paid for as Class B Trench Excavation.

Geotextile shall be paid for under item 698.2

ITEM 620.132	**GUARDRAIL, DEEP POST (SINGLE FACED AND POWDER COATED)**	**FOOT**
ITEM 620.14	**GUARDRAIL, TL-3 (SINGLE FACED AND POWDER COATED)**	**FOOT**
ITEM 627.12	**TRAILING ANCHORAGE (POWDER COATED)**	**EACH**
ITEM 628.241	**TRANSITION TO BRIDGE RAIL (POWDER COATED)**	**EACH**

The work under these Items shall conform to the relevant provisions of Subsection 601 of the Standard Specifications, the recent version of the MassDOT Construction Standard Details and the following:

Work includes the installation of MassDOT Standard Guardrail, TL-3 (Single Faced), Transitions, End Treatments and Trailing Anchorages.

All steel guardrail railings, posts, components, and end treatment components, including but not limited to w-beam panels, posts, baseplates, anchor bolts, fasteners, etc. shall receive a duplex coating consisting of hot dip galvanizing and high- performance, shop-applied, thermosetting-based, super-durable powder coatings, for fabricated steel products for exterior use, as shown on the plans or as directed.

The galvanizer shall be qualified and have demonstrated a minimum of ten years' experience in the successful application of hot dip galvanizing using the dry kettle process, and a minimum of five years' experience in the successful application of powder coatings.

GENERAL

Steel guardrail elements shall be galvanized and coated. All fabrication shall be completed prior to surface preparation and the application of any coating.

Duplex coating systems shall be submitted by the contractor for approval by the Engineer. The submittal shall contain a minimum 2 year field history of the proposed system with a minimum of 5 uses in the Northeast on galvanized surfaces utilizing a minimum of 25 total gallons. The end user contact information shall also be included.

Coating applicators shall submit a written Quality System Manual (QSM) in accordance with AASHTO R38 to the Engineer for acceptance. All coating facilities shall be audited by the Department before final approval is granted. For contracts requiring greater than 1,500 square feet of coated steel surfaces, the applicator performing surface preparation and coating of steel shall have a current American Institute of Steel Construction (AISC) Sophisticated Paint Endorsement or Society of Protective Coatings (SSPC) QP3 certification for painting or a QP 6 certification for metalizing. Applicators shall be approved by the Department prior to the bid opening date. Applicator approval shall be valid for a 5 years.

ITEMS 620.132 through 628.241 (Continued)

All coating shall be applied according to the latest requirements of the manufacturer's data sheet unless modified per these specifications. The dry film thickness of all coated surfaces shall be measured in accordance with SSPC PA2. The maximum recoat times of the intermediate and finish coats shall not be exceeded.

When grinding, drilling or any other operation produces steel turnings, filings, shavings, etc. the contractor shall completely clean all areas of all accumulation prior to the end of the work shift.

The Engineer shall provisionally accept the shop coated items before shipment to the jobsite but final acceptance of the coating system will occur after erection of the coated items, and after all required repairs and coating application has been completed.

The contractor shall be responsible for failure and damage of all applied coating. Failures include but are not limited to, visible corrosion, blistering, checking, cracking, or delamination (peeling) and loss of gloss and color of the coating system. Damage includes but is not limited to damage from installation or from external agents, such as scraping, vandalism, debris impacts, and collisions. The extent and method of repair must be approved by the Engineer.

GALVANIZING

Steel guardrail elements shall be galvanized in accordance with Section M7 of the Standard Specifications.

Galvanized members requiring shop fabrication and assembly shall be cut, welded, and/or drilled prior to galvanizing. A thin layer of a rust inhibitor shall be applied to the milled surface. Material to be powder coated shall not be quenched after galvanizing.

Damaged galvanized surfaces shall be repaired in accordance with ASTM A780 "Repair of Hot Dip Galvanizing" section 4.2.2 Paints Containing Zinc Dust "High Zinc Dust Content". The paint shall be applied to achieve a minimum dry film thickness of 3 mils and not more than 5 mils. Repair paint shall meet M7.04.11 and application shall be in accordance with the manufacturer's recommendations.

COATING OVER GALVANIZING

General

The work under this heading shall include the surface preparation and the application of a duplex coating system to galvanized components of the guardrail system.

Proposed coating systems shall be submitted by the Contractor for approval by the Engineer.

Surface preparation and application of the coating system shall be completed within 14 calendar days of galvanizing. The Contractor shall take all necessary measures to prevent wet storage stain and accumulation of dirt, dust, grease, or oil while being handled or staged prior to application of the coating.

ITEMS 620.132 through 628.241 (Continued)

All galvanized pieces shall be visually inspected to determine the cleanliness of the surface. All contaminated surfaces shall be cleaned in accordance with SSPC-SP-1.

All material shall be checked for wet storage stain. Wet storage stain shall be removed prior to abrasive blasting in accordance with SSPC-SP-16 Appendix A.

Prior to surface preparation, all components shall have a finish that is smooth and uniform. The surface shall be free of protrusions greater than 1/8 inch above the surrounding surface and meet the requirements of ASTM A123 section 6.2

The thickness of the galvanizing shall be checked before and after the completion of abrasive blasting using SSPC PA-2 to confirm that prepared surfaces still have the minimum thickness requirements of AASHTO M111 or AASHTO M232 as applicable.

Provide abrasives that are clean, dry, and sized properly to provide the specified surface profile. The profile shall be dense, uniform and of sufficient angularity to be acceptable for the application of the coating. Abrasives shall conform to the following as applicable:

- SSPC-AB 1 for mineral slag abrasives
- SSPC-AB 2 for recycled ferrous metal abrasives
- SSPC-AB 3 for new steel abrasives

The abrasive shall be tested weekly for grease, oil or non-abrasive residue using ASTM D 7393 - Standard Practice for Indicating Oil in Abrasive. Contaminated abrasives shall be changed out and not be used for surface preparation. The use of steel shot abrasive is not allowed for final blasting prior to coating application.

All compressed air sources shall have properly sized and operational oil and moisture separators to allow for oil and moisture free air.

Surfaces to be coated over galvanizing shall be blast cleaned in accordance with requirements of SSPC SP16 “Brush-off Blast Cleaning Non-Ferrous Metals” producing a minimum surface profile of 1 mil. Profile shall meet the requirements of the manufacturer for the coating being applied. Abrasives, nozzle size, nozzle pressure and dwell time shall be sufficient and controlled to thoroughly clean and produce a uniform surface profile. Surface preparation shall not loosen, cause flaking or disbonding of the galvanized surface. Unacceptable thickness and damage shall be cause for rejection of the entire piece.

Surfaces unacceptable after abrasive blasting and approved for repair shall be repaired in accordance with ASTM A780. Surface preparation of approved repair areas shall be done in accordance with SSPC SP-10 or SP-11. Repairs to the galvanized surface in excess of one percent of the total surface area of the piece being repaired are not allowed. The repair coating shall be a zinc rich primer as specified by the coating manufacturer compatible with the coating system approved.

ITEMS 620.132 through 628.241 (Continued)

Prior to coating bolted connections, galvanized fasteners shall be cleaned of all lubricating wax. Cleaning shall be in accordance with SSPC-SP-1, Solvent Cleaning, method 4.1.1. The contractor is responsible to identify the solvent and method needed to remove all lubricant. Cleanliness will be determined by the use of a white cloth wipe test. The wipe test will be performed by the Engineer using a clean white cloth and the same solvent used for cleaning. The cloth shall be wetted and rung to a damp condition, placed on the selected fasteners and rubbed with a twisting motion around the entire surface of the previously waxed surfaces. Acceptance is with no color transfer to the cloth.

Coating application shall be completed within six hours after surface preparation has been accepted by the applicator and the Engineer.

Powder Coating over Galvanizing

All surfaces receive the duplex system as described, except for ground-driven posts which must be galvanized full length and duplex coated for the top 36 inches (i.e. the above-ground portion plus four inches). At the supplier's option the duplex coating may be applied to the entire length of posts.

The coating shall be a two-coat, electrostatically shop-applied, oven-baked, powder coat system. The first coat shall be an epoxy primer suitable for application over galvanized steel. The finish coat shall be polyester Triglycidyl Isocyanurate (TGIC) super durable powder. All coats of the applied system shall be from the same manufacturer. All powder shall be stored per the manufacturer’s data sheet.

Color to be rusty brown (Federal Standard 595B, Color No. 20090).

Application and curing shall be performed in conformance with the powder coating manufacturer's recommendations and shall consist of the following:

- All parts to be coated shall be pre-baked after galvanizing to reduce the potential for outgassing. Pre-baking shall be done at a minimum of 55°F above the manufacturer’s recommended curing oven temperature for 30 minutes unless otherwise recommended by the manufacturer.
- The powder shall be applied maintaining even coverage on all surfaces to be coated. The Applicator shall ensure that a stable transfer between powder application and the curing oven is accomplished to prevent the loss of powder from the parts.

Each coat shall be visually inspected and shall not exhibit film discontinuities including but not limited to discontinuities, pinholes, runs, excess build at edges, topcoat gloss or color variations.

Any part that does not meet the specified coating thickness may be recoated immediately without undergoing additional preparation and pretreatment.

ITEMS 620.132 through 628.241 (Continued)

The contractor shall obtain all field repair and touch-up material from the applicator. Coating material used for repairs and touch up shall be from the same manufacturer as the powder used on that project or from a manufacturer recommended by the powder manufacturer. Touch up shall be applied in accordance with the powder manufacturer's written recommendations and the applicators approved touch up procedure.

The DFT of the touch up areas shall be the same as the DFT of the powder system and can be applied in multiple coats. The color, gloss and appearance shall match that of the topcoat being repaired.

METHOD OF MEASUREMENT

Items 620.14 and 620.132 will be measured for payment respectively by the Foot along the top edge of the rail element from the center of the first mid-span splice to the center of the last mid-span splice.

Item 628.241 will be measured for payment by Each, as individual units 33 ft-9 in. in length, measured from the mid-span splice with the guardrail or end terminal to the end of the thrie beam terminal connector, as shown on the plans.

Item 627.12 will be measured for payment by Each, as an individual unit 9 ft-4.5 in. in length, measured from the mid-span splice with the guardrail to the centerline of the short timber breakaway post, as shown on the plans.

BASIS OF PAYMENT

Items 620.14 and 620.132 will be paid for at the respective Contract unit prices per Foot, which price shall include all labor, materials, equipment, posts, offset blocks, panels and connecting hardware, and all incidental costs required to complete the work.

Items 627.12 and 628.241 will be paid for at the respective contract unit prices per each, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

The construction of all guardrail items shall include the assembly and erection of all components, parts and materials complete at the intended locations.

Guardrail delineators shall be considered incidental to the cost of the guardrail, guardrail end treatment or guardrail trailing anchorage.

The use of special post designs, directed by the Engineer, shall be incidental to the work with no additional compensation.

ITEM 657. TEMPORARY FENCE FOOT

The work under this Item shall conform to the relevant provisions of Section 600 of the Standard Specifications and supplemented by the following:

Work under this item shall include furnishing, installing, removing and resetting and, subsequently, removing a chain link fence located around the work area, brook, staging area and/or field office as necessary for safety and security. The Contractor will be responsible for providing an acceptable method for the installation of the fence that will provide for the safety and security for which it is intended.

Fence gates for access/egress shall be furnished, installed and maintained by the Contractor, and shall be included in the unit cost. All posts including end, gate, corner and intermediate brace posts shall be included in the unit cost. The fencing height shall be 6 feet minimum from ground level. Material need not be new, but shall not be deteriorated, nor in any way jeopardize the security purposes intended. All fencing shall meet the approval of the Engineer.

The Contractor shall be responsible for maintenance of the temporary fence, and shall be responsible and cognizant that it remains secure, and that the area is sealed off at all times to the general public. It may be necessary to remove and reset sections of temporary fence at times to conform to current stage construction.

Fence fabric shall be placed on the face of the post away from the work area. A top tension wire, rather than a pipe top rail, shall be used. The top edge of the fabric shall be finished with a "Knuckled" selvage. The fence shall not be removed until the bridge work is complete and safe pedestrian passage is provided. No additional compensation will be paid for resetting and removing the temporary fence.

METHOD OF MEASUREMENT

Item 657. Will be measured for payment by the Foot of temporary fence installed, complete in place.

BASIS OF PAYMENT

Item 657. will be paid for at the Contract unit per Foot, which price shall include all labor material, equipment, and all incidental costs required to complete the work including foundations if required, removing and resetting for each construction stage, and final removal of fence, all components of fence and foundations as described above and/or as directed by the Engineer. No payment shall be made for the replacement and/or restoration of fence damaged due to construction accidents, vandalism and/or any other manner, but shall be provided by the Contractor without additional compensation.

ITEM 697.1 **SILT SACK** **EACH**

Work under this item shall conform to the relevant provisions of Subsections 227 and 670 of the Standard Specifications and the following:

The work under this item includes the furnishing, installation, maintenance and removal of a reusable fabric sack to be installed in drainage structures for the protection of wetlands and other resource areas and the prevention of silt and sediment from the construction site from entering the storm water collection system. Devices shall be ACF Environmental (800)-448-3636; Reed & Graham, Inc. Geosynthetics (888)-381-0800; The BMP Store (800)-644-9223; or approved equal.

CONSTRUCTION

Silt sacks shall be installed in retained existing and proposed catch basins and leaching basins within the project limits and as required by the Resident Engineer.

The silt sack shall be as manufactured to fit the opening of the drainage structure under regular flow conditions, and shall be mounted under the grate. The insert shall be secured from the surface such that the grate can be removed without the insert discharging into the structure. The filter material shall be installed and maintained in accordance with the manufacturer's written literature and as directed by the Engineer.

Silt sacks shall remain in place until the placement of the pavement overlay or top course and the graded areas have become permanently stabilized by vegetative growth. All materials used for the filter fabric will become the property of the Contractor and shall be removed from the site.

The Contractor shall inspect the condition of silt sacks after each rainstorm and during major rain events. Silt sacks shall be cleaned periodically to remove and disposed of accumulated debris as required. Silt sacks, which become damaged during construction operations, shall be repaired or replaced immediately at no additional cost to the Department.

When emptying the silt sack, the contractor shall take all due care to prevent sediment from entering the structure. Any silt or other debris found in the drainage system at the end of construction shall be removed at the Contractors expense. The silt and sediment from the silt sack shall be legally disposed of offsite. Under no condition shall silt and sediment from the insert be deposited on site and used in construction.

All curb openings shall be blocked to prevent stormwater from bypassing the device.

All debris accumulated in silt sacks shall be handled and disposed of as specified in Section 227 of the Standard Specifications

COMPENSATION

Silt sacks will be measured and paid at the Contract unit price per each, complete in place, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for removal and disposal of the sediment from the insert, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 698.1 GEOTEXTILE FABRIC FOR STABILIZATION SQUARE YARD

Geotextile for Stabilization shall conform to the requirements of AASHTO M 288 and shall be listed on MassDOT's Qualified Construction Materials List. Geotextile for Stabilization shall be used for slopes and placed under proposed dumped riprap as shown on the Plans.

METHOD OF MEASUREMENT

Item 698.1 will be measured for payment by the Square Yard of geotextile fabric for Stabilization installed, complete in place.

BASIS OF PAYMENT

Item 698.1 will be paid for at the Contract unit price per Square Yard, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work. Overlaps between sheets and fold-overs detailed on the plans are considered incidental to the unit price per square yard and shall not be measured separately for payment.

Geotextile which become damaged during construction operations, shall be repaired or replaced immediately at no additional cost to the Department.

ITEM 698.2 GEOTEXTILE FABRIC FOR SUBSURFACE DRAINAGE SQUARE YARD

Geotextile for Subsurface Drainage shall conform to the requirements of AASHTO M 288 and shall be listed on MassDOT's Qualified Construction Materials List. Geotextile for Subsurface Drainage shall be used to wrap crushed stone surrounding leaching basins.

METHOD OF MEASUREMENT

Item 698.2 will be measured for payment by the Square Yard of geotextile fabric for subsurface drainage installed, complete in place.

BASIS OF PAYMENT

Item 698.2 will be paid for at the Contract unit price per Square Yard, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work. Overlaps between sheets detailed on the plans are considered incidental to the unit price per square yard and shall not be measured separately for payment.

Geotextile which become damaged during construction operations, shall be repaired or replaced immediately without additional compensation.

ITEM 740. ENGINEERS FIELD OFFICE AND EQUIPMENT (TYPE A) MONTH

The work under this Item shall conform to the relevant provisions of Subsection 740 of the Standard Specifications and the following:

Two computer systems and printer systems meeting minimum requirements set forth below including installation, maintenance, power, paper, disks, and other supplies shall be provided at the Resident Engineer's Office:

All equipment shall be UL approved and Energy Star compliant.

The Computer System shall meet the following minimum criteria or better:

Processor:	Intel, 3.5 GHz
System Memory (RAM):	12 GB
Hard Drive:	500 GB
Optical Drive:	DVD-RW/DVD+RW/CD-RW/CD+RW
Graphics Card:	8 GB
Network Adapter:	10/100 Mbit/s
USB Ports:	6 USB 3.0 ports
Keyboard:	Generic
Mouse:	Optical mouse with scroll, MS-Mouse compliant
Video/Audio	the computer system shall be capable of allow video calling and recording:
Video camera	shall be High Definition 1080p widescreen capable video calling and recording with built in microphone. The microphone system shall capture natural audio while filtering out background noise.
Audio	shall be stereo multimedia speaker system delivering premium sound.
OS:	Latest Windows Professional with all security updates
Web Browser:	Latest Internet Explorer with all security updates
Applications:	Latest MS Office Professional with all security updates Latest Adobe Acrobat Professional with all security updates Latest Autodesk AutoCAD LT Antivirus software with all current security updates maintained through the life of the contract.
Monitors:	Two 27" LED with Full HD resolution. Max. resolution 1920 x 1080
Flash drives:	2 (two) - 128GB USB 3.0
Internet access:	High Speed (min. 24 mbps) internet access with wireless router.

ITEM 740. (Continued)

The Multifunction Printer System shall meet the following minimum criteria or better:

Color laser printer, fax, scanner, email and copier all in one with the following minimum capabilities:

- Estimated volume 8,000 pages per month
- LCD touch panel display
- 50 page reversing automatic document feeder (RADF) (not including the bypass tray)
- Reduction/enlargement capability
- Ability to copy and print 11” x 17” paper size
- email and network pc connectivity
- Microsoft and Apple compatibility
- ability to overwrite latent images on hard drive
- 600 x 600 dpi capability
- 30 pages per minute print speed (color),
- 4 Paper Trays Standard
- Automatic duplexing
- Finisher with staple functions
- Standard Ethernet. Print Controller
- Scan documents to PDF, PC and USB
- ability to print with authenticated access protection

The Contractor shall supply a maintenance contract for next day service, and all supplies (toner, staples, paper) necessary to meet estimated monthly usage.

The Engineer's Field Office and the equipment included herein including the computer system, and printer shall remain the property of the Contractor at the completion of the project. Disks, flash drives, and card readers with cards shall become the property of the Department.

Compensation for this work will be made at the contract unit price per month which price includes full compensation for all services and equipment, and incidentals necessary to provide equipment, maintenance, insurance as specified and as directed by the Engineer.

ITEM 767.121 SEDIMENT CONTROL BARRIER FOOT

The work under this item shall conform to the relevant provisions of Subsections 670, 751 and 767 of the Standard Specifications and shall include the furnishing and placement of a sediment control barrier. Sediment control barrier shall be installed prior to disturbing upslope soil.

The purpose of the sediment control barrier is to slow runoff velocity and filter suspended sediments from storm water flow. Sediment barrier may be used to contain stockpile sediments, to break slope length, and to slow or prevent upgradient water or water off road surfaces from flowing into a work zone. Contractor shall be responsible for ensuring that barriers fulfill the intent of adequately controlling siltation and runoff.

Twelve-inch diameter (after installation) compost filter tubes with biodegradable natural fabric (i.e., cotton, jute, burlap) are intended to be the primary sedimentation control barrier. Photo-biodegradable fabric shall not be used.

For small areas of disturbance with minimal slope and slope length, the Engineer may approve the following sediment control methods:

- 9-inch compost filter tubes
- Straw bales which shall be trenched

No straw wattles may be used. Additional compost filter tubes (adding depth or height) shall be used at specific locations of concentrated flow such as at gully points, steep slopes, or identified failure points in the sediment capture line.

When required by permits, additional sediment barrier shall be stored on-site for emergency use and replacement for the duration of the contract.

Where shown on the plans or when required by permits, sedimentation fence shall be used in addition to compost filter tubes and straw bales and shall be compensated under that item.

Sediment control barriers shall be installed in the approximate location as shown on the plans and as required so that no excavated or disturbed soil can enter mitigation areas or adjacent wetlands or waterways. If necessary to accommodate field conditions and to maximize effectiveness, barrier locations may be shifted with approval from the Engineer. Barriers shall be in place prior to excavation work. No work shall take place outside the barriers.

MATERIALS AND CONSTRUCTION

Prior to initial placement of barriers, the Contractor and the Engineer shall review locations specified on the plans and adjust placement to ensure that the placement will provide maximum effectiveness.

Barriers shall be staked, trenched, and/or wedged as specified herein and according to the Manufacturer’s instructions. Barriers shall be securely in contact with existing soil such that there is no flow beneath the barrier.

ITEM 767.121 (Continued)

Compost Filter Tube

Compost material inside the filter tube shall meet M1.06.0, except for the following: no peat, manure or bio-solids shall be used; no kiln-dried wood or construction debris shall be allowed; material shall pass through a 2-inch sieve; and the C:N ratio shall be disregarded.

Outer tube fabric shall be made of 100% biodegradable materials (i.e., cotton, hemp or jute) and shall have a knitted mesh with openings that allow for sufficient water flow and effective sediment capture.

Tubes shall be tamped, but not trenched, to ensure good contact with soil. When reinforcement is necessary, tubes shall be stacked as shown on the detail plans.

Straw Bales

Straw bales shall be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

Bales should be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. All bales should be either wire-bound or string-tied. Straw bales should be installed so that bindings are oriented around the sides (rather than along the tops and bottoms) of the bales in order to prevent deterioration of the bindings.

The barrier should be entrenched and backfilled. A trench should be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. The trench must be deep enough to remove all grass and other material which might allow underflow. After the bales are staked and chinked (filled by wedging), the excavated soil should be backfilled against the barrier. Backfill soil should conform to the ground level on the downhill side and should be built up to 4 inches against the uphill side of the barrier.

Each bale should be securely anchored by at least 2 stakes or re-bars driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together. Stakes or re-bars should be driven deep enough into the ground to securely anchor the bales. For safety reasons, stakes should not extend above the bales but should be driven in flush with the top of the bale.

The gaps between the bales should be chinked (filled by wedging) with straw to prevent water from escaping between the bales. Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency. Wedging must be done carefully in order not to separate the bales.

When used in a swale, the barrier should be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment-laden runoff will flow either through or over the barrier but not around it.

ITEM 767.121 (Continued)

Sedimentation Fence

Materials and Installation shall be per Section 670.40 and 670.60 of the Standard Specifications and the following:

Sedimentation fence shall only be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

When used with compost filter tubes, the tube shall be placed on a minimum of 8 inches of folded fabric on the upslope side of the fence. Fabric does not need to be trenched.

When used with straw bales, an 8-inch deep and 4-inch wide trench or V-trench shall be dug on the upslope side of the fence line. One foot of fabric shall be placed in the bottom of the trench followed by backfilling with compacted earth or gravel. Stakes shall be on the down slope side of the trench and shall be spaced such that the fence remains vertical and effective.

Width of fabric shall be sufficient to provide a 36-inch high barrier after fabric is folded or trenched. Sagging fabric will require additional staking or other anchoring.

MAINTENANCE

Maintenance of the sediment control barrier shall be per Section 670.60 of the Standard Specifications or per the Stormwater Pollution Prevention Plan (SWPPP), whichever is more restrictive.

The contractor shall inspect the sediment barrier in accordance with relevant permits. At a minimum, barriers shall be inspected at least once every 7 calendar days and after a rain event resulting in 0.25 inches or more of rainfall. Contractor shall be responsible for ensuring that an effective barrier is in place and working effectively for all phases of the Contract.

Barriers that decompose such that they no longer provide the function required shall be repaired or replaced as directed. If the resulting berm of compost within the fabric tube is sufficiently intact (despite fabric decay) and continues to provide effective water and sediment control, barrier does not necessarily require replacement.

DISMANTLING & REMOVING

Barriers shall be dismantled and/or removed, as required, when construction work is complete and upslope areas have been permanently stabilized and after receiving permission to do so from the Engineer.

Regardless of site context, nonbiodegradable material and components of the sediment barriers, including photo-biodegradable fabric, plastic netting, nylon twine, and sedimentation fence, shall be removed and disposed off-site by the Contractor.

ITEM 767.121 (Continued)

For naturalized areas, biodegradable, natural fabric and material may be left in place to decompose on-site. In urban, residential, or other locations where aesthetics is a concern, the following shall apply:

- Compost filter tube fabric shall be cut and removed, and compost shall be raked to blend evenly (as would be done with a soil amendment or mulch). No more than a 2-inch depth shall be left on soil substrate.
- Straw bales shall be removed and disposed off-site by the Contractor. Areas of trenching shall be raked smooth and disturbed soils stabilized with a seed mix matching adjacent seeding or existing grasses (i.e., lawn or native grass mix).
- Sedimentation fence, stakes, and other debris shall be removed and disposed off-site. Site shall be restored to a neat and clean condition.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 767.121 will be measured and paid for at the contract unit price per foot of sediment control barrier which price shall include all labor, equipment, materials, maintenance, dismantling, removal, restoration of soil, and all incidental costs required to complete the work.

Additional barrier, such as double or triple stacking of compost filter tubes, will be paid for per foot of tube installed.

Barriers that have been driven over or otherwise damage by construction activities shall be repaired or replaced as directed by the Engineer at the Contractors expense.

ITEM 946.141 PRECAST-PRESTRESSED CONCRETE PILE – 14 INCH FOOT

The work under this Item shall conform to the relevant provisions of Subsection 940 of the Standard Specifications and the following:

Artesian conditions were encountered at this site. A NO GO BELOW elevation of 747.0 has been identified on the plans.

The installation of Precast-Prestressed Concrete Piles must meet strict location tolerances to properly fit and support the precast bridge abutments. The contractor shall use necessary measures to meet the location tolerances specified herein, including the use of a robust template. The following items are covered in this special provision:

1. Preparation of additional submittal for pile installation.
2. Pre pile installation meeting.
3. Accuracy of pile locations.
4. Survey requirements.
5. Pile driving equipment.

SUBMITTALS

In addition to the submittals required in Subsection 940, the contractor shall submit to the Engineer for review and acceptance at least four weeks before driving any pile a plan which provides the following additional information to meet the pile location tolerances specified herein:

1. Details of the robust template the contractor proposes to use to meet the location tolerances specified herein.
2. Pile installation sequence to reduce potential for pile movement due to soil displacement from installation of adjacent piles.
3. Any special driving procedures to reduce the potential for pile movement.
4. Contingency plans if a driven pile is outside the tolerances specified herein.

PRE-INSTALLATION MEETING

At least one week prior to driving test piles, the pile contractor shall attend a meeting with the Engineer to review the pile installation plan discussed above. The pile contractor's site foreman must also attend the meeting. Note that artesian conditions were encountered at this site. A NO GO BELOW elevation of 747.0 has been identified on the plans.

ITEM 946.141 (Continued)

ACCURACY OF DRIVING

The four corners of the piles at the cut-off elevation shall be within 4.0 inches of the plan location.

DRIVING EQUIPMENT

1. Install piles with approved modern equipment.

2. Fix the leads of the pile driving rig at two points. The points shall be at least half the length of the pile apart to maintain the pile and hammer in axial alignment at the correct plan location during the entire driving operation. The leads shall extend down to the lowest point at which the hammer must operate. The bottom of the leads shall be connected to the crane body with a spotter.

3. Pile driving hammer shall be a variable stroke hydraulic hammer.

METHOD OF MEASUREMENT

Item 946.141 will be measured for payment by the Foot of Precast-Prestressed Concrete Pile, installed, complete in place. The length of piles to be paid for shall be the total length from the tip of the pile including any steel extension installed for protection (to the plan cut-off elevation) and any extensions required to reach the cutoff elevation.

BASIS OF PAYMENT

Item 946.141 will be paid for at the Contract unit price per Foot, which price shall include all labor, materials, equipment and all incidental costs required to complete the work.

No payment will be made for the cut-off of precast-prestressed concrete piles.

ITEM 991.1 **CONTROL OF WATER – STRUCTURE NO. C-20-004** **LUMP SUM**

The work under this Item shall conform to the relevant provisions of Subsections 7.02 and 140 of the Standard Specifications, all applicable environmental regulations and permits, and the following:

The work to be performed under this Item shall include all work necessary for the control of water within the excavations and demolition areas and to divert and/or channelize the flow of water for the construction of North Poland Road Bridge and the dumped riprap scour protection in the dry. The work shall include designing, furnishing, installing, maintaining, operating, and removing temporary dewatering systems as required, to lower and control water levels. Work also includes properly disposing of pumped water, constructing, maintaining, observing, and removing of equipment and instrumentation for control of the system. The dewatering system shall not directly discharge into Poland Brook.

The Massachusetts Division of Fish and Wildlife has imposed a Time of Year Restriction on in-water work for this project. In order to avoid impacts to endangered fish populations, no in-water work shall occur during the period of April 1 – July 31 of any year. However, an exception has been made to allow for the installation of temporary cofferdams for channelizing the flow of Poland Brook between July 1 and July 15. The Contractor shall take care to minimize disturbance to the aquatic environment to the extent practicable while installing cofferdams during this period.

It is the responsibility of the Contractor to determine the need and extent of dewatering required, sedimentation and dewatering techniques and controls and submit method and materials he/she proposes to use for approval by the Engineer.

Plans and calculations for the water control measures shall be developed by the Contractor for this Item. The plans and calculations shall be prepared and stamped by a Professional Engineer registered in the Commonwealth of Massachusetts and shall be submitted for review and approval prior to the start of construction.

The Contractor shall use such equipment and shall perform the operations in such a manner that boiling or other disturbances of the soil in the foundation area will be prevented. The Contractor shall keep the excavated area dry by such means that the water will be prevented from entering the excavations and adversely affecting the stability of the foundation material or supporting soils.

ITEM 991.1 (Continued)

The pumping discharge shall not be allowed to enter directly into the water from the work areas, rather it shall be pumped to a temporary stilling basin or other appropriate treatment or containment device. The criteria that shall be implemented for the control of water must meet the following:

1. The enclosure shall be adequately sized and designed to achieve adequate water quality treatment/sedimentation trapping and prevent overtopping from dewatering and to provide the required filtering or containment.
2. Seepage removed by the dewatering system shall be free of soil fines.
3. The outlet from the containment structure shall not cause erosion of the surrounding area. An approved method of controlling erosion, such as an erosion control blanket, stone, etc. shall be used at the outlet.
4. Impacts from dewatering will be minimized by designing support walls for minimal leakage, covering trucks, barges and stockpiles during rain events and land contouring to limit surface runoff from leaving the dewatering site.
5. Dewatering will not take place within wetland or water resource areas.
6. Dewatered excavated material will be transported to the disposal site in accordance with local, state, and federal regulations.
7. The control of water containment structure shall be maintained as follows:
    a. Inspect at least twice daily during dewatering operations.
    b. Repair any damage immediately.
    c. Clean containment structure daily. Remove any debris immediately.
    d. Remove sediments when accumulated deposits reach a depth of 6 inches
    e. Dispose sediments outside of saltwater marsh area limits at a location approved by the Engineer.

The Contractor shall inspect the outlet daily and maintain the erosion controls at the outfall.

Placement of the dewatering stilling structure will be specified in the dewatering plan and will be submitted for approval by the Engineer. Pumping shall be conducted in a manner which will not adversely affect the freshly placed concrete within the excavation.

The Contractor shall provide and maintain pumps, pipes and other devices to promptly and continually remove and dispose of water from the excavation areas. The size and configuration of pumps and pipes shall be selected by the Contractor.

The Contractor is advised that the effectiveness of the water control method used will vary based on the field conditions and the time at which the actual excavation work is being performed. The Engineer shall order the Contractor to stop all excavation operations when in his judgment the Contractor's water control operations are failing to produce adequate results or are posing a threat to the environment.

ITEM 991.1 (Continued)

SUBMITTALS

Submit the following documents related to dewatering:

- Qualifications of the Contractor's Professional Engineer water diversion and dewatering designer
- Design of the water diversion and dewatering systems
- Site visit reports by the Contractor's Professional Engineer water diversion and dewatering designer.

BASIS OF PAYMENT

Item 991.1 will be paid at the contract unit LUMP SUM bid price, which price shall include design for the dewatering and treatment operations used to maintain a water free excavation for construction of the proposed work shall include all labor, materials, equipment, and installation, piping, pumping, maintenance, subsequent removal of all related materials and equipment and restoration of site shall be included in the lump sum contract price bid under this Item. This work will include preparation of the Construction Water Diversion and Dewatering Plan.

ITEM 993.11 TEMPORARY BRIDGE NO. C-20-004 REMOVED AND STACKED LUMP SUM

The work under this Item shall conform to the relevant provisions of Subsection 112 of the Standard Specifications and shall include completely dismantling the existing temporary bridge superstructure installed in 2023. This includes, but is not limited to, the modular bridge temporary superstructure, attached guardrail, miscellaneous items attached to the existing structure, and temporary concrete barrier.

No debris, tools or incidental equipment of any kind shall be permitted to fall into the water below. Any material that accidentally falls into the water shall be removed immediately. All debris shall be promptly removed and satisfactorily disposed of by the Contractor at his/her own expense.

The temporary bridge is owned by MassDOT and shall be removed and stacked at the MassDOT Pittsfield Depot located at 77 Central Berkshire Boulevard (Route 41) in Pittsfield, MA.. Contractor shall contract the District 1 Radio Room to coordinate the timing of transport.

All costs associated with the handling, transportation, and delivery of all aforementioned materials back to the MassDOT Depot shall be included in the bid price, any other costs associated with the temporary bridge or handling shall be considered incidental to this Item and no additional compensation shall be made to the Contractor.

CONSTRUCTION METHODS

The Contractor shall consult/retain a technical representative from the beam bridge manufacturer for guidance on the dismantling of the temporary bridge, or provide proof of experience to the Engineer that the Contractor has erected or dismantled a minimum of 5 similar modular bridges in the past.

It is expected that the Contractor will prepare the beam bridge sections for transportation and storage based on the recommendations of the technical representative. The Contractor will be required to submit a written description and plans detailing the dismantling sequence and storage preparations to complete the work. The submittal shall be prepared by a Professional Engineer registered in the Commonwealth of Massachusetts and submitted to the Engineer for approval. The submittal shall include any necessary utility relocations, crane pick locations relative to North Poland Road and the MassDOT Depot facility, supporting crane calculations using the appropriate factors of safety per MassDOT Specification, and details of the methods for transportation and storage at the MassDOT Depot facility.

The temporary bridge shall be completely disassembled into the modular bridge sections, including the bridge rail, and the components returned to MassDOT in a clean, undamaged condition. Prior to dismantling the superstructure, the Contractor and the Engineer shall make a joint inspection to determine if any parts have been damaged prior to the start of the work. Care should be taken during the disassembly, preparation for storage, and transportation as any damage will be the responsibility of the Contractor.

ITEM 993.11 (Continued)

CLEANING OF MODULAR BRIDGE

Any damaged areas of the galvanized components shall be cleaned of any oil, grease, rust, scale, or other foreign material, then touched up with two coats of Zinc-rich paint, meeting Department Specification M7.04.11 (Paint, High Zinc Dust Content, Galvanizing Repair).

All fasteners, including bolts, nuts and washers, and any threaded portions of the beam bridge components, excluding high strength bolts, shall be cleaned of rust, dirt, etc. and lubricated or otherwise coated with a thin rust prevent film, in a manner satisfactory to the Engineer, to prevent rusting. Packaging in an oil-bath of any type will not be permitted.

If any type of abrasive blasting is used to clean the components, all holes shall be protected from damage due to the blasting operation.

STACKING OF MODULAR BRIDGE COMPONENTS

All cleaned and refurbished parts shall become the property of MassDOT, and shall be delivered to the MassDOT Depot facility or as directed by the Engineer. The Contractor shall transport and off-load all components and shall provide all the necessary wooden dunnage required to stack the components as directed. The intent of proper stacking is to provide readily accessible stockpiles when such bridge beam parts are needed in the future. Contractor shall place a layer of road fabric with 6″-8″ of milling mulch prior to stacking bridge components.

Wooden scraps shall not be allowed as proper dunnage. Dunnage pieces shall be long enough so that only one piece is required at each location and shall not extend beyond the stacked materials in an unsafe manner.

The dunnage shall be of such width and thickness so that it will not be broken or severely distorted by the weight of the components being stockpiled and shall be of such thickness to permit reasonable handling by use of slings, chokers, forklifts, etc. When two pieces of dunnage are required, they shall be of the same thickness.

After cleaning and lubricating, all fasteners shall be packed in substantial weatherproof containers with covers. Retainer hardware for the fasteners (clips, nuts, washers, lock washers, etc.) shall be placed in 4 mil polyethylene containers. Each container shall include component parts with which the retainers mate. Only one type of fastener shall be in a container. Within each container, the number of nuts, washers, clips, etc., shall match the number of the bolts or other fasteners. Each container shall be clearly labeled with an etched or embossed metal tag to indicate the name of the manufacturer and model number, if any, of the beam bridge, quantity, part, part number, and where appropriate, the size. In lieu of packing the mating fasteners in polyethylene bags, bolts may be packed in the container with the proper washers and nuts attached. Containers shall be clearly labeled as above and shall not include any “odd” parts.

ITEM 993.11 (Continued)

Containers shall be of a size, when packed, as to be readily manhandled and shall have appropriate lifting devices attached to be readily machine handled.

REPLACEMENT PARTS

At the end of this contract, the Contractor shall have delivered and properly stored all parts required for a one-lane modular bridge with a total length of approximately 91 feet. The quantity of parts shall be determined from the literature provided by the manufacturer of the modular bridge. Any parts that have been lost or damaged and that have not been noted as damaged on the inventory prior to dismantling shall be replaced by the Contractor at his own expense.

BASIS OF PAYMENT

Item 993.11 will be paid for at the Contract Lump Sum bid price, which price shall include full compensation for all material, labor, fees, equipment, cleaning, delivery, packaging and storage, and all incidental costs required to complete the work as specified and as required by the Engineer. Costs shall include engineering services for the disassembly plan set. Removals and disposals of ny materials that are not specifically listed for payment under another item shall be included under this item without additional compensation.

ITEM 995.01 BRIDGE STRUCTURE, BRIDGE NO. C-20-004 LUMP SUM

The work under this Item shall conform to the applicable provisions of Subsection 995 of the Standard Specifications and the specific requirements stipulated below for the component parts of this item. For those components where no specific requirement is stipulated, the Standard Specification shall apply, except for payment.

Work under this item includes all material, equipment and labor needed to construct the following: precast concrete abutments, wingwalls, and approach slabs; prestressed concrete New England Deck Bulb Tee Beam superstructure; bridge railings; precast highway guardrail transitions; bearings; controlled density fill around the precast highway guardrail transitions; and all other items not specifically provided for in the contract.

The work does not include any items listed separately in the proposal. Payment for materials shown on the Plans as being part of this bridge structure or which may be incidental to its construction and are not specifically included for payment under another item shall be considered incidental to the work performed under this Item and shall be included in the unit price of the component of which they are a part.

SAWING & SEALING JOINTS IN ASPHALT PAVEMENT AT BRIDGES

The work to be done under this heading consists of making a sealed kerf across the full width of the finished asphalt pavement at bridge abutments where called for on the Plans. The shape, width, and depth of the kerf shall be as shown on the Plans.

Prior to the start of the asphalt pavement operation, the Contractor shall place a mark on each curb or barrier on either side of the paved roadway. These marks shall be aligned with the actual end of the bridge deck and shall be placed so that they will not be covered or otherwise obscured by the asphalt pavement.

After the completion of the paving operation, the Contractor shall snap a straight chalk line on the pavement between these two marks. The Contractor shall then saw cut the pavement along this line to the depth, width and shape as shown on the Plans. The equipment shall be approved by the Engineer prior to commencing work.

After completing the saw cutting, the Contractor shall clean the saw groove of any dust and debris with an oil free air blast. If the groove was wet sawn, the groove shall be cleaned with a water blast to remove any remaining slurry and debris, vacuumed with a Wet-or-Dry vacuum to remove any standing water, and then dried with an air blast from a Hot-Air-Lance.

Once the groove is clean and dry, the Contractor shall fill it completely with a hot-applied bituminous crack sealer meeting the requirements of M3.05.4 in accordance with the manufacturer's application instructions and restrictions regarding ambient and material temperatures. The crack sealer shall be thoroughly cured prior to opening the road to traffic. To reduce tackiness, only boiler slag aggregate (black beauty) shall be scattered over the sealer when required by the Engineer. Conventional sand shall not be used for this purpose.

ITEM 995.01 (Continued)

5000 PSI, 3/4 IN., 685 HP CEMENT CONCRETE
8000 PSI, 3/8 IN., HP CEMENT CONCRETE

The work to be done under these headings shall conform to the relevant provisions of Sections 901 and M4.06.1 of the Standard Specifications and the following:

MATERIALS

Liquid-Applied Evaporation Reducers.
Liquid-applied evaporation reducers shall produce an effective monomolecular film over the bleed water layer, to reduce the rate of evaporation of the bleed water from the surface and plastic shrinkage.

Curing Materials.
The materials used for curing methods and procedures shall meet the requirements specified herein.

Curing materials applied to the concrete shall allow the concrete to mature sufficiently to achieve its designed and desired properties, including strength, volume stability, permeability, durability, and resistance to freezing, thawing, and de-icing cycles. Curing water shall be free of deleterious impurities, causing staining and deterioration. The potential staining ability of curing water shall be evaluated by means of CRD-C401 (US Army Corps of Engineers 1975) for instances where curing water quality is questioned.

A. Saturated Covers
Saturated covers shall meet AASHTO M 182, Class 3. Saturated covers shall be in good condition, free from holes, tears, or other defects that would render it unsuitable for curing cement concrete. Saturated covers shall be dried to prevent mildew when storing. Saturated covers shall be of sufficient thickness to maximize moisture retention. Saturated covers shall be free of harmful substances that are deleterious or cause discoloration to cement concrete and cementitious materials. Saturated covers shall have the ability to retain sufficient moisture from continuous watering so that a film of water remains on the surface of cement concrete.

B. Sheet Materials
Sheet materials shall meet ASTM C171 Standard Specification for Sheet Materials for Curing Concrete. Sheet materials shall inhibit moisture loss and reduce temperature rise in concrete exposed to radiation from the sun.

ITEM 995.01 (Continued)

1. Polyethylene Film.

Polyethylene film shall be clear, white, or black in color and consist of a single sheet manufactured from polyethylene resins, be free of visible defects, including tears, wrinkles, and discontinuity. The film shall prohibit mottling and uneven spots from appearing on the surface of concrete, due to variations in temperature, moisture content, or both. Polyethylene film shall accommodate concrete surfaces with constant contact without damage.

a. White Polyethylene Film.

White polyethylene film shall minimize heat gain caused by absorption of solar radiation.

b. Clear and Black Polyethylene Films.

Clear and black polyethylene films shall inhibit absorption of solar radiation.

2. White Burlap-Polyethylene Sheeting.

White burlap-polyethylene sheeting shall be securely bonded to the burlap so to avoid separation of the materials during handling and curing of the concrete.

3. Reinforced Impervious Paper.

Reinforced impervious paper shall be white in color, consist of two sheets of kraft paper cemented together with a bituminous adhesive, and reinforced with embedded cords or strands of fiber running in both directions. Reinforced impervious paper shall be free of holes, tears, and pin holes from deterioration of the paper through repeated use. Reinforced impervious paper shall be treated to prevent tearing when wetted and dried. Reuse of reinforced impervious paper shall be permitted so long as it is able to retain moisture on the surface of concrete. The paper shall be discarded and prohibited from use when moisture is no longer retained in the material.

C. Liquid Membrane-Forming Compounds for Curing.

Liquid membrane-forming compounds for curing, including compounds with curing properties and compounds with both curing and sealing properties, shall meet ASTM C309 Standard Specifications for Liquid Membrane Forming Compounds for Curing Concrete, maintain valid listing on the Department Qualified Construction Materials List (QCML), and meet the requirements specified herein.

Compounds shall form a continuous, non-yellowing, and durable film with quality moisture-retention properties. Compounds shall maintain the relative humidity of the concrete surface above 80% for greater than or equal to seven (7) days to sustain cement hydration. Compounds shall not affect the original color of the concrete surface. Compounds shall not degrade due to exposure to ultraviolet light from direct sunlight. Compounds shall meet the local and federal allowable Volatile Organic Compound (VOC) content limits.

ITEM 995.01 (Continued)

Table 1: Types of Liquid Membrane-Forming Compounds for Curing

Type	Description
Type 1	Clear or translucent without dye
Type 1-D	Clear or translucent with fugitive dye
Type 2	White pigmented

Table 2: Composition Class of Liquid Membrane-Forming Compounds for Curing

Type	Description
Class A	Unrestricted composition, generally wax-based products
Class B	ASTM D883 resin-based products

CONSTRUCTION METHODS

Application of Liquid-Applied Evaporation Reducers During Evaporative Conditions.

A. Prior to the Completion of Finishing Operations.

Prior to the completion of finishing operations, if the concrete and air temperatures, relative humidity of the air, and the wind speed have the capacity to evaporate free water from the fresh concrete surface at a rate that is greater than or equal to the bleeding rate of the concrete, liquid-applied evaporation reducers shall be applied immediately after the bleed water sheen has disappeared from the surface of the concrete or when the concrete surface exhibits loss of moisture and surface drying, per the Manufacturer's instructions and recommendations as specified herein. Evaporation reducers shall not be worked into the surface in subsequent finishing operations.

B. After the Completion of Finishing Operations.

After the completion of finishing operations and prior to the concrete achieving final set, if the concrete surface exhibits loss of moisture and surface drying, liquid-applied evaporation reducers shall be applied immediately to the concrete surface to prevent the loss of moisture without damaging the concrete surface, per the Manufacturer's instructions and recommendations as specified herein. Optionally, the Contractor may apply liquid membrane-forming compounds for curing immediately to the concrete surface when evaporative conditions prevail. No additional finishing operations shall be conducted.

Curing.

Immediately after the completion of finishing operations and final set of the concrete is achieved, one of the following curing materials shall be applied to the concrete surface, to prevent loss of moisture and surface drying.

ITEM 995.01 (Continued)

The Contractor shall maintain a continuous application of moisture or moisture retention throughout the entire duration of the curing method cycle and meet the minimum sustained ambient temperature, duration, and strength requirements as specified herein. Controlled, gradual, and uniform termination of the curing method cycle shall begin only after all specified conditions are met.

Table 3: Termination of Curing Method

Methods	Duration	Sustained Ambient Temperature (°F)	Compressive Strength
Saturated Covers	≥ 7 Days	40 – 85	≥ 70% of f'_c[2]
Sheet Materials			
Liquid Membrane-Forming Compounds for Curing[1]			
[1] If liquid membrane-forming compounds for curing were applied previously during evaporative, no additional application is required. [2] Compressive strength cylinders for termination of curing cycle shall be cast and field cured with the same environmental conditions that the concrete is subjected to throughout the entire duration of the final curing cycle.			

A. Saturated Covers.

Saturated covers shall be applied as specified herein. Prior to application, saturated covers shall be thoroughly rinsed in water and free of harmful substances that are deleterious or cause discoloration to cement concrete. The Contractor shall maintain sufficient moisture with continuous watering so that a film of water remains on the surface of the cement concrete throughout the entire duration of the final curing method cycle. Saturated covers shall be properly positioned, secured, and maintained on the surface of the concrete to maximize moisture retention and to prevent moisture loss. The Contractor shall prohibit saturated covers from drying out and prevent the absorption of curing water from the surface of the concrete. Polyethylene film may be applied over the saturated cover to limit the amount of continuous watering required for sufficient moisture retainage.

B. Sheet Materials.

Sheet materials shall be applied as specified herein. Adjoining sheet materials shall overlap not less than 12 inches. All edges of the sheet materials shall be secured to maintain a moist environment.

ITEM 995.01 (Continued)

1. Polyethylene Film.

Polyethylene film shall be applied as specified herein. The Contractor shall prohibit mottling and uneven spots from appearing on the surface of concrete, due to variations in temperature, moisture content, or both. Application of additional curing water under the film or application of a polyethylene film bonded to absorbent fabric to the concrete surface may be required to prevent mottling and to retain and evenly distribute the moisture. The Polyethylene film shall be applied to concrete surfaces with constant contact without damage. The film shall extend beyond the edges of the concrete surface. Edges of adjacent polyethylene film shall overlap a minimum of 6 inches and be tightly sealed with the use of sand, wood planks, pressure-sensitive tape, mastic, or glue to maintain close contact with the concrete surface, retain moisture, and prevent the formation of air pockets.

a. White Polyethylene Film.

White polyethylene film shall be exclusively applied during warm or hot weather applications as specified herein.

b. Clear and Black Polyethylene Films.

Clear and black polyethylene film shall be exclusively applied during cool or cold weather applications as specified herein.

2. White Burlap-Polyethylene Sheeting.

White burlap-polyethylene sheeting shall be applied as specified herein.

3. Reinforced Impervious Paper.

Reinforced impervious paper shall be applied as specified herein.

C. Liquid Membrane-Forming Compounds for Curing.

Liquid membrane-forming compounds for curing shall be applied per the Manufacturer's instructions and recommendations as specified herein.

Prior to use, compounds shall be thoroughly mixed, stirred, and agitated. Compounds shall be applied immediately after final finishing and the disappearance of the surface water sheen, but before the free water on the surface has evaporated, to prevent the formation of cracks and loss of moisture at the surface. Careful considerations shall be made by the Contractor to determine if the evaporation rate is exceeding the rate of bleeding, thus causing the surface to appear dry even though bleeding is still occurring. To diagnose and prevent this condition, the Contractor shall place a transparent plastic sheet over a test area of the uncured and unfinished concrete surface and shall determine if any bleed water accumulates under the plastic. Under such conditions, the application of liquid membrane-forming compounds to the concrete surface shall be delayed to prevent bleed water from being sealed below the concrete surface, map cracking of the membrane films, reduction in moisture-retention capability, and the need for reapplication of the compound.

ITEM 995.01 (Continued)

When using compounds to reduce moisture loss from formed surfaces, the exposed surface shall be wetted immediately after form removal and kept moist until the compound is applied. The concrete shall be allowed to reach a uniformly damp appearance with no free water on the surface, and then application of the compound shall begin at once. Delayed application resulting in surface drying, absorption of the compound into the concrete, and forming of a discontinuous membrane shall be prohibited.

The concrete surface shall be damp when the compound is applied. Power-driven spray equipment shall be used for uniform application of compounds on large paving projects. Spray nozzles recommended by the compound Manufacturer and use of windshields shall be arranged by the Contractor to prevent wind-blown loss of compound and to ensure proper coverage application rates are achieved. The compound shall be applied by power sprayer, using appropriate wands and nozzles with pressures between 25 and 100 psi. The Contractor shall fill the power sprayer with curing compound from the Manufacturer's original container in the presence of the Engineer. Any dilution as recommended by the Manufacturer shall take place in the presence of the Engineer. For very small areas such as repairs, the compound shall be applied with a wide, soft-bristled brush or paint roller.

The Contractor shall verify the application rate and procedures are in accordance with the Manufacturer's instructions and recommendations. At least one uniform coat shall be applied at a rate of 150 to 200 ft^2/gallon. On very deeply textured surfaces, the surface area to be treated shall be at least twice the surface area of the surface. In such cases, two separate applications may be needed, each at 200 ft^2/gallon or greater if specified by the Manufacturer to achieve the desired moisture retention rate, with the first being allowed to become tacky before the second is applied. If two coats are necessary to ensure complete coverage, for effective protection the second coat should be applied at right angles to the first. Complete coverage of the surface shall be attained due to the potential for formation of small pinholes in the membrane, which will result in loss of moisture from the concrete. Compounds shall not sag, run off peaks, or collect in grooves.

Compounds and procedures shall be compatible with concrete surfaces receiving subsequent applications or placements of concrete, overlays, coatings, paints, sealers, finishes or other toppings to ensure acceptable bonding to the concrete. Testing to establish compatibility among the curing compound, subsequent surface treatments, concrete moisture content and the actual finished surface texture of the concrete shall be conducted when compatibility is not known. The compound Manufacturer shall be consulted by the Contractor to determine the compatibility of the application. Compounds shall not be applied to concrete surfaces where bonding of subsequent applications or placements is incompatible or is of concern. The use of wax-based curing compounds shall be prohibited in instances where concrete surfaces are subject to additional toppings and vehicular, pedestrian, or other traffic.

ITEM 995.01 (Continued)

Deliberate removal of compounds in the presence of the Engineer and in accordance with Manufacturer's instructions and recommendations shall be conducted as an alternative to compatibility testing, incompatibility, or in instances where bonding is of concern. Bonding of subsequent materials may still be inhibited by the presence of the compound even after the moisture retention characteristics of the compound have diminished.

White-pigmented compounds shall be used in instances where solar-heat gain is concern to the concrete surface. White-pigmented compounds shall be agitated in the container prior to application to prevent pigment from settling out resulting in non-uniform overage and ineffective curing.

Protection from Adverse Conditions.
The concrete shall be protected from all adverse conditions, including precipitation, cold conditions, and hot conditions, until 100% of f'_c is attained, as specified herein. Concrete that is not protected from adverse conditions shall be installed at the Contractor's risk and any damage or unsatisfactory concrete shall be removed and replaced at the Contractor's expense.

A. Precipitation.
Polyethylene sheets shall be applied to all exposed surfaces of the concrete immediately prior to the first signs of precipitation and all batching and placing operations shall cease. The fresh concrete shall be covered to prevent the precipitation from indenting the surface, adding water to the surface, or wash away paste. Removal of the covering and resumption of concrete batching and placing shall not take place until the precipitation ends. Corrective measures shall take place for any concrete damaged during the precipitation and covering.

B. Cold Conditions.
Cold weather concreting shall be defined as the procedures, operations, materials, and equipment required for the mixing, delivery, placement, finishing, curing, and protection of concrete during cold conditions, while exposed to air temperatures falling below, or expected to fall below 40°F.

The protection period shall be defined as the minimum duration required to prevent concrete from the negative effects of cold weather exposure. The protection period shall remain in place while cold weather conditions exist. Controlled and gradual termination of the protection period shall be conducted only after 100% of f'_c is attained and all specified conditions are met.
The procedures, operations, materials, and equipment selected for cold weather concreting shall adequately maintain specified temperature ranges by addressing all variables, including ambient weather conditions, geometry of the structure, and mix design proportions. Concrete temperatures for cold weather concreting shall meet Table 4.

ITEM 995.01 (Continued)

Table 4: Temperature Requirements for Cold Weather Concreting

Phase	Cold Weather Temperature (°F)	Thickness of Sections (ft.)			
		< 1	1-3	3-6	> 6
		Concrete Temperature (°F)			
Mixing	30-39	60-75	55-70	50-65	45-60
	0-30	65-80	60-75	55-70	50-65
	< 0	70-85	65-80	60-75	55-70
Placement	< 40	55-75	50-70	45-65	40-60
Protection Period	< 40	55-75	50-70	45-65	40-60
Termination of Protection Period	< 40	Rate of Ambient Temperature Change in 24 Hours (°F)			
		≤ 50	≤ 40	≤ 30	≤ 20

Cold weather concreting procedures, operations, materials, and equipment shall be developed and performed to prevent damage to concrete due to freezing at early ages, to ensure that the concrete develops the recommended strength for safe removal of forms, to maintain curing conditions that promote quality strength and durability development, to limit rapid temperature fluctuation, and to provide protection consistent with intended serviceability of the structure. The Contractor shall develop and submit to the Department for review and approval, cold weather concreting procedures for the mixing, delivery, placement, finishing, curing, and protection of concrete during cold weather, including:

(1) Procedures for protecting the subgrade from frost and the accumulation of ice or snow on reinforcement or forms prior to placement
(2) Methods and requirements for cold weather protection and temperature control of constituent materials incorporated into the mix design
(3) Chemical admixtures incorporated into the mix design for cold weather protection and temperature control
(4) Methods and requirements for cold weather protection and temperature control during mixing, delivery, placement, finishing, curing, and protection period
(5) Curing methods to be used during and following the protection period
(6) Types of covering, insulation, heating, or enclosures to be provided
(7) Methods for verification of in-place strength
(8) Procedures for continuously measuring and recording ambient and concrete temperatures
(9) Procedures for preventing drying during dry, windy conditions

All procedures, operations, materials, and equipment required for adequate protection and curing shall be present and ready for use prior to concrete production.

ITEM 995.01 (Continued)

1. Insulating Materials.

Insulating materials used for cold weather concreting shall meet the requirements specified herein. The thermal resistance of the proposed insulation system shall be determined to meet the concrete temperature range requirements specified herein. Supplemental heat, including hydronic heating systems, shall be applied in instances where insulating materials cannot achieve the concrete temperature requirements.

2. Heaters.

Heaters used for cold weather concreting including direct fired, indirect fired, and hydronic heaters shall meet ANSI A10.10 carbon monoxide limits, safety regulations for ventilation, and the stability, operation, fueling, and maintenance of heaters and the requirements specified herein.

a. Direct Fired Heaters.

Direct fired heaters generate heat to an enclosed space through the combustion of fossil fuels, including oil, kerosene, propane, gasoline, and natural gas. Hot air comprised of carbon dioxide and carbon monoxide combustion products, is discharged into the enclosed space. Direct fired heaters shall be prohibited from heating the air directly surrounding the concrete surface due to calcium carbonate formation interfering with the hydration reaction, from the reaction between the carbon dioxide generated from the combustion of fossil fuels and the calcium hydroxide on the surface of freshly placed concrete, resulting in a soft, chalky, and nondurable concrete surface. Direct fired heaters shall only be used on concrete surfaces protected from fossil fuel combustion products.

b. Indirect Fired Heaters.

Indirect fired heaters generate heat to an enclosed space through the combustion of fossil fuels, including oil, kerosene, propane, gasoline, and natural gas. The carbon dioxide and carbon monoxide combustion products are expelled through venting, resulting in clean heated air discharged into the enclosed space. Indirect fired heaters are suitable for heating the air directly surrounding the concrete surface.

c. Hydronic Heaters.

Hydronic heaters generate heat to an enclosed space through the circulation of the heat-transfer fluid in a closed system of pipes or hoses. The heat-transfer fluid is comprised of a propylene glycol water solution and is heated through the combustion of fossil fuels, including diesel fuel and kerosene. The combustion of fossil fuel occurs outside of the enclosed space and does not expose the concrete surface to the deleterious effects of carbon dioxide.

ITEM 995.01 (Continued)

After the concrete placement achieves final set, polyethylene film or other suitable material shall sufficiently serve as a vapor barrier. The heat-transfer hoses shall be placed on top of the vapor barrier and covered with insulating materials. Hydronic heaters shall be used to thaw or preheat subgrades prior to concrete placement and provide supplementary heat to insulating materials. Hydronic heaters shall provide an even distribution of heat to prevent curling and cracking induced by temperature gradients within concrete.

3. Enclosures.

Enclosures shall be made of wood, canvas tarpaulins, polyethylene film, or prefabricated rigid plastic. Enclosures shall be airtight, block wind, prevent admittance of cold air, conserve heat, and withstand wind and snow loads. Enclosures shall provide adequate headroom for craftsmen and sufficient space between the concrete and the enclosure to permit free circulation of warm air. Supplementary heat shall be supplied to enclosures by hydronic heaters, live steam, hot forced air, or indirect fired combustion heaters. Icing along the perimeter of the enclosure shall be prevented when live steam is utilized. Heaters and ducts shall be positioned to prevent the hot, dry air from overheating or drying the concrete surface. Insulating materials shall be applied as a vapor barrier to the concrete surface immediate after final set is attained.

C. Hot Conditions.

Hot weather concreting shall be defined as the procedures, operations, materials, and equipment required for the mixing, delivery, placement, finishing, bleed water evaporation, curing, and protection of concrete during hot weather conditions, while exposed to air temperatures exceeding, or expected to exceed 85°F; concrete temperatures approaching, or expected to approach 90°F; evaporation rates of surface water approaching, or expected to approach the bleed water rate of the concrete; high solar radiation; low relative humidity; and high wind speed. If the bleed water rate of the concrete is unknown, 0.15 $lb/ft^2/hr$ shall be assumed.

The evaporation rate of surface water shall be determined by the following equation:

$$E = (T_c^{2.5} - r * T_a^{2.5})(1 + 0.4V) \times 10^{-6}$$

where E = evaporation rate of water-covered surface ($lb/ft^2/hr$), T_c = concrete temperature of the evaporating surface (°F), r = relative humidity of air surrounding the evaporating surface (%), T_a = temperature of the air surrounding the evaporative surface (°F), and V = average wind speed 20 inches above the evaporating surface. The air surrounding the evaporating surface shall be defined as the air approximately 4 to 6 feet above the evaporating surface on the windward side and shielded from the sun's rays.

ITEM 995.01 (Continued)

The protection period shall be defined as the minimum duration required to prevent concrete from the negative effects of hot weather exposure, including the acceleration of rate of moisture loss and rate of cement hydration, difficulties in curing, increased concrete temperature, increased water demand, accelerated slump loss, increased rate of setting, increased tendency for plastic shrinkage and thermal cracking, increased potential for cold joints, and difficulties in controlling entrained air content. The protection period shall remain in place while hot weather conditions exist. Controlled and gradual termination of the protection period shall be conducted when conditions permit. The rate of ambient temperature change shall meet Section 901.61.B: Cold Conditions.

The procedures, operations, materials, and equipment selected for hot weather concreting shall adequately maintain specified temperature ranges and evaporation rates by addressing all variables, including ambient weather conditions, geometry of the structure, and mix design proportions.

Hot weather concreting procedures, operations, materials, and equipment shall be developed and performed to prevent damage to concrete and promote long-term durability. The Contractor shall develop and submit to the Department for review and approval, hot weather concreting procedures for the mixing, delivery, placement, finishing, curing, and protection of concrete during hot weather, including:

(1) Procedures for preparing the subgrade prior to placement
(2) Methods and requirements for hot weather protection and temperature control of constituent materials incorporated into the mix design
(3) Chemical admixtures incorporated into the mix design for hot weather protection and temperature control
(4) Methods and requirements for hot weather protection and temperature control during mixing, delivery, placement, finishing, curing, and protection period
(5) Initial curing methods meeting Section 901.67: Curing to be used to reduce surface evaporation
(6) Curing methods to be used during and following the protection period
(7) Types of covering, insulation, cooling, or enclosures to be provided
(8) Evaporation rate and bleeding rate of concrete calculations
(9) Procedures for continuously measuring and recording ambient and concrete temperatures
(10) Procedures for preventing drying during dry, windy conditions

All procedures, operations, materials, and equipment required for adequate protection and curing shall be present and ready for use prior to concrete production.

ITEM 995.01 (Continued)

PRESTRESSED CONCRETE DECK BULB TEE BEAMS (NEDBT40)

A. General.

The work under this Heading consists of fabricating, transporting and installing prestressed concrete deck bulb tee beams (NEDBT40), and includes all necessary labor, materials, and equipment to complete the work as shown on the Plans. The work shall conform to the MassDOT Standard Specifications and the requirements of the current AASHTO LRFD Bridge Construction Specifications, supplemented by the current relevant provisions of the latest edition of PCI MNL-116 (The Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products), except as noted herein. MassDOT contract documents shall take precedence over the AASHTO LRFD Bridge Construction Specifications and PCI MNL-116. Section 930, M4.02.14, and M4.03.00 through M4.03.14 of the MassDOT Standard Specifications are superseded in their entirety by the requirements specified below.

QUALITY ASSURANCE

A. General.

Quality Assurance includes all the planned and systematic actions necessary to provide confidence that a product or facility will perform satisfactorily in service. It is an all-encompassing term that includes Quality Control (performed by the Fabricator) and Acceptance (performed by MassDOT). Quality Control is the system used by the Contractor and Fabricator to monitor and assess their production processes at the plant facility and installation activities at the project site to ensure that the final product will meet the specified level of quality. Acceptance includes all factors used by MassDOT to determine the corresponding value for the product. MassDOT Acceptance inspection at the plant facility is intended as a means of evaluation of compliance with contract requirements. Contractor and Fabricator Quality Control activities and MassDOT Acceptance activities shall remain independent from one another. MassDOT Acceptance activities shall not replace Fabricator Quality Control activities.

B. Fabricator Quality Control.

Quality Control shall be performed by the Fabricator to ensure that the product is fabricated in conformance with the specifications herein. The Fabricator shall maintain a Quality Control system to monitor, assess, and adjust placement and fabrication processes to ensure the Prestressed Concrete Beam(s) meet the specified level of quality, through sufficient Quality Control sampling, testing, inspection, and corrective action (where required). The Fabricator's Quality Control system shall address all key activities during the placement and fabrication and shall be performed in conformance with the Fabricator's PCI Certification. Quality Control documentation shall meet the requirements of the *Fabricator Quality Control – Documentation* section below. Upon request, Fabricator Quality Control documentation shall be provided to the MassDOT Plant Inspector.

ITEM 995.01 (Continued)

1. Plant.

Prior to the fabrication of Prestressed Concrete Beams, the Fabricator's precast concrete plant shall obtain the following:

(a) Certification by the Precast/Prestressed Concrete Institute (PCI) Plant Certification Program, for Prestressed Concrete Beam fabrication, Category B3 level or higher
(b) MassDOT Prequalification
(c) MassDOT Mix Design Approval

All concrete for a given Prestressed Concrete Beam shall be produced by a single company and plant, unless otherwise approved by the Engineer.

2. Personnel.

The Fabricator shall provide adequate training for all QC personnel in accordance with PCI certification. There shall be sufficient personnel trained and certified to perform the tests listed under Subsection M4.02.13, Part D. At a minimum, the Fabricator's Quality Control Personnel shall maintain the following qualifications and certifications:

(a) QC Manager with an active Precast/Prestressed Concrete Institute (PCI) Technician/Inspector Level II or higher, and a minimum of 5 years continuous experience in the manufacture of Prestressed Concrete Beams for state transportation departments. The QC Manager shall be on site while the batch plant is producing and placing concrete for MassDOT projects.

(b) A Technician/Inspector having the Precast/Prestressed Concrete Institute (PCI) Technician/Inspector Level II or higher

The Contractor shall submit to the Engineer a copy of the Fabricator's Quality Control Personnel required qualifications, as specified above.

3. Laboratory.

The Fabricator shall provide a room of sufficient size to house all equipment and to adequately perform all testing. The room shall have either a separate moisture storage room or curing box for concrete cylinders, and it shall be thermostatically controlled to maintain temperatures consistent with AASHTO T 23. It shall include a desk and file cabinet for proper record keeping, and have good lighting and ventilation. This room shall be kept for testing and quality control and not used for any other purpose. An additional desk and file cabinet shall be provided for exclusive use of the Engineer. No exception from these requirements will be allowed without the express written permission of the Engineer.

ITEM 995.01 (Continued)

4. Testing Equipment.

At a minimum, the Fabricator's plant facility shall have the following testing equipment:

(a) Air Content Meter Type A or B: AASHTO T 152
(b) Air Content Meter Volumetric Method: AASHTO T 196 (Required for Lightweight Concrete)
(c) Slump Cone: AASHTO T 119
(d) Cylinder Molds AASHTO M 205
(e) Concrete Testing Machine: AASHTO T 22
(f) Screening Sieve: AASHTO T 27, AASHTO T 11
(g) Curing Box: AASHTO T 23
(h) Spread Test Base Plate for Self-Consolidating Concrete (SCC): ASTM C1611
(i) All other equipment prescribed by AASHTO and ASTM standards for the tests to be performed by the Fabricator as specified

5. Inspection.

Quality Control personnel shall monitor and inspect the fabrication of each Prestressed Concrete Beam. Quality Control personnel shall report all inspection activities on Quality Control Inspection Reports and non-conformances on Non-Conformance Reports (NCRs) throughout the entire fabrication process, as specified herein.

6. Temperature Monitoring.

At a minimum, the Fabricator shall monitor, record, and report the temperatures of the form, ambient temperatures surrounding the concrete, and temperatures of the concrete continuously, without interruption as specified below:

- Prior to placement of concrete to verify that $T_i \geq 50°F$.
- Immediately after placement to verify that $T_i \geq 50°F$ is maintained.
- Throughout the entire duration of the curing cycle, at regular intervals not to exceed one hour until 100% Design Strength (f'_c) is attained and concrete has cooled to within 40°F of the ambient temperature surrounding the Prestressed Concrete Beam.

At a minimum, the temperature measuring devices shall record and report the temperature of the concrete to the nearest 2°F. At least two temperature sensors (thermocouples) shall be positioned to record the maximum and minimum anticipated concrete temperatures. The anticipated minimum temperature shall be measured with one or more thermocouples at a distance no greater than 2 inches from the surface of the thinnest section. The anticipated maximum temperature shall be measured with one or more thermocouples at the center of the thickest section. Proposed temperature measurement locations shall be submitted to the Engineer for approval. Temperature recording devices shall be located within the curing enclosure and calibrated as required by PCI MNL-116 Section 4.18.4. Maximum heat increase and cool down rates shall comply with PCI MNL-116, Section 4.19. The Contractor shall furnish temperature logs recorded at a minimum frequency of once per hour to the Inspector as required, with each post-pour QC inspection report.

ITEM 995.01 (Continued)

7. Sampling and Testing.

At a minimum, the Fabricator shall perform random Quality Control sampling and testing as specified in *Table 1: Quality Control Sampling and Testing*. The Fabricator shall perform additional Quality Control sampling and testing on concrete that has been retempered with admixtures or hold-back water during fabrication. Test Specimens shall conform to the requirements of Section M4.02.13 of the MassDOT Standard and Supplemental Specifications and AASHTO R 60, with the exception of the Stripping (80% f'_c) set of cylinders. Stripping (80% f'_c) cylinders shall be cured in the same location and environment as the Prestressed Concrete Beam they represent. If approved by the Engineer, compressive strength cylinder match curing equipment, that maintains the same concrete conditions that the corresponding Prestressed Concrete Beam is exposed to, may be utilized in lieu of Stripping (80% f'_c) field cured cylinders, with the use of thermocouples, controllers, and heaters.

Table 1: Quality Control Sampling and Testing

Quality Characteristic	Test Method	Sample Size	Specification Limit	Lot Size [(c)]	Sublot Size [(d)]	Frequency	Point of Sampling
Slump (in.) [(a)]	AASHTO T 119	Per AASHTO	≤ 8 in. or as approved by the Engineer	Total Quantity of Beams fabricated on a Contract, per Bid Item, per Mix Design	One (1) Beam	One (1) per Sublot or fraction thereof	Point of Discharge
Air Content (%)	AASHTO T 152	Per AASHTO	5% ≤ % ≤ 8%				
Temperature (°F)	AASHTO T 309	Per AASHTO	50°F ≤ °F ≤ 90°F				
Compressive Strength (psi)	AASHTO T 22 AASHTO T 23	Stripping Cylinders: One (1) set of Three (3) 4 x 8 in.	≥ 80% f'_c at Stripping				
		7-day Cylinders: One (1) set of Three (3) 4 x 8 in.	For Information at 7 days				
		28-day Cylinders: One (1) set of Three (3) 4 x 8 in.	≥ 100% f'_c at 28 days				
		56-day Cylinders: One (1) set of Three (3) 4 x 8 in.	≥ 100% f'_c at 56 days [(b)]				

Notes:

(a) Self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.
(b) 56-day Compressive Strength test specimens shall require testing only when 28-day Compressive Strength test specimens have failed to meet Design Strength (f'_c).

ITEM 995.01 (Continued)

(c) Lot shall be defined as a specific quantity of material from a single source, produced or placed by the same controlled process.
(d) Sublot shall be defined as an equal division or part of a Lot from which a sample of material is obtained in order to assess the Quality Characteristics of the Lot.

8. Certificate of Compliance.

The Fabricator shall provide a Certificate of Compliance in accordance with Standard Specifications, Division I, Section 6.01, stating that QC test cylinders have achieved the design strength, f'_c. A Certificate of Compliance shall accompany each shipment and shall be presented to the MassDOT Resident Engineer or designee upon delivery to the site.

9. Documentation.

At a minimum, the Fabricator shall maintain a filing system for the following QC records and documentation. All QC records and documentation shall be made available to MassDOT upon the request of the Department.

(a) Current MassDOT Approved Mix Design Sheet(s) and Approval Letter(s)
(b) PCI Certification
(c) Current Qualifications and Certifications for QC Manager(s) and QC Technician(s)
(d) Most current set of Approved Shop Drawings
(e) Approved Placement, Finishing and Curing Plan
(f) Approved Dunnage Plan
(g) Fabricator Certificate of Compliance for each fabricated Prestressed Concrete Beam
(h) Admixture Manufacturer's Certification of Compliance for each approved Admixture
(i) Completed QC Inspection Report for each fabricated Prestressed Concrete Beam
(j) Identification Number for each fabricated Prestressed Concrete Beam
(k) Time and date of casting of each fabricated Prestressed Concrete Beam
(l) Date of stripping of each fabricated Prestressed Concrete Beam
(m) Batch Ticket Printout reporting the quantity of concrete produced for each batch of concrete produced
(n) Concrete temperature records for each fabricated Prestressed Concrete Beam
(o) QC Test Report Forms for each sublot of concrete produced
(p) Non-Conformance Reports (NCRs)
(q) Documentation of Repairs (if applicable)

ITEM 995.01 (Continued)

C. Acceptance.

MassDOT will perform Acceptance inspection, sampling, and testing during fabrication and installation, to evaluate the quality and degree of compliance of the fabricated Prestressed Concrete Beam to MassDOT specifications. Additionally, MassDOT Inspectors will monitor the Fabricator's Quality Control activities to ensure the Fabricator is properly administering Quality Control in conformance with the Fabricator's NPCA or PCI Certification. Acceptance inspection and test results not meeting MassDOT specifications will result in Non-conformance Reports (NCR) being issued by MassDOT to the Fabricator or Contractor for corrective action. Final Acceptance for the fabricated Prestressed Concrete Beams shall be determined by MassDOT.

1. Inspection.

A MassDOT Inspector will be assigned to perform Acceptance activities during fabrication, which includes the inspection of the materials, work procedures, and Prestressed Concrete Beams. At least seven (7) days prior to the scheduled start of fabrication, the Fabricator shall contact the MassDOT Research and Materials Section (RMS) to provide notice of the scheduled fabrication start date. The Fabricator shall complete the following activites prior to notifying MassDOT RMS of the scheduled start date:

(a) Receive approval for all submitted Fabricator cement concrete mix designs from the MassDOT Research and Materials Section for the current year, as specified under the *Mix Design* section and *Table 3: Trial Batch Sampling Testing for New Mix Designs*. Self-consolidating concrete shall meet the requirements of M4.02.17.
(b) Receive approval for the submitted Fabricator Placement, Finishing, and Curing Plan from the MassDOT Research and Materials Section, as specified under the *Placement, Finishing, and Curing Plan* section.
(c) Receive Engineer of Record approved shop drawings from the MassDOT Research and Materials Section as specified under the *Shop Drawings* section.
(d) Participate in the pre-production meeting, as described under the *Pre-Production Meeting* section (if required).

Prior to the start of fabrication, the Fabricator shall review the fabrication schedule with the MassDOT Inspector. Fabrication shall only proceed when:

(a) The QC Inspector and MassDOT Inspector are present to inspect the Prestressed Concrete Beam(s) being fabricated.
(b) The QC Manager is present at the Fabricator's plant.

The Fabricator shall grant access to all required areas of the Fabricator's plant to the MassDOT Inspector, during the hours of fabrication. Fabrication without MassDOT Inspector access to required areas is prohibited, and will result in the rejection of the Prestressed Concrete Beam(s).

Additionally, the MassDOT Inspector will monitor the adequacy of the Fabricator's Quality Control activities. MassDOT Inspector Acceptance activities performed at the Fabricator's plant shall remain independent from the Fabricator, and does not replace the Fabricator's required Quality Control activities.

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2. Sampling and Testing.

At a minimum, the MassDOT Inspector will perform random Acceptance sampling and testing for each Sublot of concrete produced as specified in *Table 2: Acceptance Sampling and Testing.* The MassDOT Inspector will also perform Acceptance sampling and testing on concrete that has been retempered with admixtures or hold-back water during production. Test Specimens will conform to the requirements of Section M4.02.13 of the MassDOT Standard and Supplemental Specifications and AASHTO R 60.

Table 2: Acceptance Sampling and Testing

Quality Characteristic	Test Method	Sample Size	Specification Limit	Lot Size [c]	Sublot Size [d]	Frequency	Point of Sampling
Slump (in.) [a]	AASHTO T 119	Per AASHTO	≤ 8 in. or as approved by the Engineer	Total Quantity of Beams fabricated on a Contract, per Bid Item, per Mix Design	One (1) Beam	One (1) per Sublot or fraction thereof	Point of Discharge
Air Content (%)	AASHTO T 152	Per AASHTO	5% ≤ % ≤ 8%				
Temperature (°F)	AASHTO T 309	Per AASHTO	50°F ≤ °F ≤ 90°F				
Compressive Strength (psi)	AASHTO T 22 AASHTO T 23	7-day Cylinders: One (1) set of Three (3) 4 x 8 in.	For Information at 7 days				
		28-day Cylinders: One (1) set of Three (3) 4 x 8 in.	≥ 100% f'_c at 28 days				
		56-day Cylinders: One (1) set of Three (3) 4 x 8 in.	≥ 100% f'_c at 56 days [b]				

Notes:

(a) Self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.
(b) 56-day Compressive Strength test specimens shall require testing only when 28-day Compressive Strength test specimens have failed to meet Design Strength (f'_c).
(c) Lot shall be defined as a specific quantity of material from a single source, produced or placed by the same controlled process.
(d) Sublot shall be defined as an equal division or part of a Lot from which a sample of material is obtained in order to assess the Quality Characteristics of the Lot.

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MATERIALS

A. Materials.

Materials shall meet the following specifications (if applicable):

General	M4.00.00
Portland Cement	M4.01.0
Blended Hydraulic Cements	M4.01.1
Fly Ash	M4.01.2
Cement Concrete	M4.02.00
Cement	M4.02.01
Cement Mortar	M4.02.15
Aggregates	M4.02.02
Lightweight Aggregates	M4.02.03
Water	M4.02.04
Cement Concrete Additives	M4.02.05
Proportioning	M4.02.06
Mixing and Delivery	M4.02.10
Test Specimens	M4.02.13
Mortar for Filling Keyways	M4.04.0
Slag	AASHTO M 302
High Performance Cement Concrete	M4.06.1
Self-Consolidating Concrete (SCC)	M4.02.17
Prestressing Strands	AASHTO M 203
Reinforcing Bars	M8.01.0
Epoxy Coated Reinforcing Bars	M8.01.7
Welded Wire Reinforcement	M8.01.2
Mechanical Reinforcing Bar Splicer	M8.01.9
Strand Chuck	M8.15.0
Lifting Devices	PCI MNL-116

1. Cement Concrete Mix Design.

The cement concrete shall be comprised of specified proportions of water and MassDOT approved aggregates, cement, supplementary cementitious materials (SCMs), and admixtures to form a homogenous composition. When used, self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.

The Fabricator is responsible for developing the concrete mix to be used for fabricating prestressed beams and having it prequalified by the MassDOT Research and Materials Section. The mix design compressive strength shall be as shown on the plans and as prequalified by the MassDOT Research and Materials Section. Prequalification shall include the trial batch testing shown in Table 3. For previously prequalified mixes, the Fabricator shall perform any tests specified in Table 3 that were not previously performed.

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If the concrete mix has not been prequalified by the MassDOT Research and Materials Section, the Fabricator shall design and submit for approval, the proportions and test results for a concrete mix that shall attain the requirements specified in Table 3. The proposed mix design and all required test results shall be submitted to the MassDOT Research and Materials Section for approval. Requirements for additional testing and receipt of additional documentation from the Fabricator will be determined by RMS. Unsatisfactory results or other conditions identified during this additional testing and additional documentation review, will require re-submission of a new mix design for review and approval.

The mix shall be formulated with calcium nitrite corrosion inhibitors, which shall be added at a rate of 3 gallons per cubic yard of concrete in order to increase the active corrosion threshold to 9.9 pounds of chloride per cubic yard of concrete at the reinforcing bar level.Prior to production of cement concrete, the Fabricator shall report and submit all proposed mix design formulations and its constituent materials onto the MassDOT Cement Concrete Mix Design Sheet to the MassDOT Research and Materials Section for review and approval. All mix design yields shall be designed for 1.0 cubic yards of concrete, with an allowable tolerance of +/- 1.0 %. All liquids incorporated into the proposed mix design(s) shall include both water and admixtures in the liquid mass calculation.

During production of cement concrete, the Fabricator shall not alter the previously approved mix design formulation or its constituent materials. Proposed alterations in source, type, batch quantity, or gradation to any of the constituent materials of the previously approved mix design formulation shall require a new MassDOT Mix Design Sheet submission to the MassDOT Research and materials Section for review and approval. Fabrication shall not occur without prior MassDOT mix design approval. All concrete used for prestressed concrete beams shall be batched by the Fabricator producing the prestressed concrete beams. The use of ready-mix concrete batched by others shall not be permitted.

The Fabricator shall notify MassDOT RMS to schedule trial batch testing for the new mix design(s). Trial batch testing shall meet the following requirements:

(a) Performed by a qualified laboratory and/or AASHTO accredited laboratory.
(b) Performed and/or sampled in the presence of a MassDOT Inspector.
(c) Meet the requirements as specified in *Table 3: Trial Batch Sampling Testing for New Mix Designs*. Self-consolidating concrete (SCC) shall meet M4.02.17.

Failure to perform all of the required trial batch testing or provide MassDOT RMS trial batch test results within the Specification Limits (as specified in Table 3) will result in the disqualification of the Fabricator's proposed mix design(s).

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Table 3: Trial Batch Sampling and Testing for New Mix Designs

Quality Characteristic	Test Method	Sample Size	Specification Limit	Performed By
Slump [(a)]	AASHTO T 119	Per AASHTO	Max. 8 inches or as approved by the Engineer	Quality Control
Air Content (AC)	AASHTO T 152	Per AASHTO	$5\% \leq AC \leq 8\%$	Quality Control
Temperature (°F)	AASHTO T 309	Per AASHTO	$50°F \leq °F \leq 90°F$	Quality Control
Compressive Strength [(b)]	AASHTO T 22 AASHTO T 23	28-day Cylinders: One (1) set of Three (3) 4 x 8 in.	Lab Mixed $f'_{cr} = 1.3\ f'_c$ at 28 days	MassDOT
			Batch Mixed $f'_{cr} = 1.2\ f'_c$ at 28 days	
Alkali-Silica Reaction (ASR) [(d)]	ASTM C 1567	Per ASTM	M4.02.00	Quality Control
Resistance to Chloride Ion Penetration Chloride Ion Penetration [(e)]	AASHTO T 358 [(f)]	28-day Cylinders: One (1) set of Three (3) 4 x 8 in.	Resistivity ≥ 21 kΩ-cm at 28 days	MassDOT
Freeze/Thaw Durability [(c)]	AASHTO T 161 (Procedure A)	Per AASHTO	Relative Dynamic Modulus of Elasticity after 300 cycles ≥ 80%	Quality Control

Notes:

(a) Self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.

(b) Trial batch compressive strength testing shall be performed by MassDOT. Acceptance will be based on compressive strength testing performed by MassDOT. For mixes requiring $f'_c > 8{,}000$ psi, three consecutive trial batches shall be performed, all achieving $f'_{cr} \geq 1.1\ f'_c$, for MassDOT approval.

(c) If an AASHTO accredited laboratory is preparing the trial batch test specimens, MassDOT Acceptance presence is not required. If the Fabricator is preparing the trial batch test specimens, MassDOT Acceptance presence is required during trial batch test specimen preparation.

(d) Alkali Silica Reaction (ASR) testing shall meet the requirements of M4.02.00. Independent laboratories performing ASR testing shall be listed on the MassDOT Quality Construction Materials List (QCML).

(e) Calcium nitrite shall be removed from mix designs containing the admixture and replaced by an equivalent quantity of water when preparing Chloride Ion Penetration resistance trial batch test specimens.

(f) The Wenner probe tip spacing "a" shall be 1.5.

2. Reinforcement and Prestressing Strands.

The size and grade of steel reinforcement and prestressing strands shall be as indicated on the plans. All reinforcing steel shall be epoxy coated, Grade 60. All prestressing strands shall be uncoated.

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3. Threaded Inserts

Threaded inserts are permissible in Prestressed Concrete Beams for installing formwork, utility supports, or deck drains. Threaded inserts shall be hot dip galvanized or made of stainless steeland shall not come in contact with the reinforcing steel. The number of threaded inserts installed for the Contractor's convenience shall be kept to a minimum.

CONSTRUCTION METHODS – PLANT FABRICATION

A. Shop Drawings

Prior to performing any work under this Section, the Contractor shall receive approval for all shop drawings for the Prestressed Concrete Beam being worked on and any special Contract requirements, provided that a complete shop drawing package is provided. The Contractor shall not order materials or begin work before receiving approved shop drawings. MassDOT will reject any Prestressed Concrete Beams that deviate from the approved drawings or are fabricated prior to receiving written approval of the shop drawings. The Contractor shall bear full responsibility and costs for all materials ordered or work performed prior to the approval of the shop drawings or written authorization from MassDOT.

The Contractor shall submit scaled shop drawings to the Engineer of Record for review and approval. Upon approval, the Engineer of Record will forward two (2) sets of scaled, full size (minimum 24x36") paper copies of the Approved (or Approved As Noted) shop drawings to the MassDOT Director of Research and Materials. Calculations are not to be included in any submittal to the Research and Materials Section. An approval stamp shall appear on every shop drawing sheet. Wet-stamping or wet-signing is not required, provided that the stamp and reviewer name are legible. The Fabricator's name and address shall appear on each sheet.

Resubmittal of "Approved as Noted" shop drawings is not necessary for minor revisions, provided that the correction can be clearly understood and is unambiguous without possibility of misinterpretation. Shop drawings with questions or comments that require a response and/or additional information from the Fabricator must be resubmitted.

Detailed shop drawings shall be prepared in accordance with the relevant provisions of Subsection 5.02 and shall, at a minimum, contain the following:

- Number and type of Prestressed Concrete Beams including overall length, width and height.
- Skew angle.
- Location and spacing of strands, draped strands and their geometry, and/or location and spacing of strands to be debonded including the length of each strand's debondment.
- Location, size and geometry of all steel reinforcement, and mechanical reinforcing bar splicers if called for on the plans.
- Location and details of all inserts, anchors, and any other items required to be cast into the Prestressed Concrete Beams (whether detailed on the plans by the Engineer of Record or provided for the Contractor's convenience). Prestressed Concrete Beams shall not be fired or drilled into for attachment purposes. All hardware shall be galvanized except as noted.
- Locations and details of the lifting devices, including supporting calculations, type and amount of any additional reinforcing required for lifting. The Fabricator shall design all lifting devices based on the no cracking criteria in Chapter 8 of the PCI Design Handbook (7^{th} edition).
- The minimum compressive strength required prior to release of prestressing and prior to handling the Prestressed Concrete Beam.

ITEM 995.01 (Continued)

The shop drawings shall not include procedures for placement, finishing, and curing of concrete. These details shall be included in the Placement, Finishing and Curing Plan that is to be submitted to MassDOT Research and Materials Section as described under *Placement, Finishing, and Curing Plan*.

B. Fabrication.

All Prestressed Concrete Beams shall be fabricated in accordance with the latest edition of PCI MNL-116 as modified herein.

C. Placement, Finishing and Curing Plan.

At least 30 days prior to start of fabrication, the Contractor shall submit the Fabricator's proposed Placement, Finishing and Curing Plan to the Engineer for approval by MassDOT Research and Materials Section. This shall be an independent submittal, separate from the fabrication shop drawings. The Placement, Finishing and Curing Plan shall include the following:

- Method of Mixing
- Method of Placement
- Method of Consolidation
- Method of Finishing
- Method of Initial Curing
- Method of Intermediate Curing
- Method of Final Curing
- Moisture Retention Materials and Equipment (water spray equipment, saturated covers, sheet materials, liquid membrane-forming compounds, accelerated curing equipment, etc.)
- Cylinder Curing Methods, Location, and Environmental Control (temperature, humidity, etc.)
- Temperature Monitoring, Recording, and Reporting

D. Dunnage Plan Shop Drawings.

At least 30 days prior to the start of fabrication, the Contractor shall submit proposed Dunnage Plan Shop Drawings to the Engineer of Record for review and approval. This shall be an independent submittal, separate from the fabrication shop drawings. Upon approval, the Engineer of Record will forward two (2) sets of scaled, full size (minimum 24"x36") paper copies of the Approved (or Approved As Noted) Dunnage Plan Shop Drawings to the MassDOT Director of Research and Materials. Calculations are not to be included in any submittal to the Research and Materials Section. The Dunnage Plan Shop Drawings shall include the following:

(a) Proposed layout of the Prestressed Concrete Beams for storage in yard and during shipping
(b) Support and blocking point locations
(c) Support and blocking materials

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E. Pre-Production Meeting.

The Contractor shall notify the MassDOT Research and Materials Section to determine if a pre-production meeting will be required to review the specification, shop drawings, curing plan, schedule, and discuss any specific requirements. The meeting shall be held prior to scheduling a MassDOT Inspector (refer to Section *Quality Assurance – Precast Concrete, C. Acceptance, A. Inspection*), and at least seven (7) days prior to the scheduled casting of any Prestressed Concrete Beam or control section. The Contractor shall schedule the meeting, which shall include representatives of the Fabricator and MassDOT.

F. Reinforcement.

The reinforcing bars shall be installed in accordance with Section 901.62 of the Supplemental Specifications, including tolerances for cover and horizontal spacing of bars. Components of mechanical reinforcing bar splicers shall be set with the tolerances shown on the plans. The reinforcing bars and mechanical reinforcing bar splicers shall be assembled into a rigid cage that will maintain its shape in the form and which will not allow individual reinforcing bars to move during the placement of concrete. This cage shall be secured in the form so that the clearances to all faces of the concrete, as shown on the plans, shall be maintained.

G. Placing and Tensioning Strands.

Placing and tensioning strands shall be in accordance with PCI MNL-116. The location of all prestressing strands shall be as indicated on the plans.

H. Tolerances.

Fabrication shall comply with tolerances specified on the plans. Tolerances for steel reinforcement placement shall be in accordance with 901.62. In the absence of specifications on the plans, tolerances shall comply with the latest version of the PCI MNL 135, Precast Tolerance Manual.

I. Forms.

Concrete shall be cast in rigidly constructed forms, which will maintain the Prestressed Concrete Beams within specified tolerances to the shapes, lines and dimensions shown on the approved fabrication drawings. Forms shall be constructed from flat, smooth, non-absorbent material and shall be sufficiently tight to prevent the leakage of the plastic concrete. When wood forms are used, all faces in contact with the concrete shall be laminated or coated with a non-absorbent material. All worn or damaged forms, which cause irregularities on the concrete surface or damage to the concrete during form removal, shall be repaired or replaced before being reused. Any defects or damage of more than "Category 2, Minor Defects" made to the concrete, due to form work, stripping or handling, shall be subject to repair or rejection, as defined in the *Repairs and Replacement* section. If threaded inserts are cast into the elements for support of formwork, the inserts shall be recessed a minimum of 1 inch and shall be plugged after use with a grout of the same color as that of the precast cement concrete.

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J. Mixing of Concrete.

The concrete shall be proportioned and mixed in conformance with the Fabricator's MassDOT approved mix design and M4.02.10 Mixing and Delivery. Fabrication shall not occur without prior MassDOT mix design approval. The Fabricator shall provide copies of batch tickets to the MassDOT Plant Inspector. The MassDOT Plant Inspector will verify if the batch ticket quantities are within the tolerances of the Fabricator's MassDOT approved mix design.

K. Placement of Concrete.

Prior to the placement of concrete, the temperature of the forms shall be greater than or equal to 50°F. Quality Control inspection shall be performed by the Fabricator as specified in the *Fabricator Quality Control* section. Placement of the concrete shall not proceed until the MassDOT Plant Inspector is present to perform inspection and begin monitoring Fabricator Quality Control inspection activities and is in compliance with specifications. The MassDOT Plant Inspector shall inspect and accept the placement of the reinforcing steel and prestressing strands prior to the placement of concrete into the forms. The Fabricator shall verify all materials and equipment required for protecting and curing the concrete are readily available and meet the requirements of the *Final Curing Methods* section below. All items encased in the concrete shall be accurately placed in the position shown on the Plans and firmly held during the placing and setting of the concrete. Clearance from the forms shall be maintained by supports, spacers, or hangers and shall be of approved shape and dimension.

During placement, the concrete shall maintain a concrete temperature range between 50°F and 90°F. The Fabricator shall minimize the time to concrete placement (measured from start of mixing to completion of placement). In no event shall time to placement exceed 90 minutes. The Fabricator shall perform additional Quality Control sampling and testing on concrete that has been retempered with admixtures or hold-back water during the placement of the concrete as specified in the *Fabricator Quality Control* section above. Delays or shutdowns of over 30 minutes shall not be allowed during the continuous filling of individual forms.

L. Consolidation of Concrete.

Suitable means shall be used for placing concrete to prevent segregation or displacement of reinforcing steel or forms. The concrete shall be thoroughly consolidated by external or internal vibrators or a combination of both. Vibrators shall not be used to move concrete within the forms. Vibrators shall be used as specified in 901.63C and as directed by the Engineer. Concrete shall be placed and consolidated in a way that minimizes the presence of surface voids or bug holes on the formed surfaces. When used, self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.

M. Finishing of Concrete.

The top of the prestressed concrete beams shall be given a float finish except for those areas that will have concrete cast against them, which shall receive a rake finish with a ¼" amplitude applied longitudinally along the length of the beam to the limits shown on the plans.

N. Exposed Surfaces of Prestressed Concrete Beams.

As soon as conditions permit, before the concrete has fully hardened, all dirt, laitance, and loose aggregate shall be removed from the exposed concrete surfaces. Contractor shall not allow foot traffic on the uncured concrete until it has reached sufficient strength to prevent damage.

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O. Exposed Surfaces of Shear Keys and Closure Pour Shear Keys.

The closure pour shear key cast in the sides of the beam flanges shall have an exposed aggregate finish. The closure pour reinforcing steel and its coating shall not be damaged by the process for creating the exposed aggregate surface. Fabricator may utilize a surface retarder with water blast, abrasive blast, or a combination of both to achieve the desired shear key finish. The abrasive blast shall use oil free compressed air. The profile of the shear key surfaces shall be similar to that of 60 grit sand paper.

P. Initial Curing Methods.

After the placement of concrete and prior to concrete finishing, the Fabricator shall initiate initial curing methods when the concrete surface begins to dry, to reduce moisture loss from the surface. Application of one or more of the following initial curing methods shall occur immediately after the bleed water sheen has disappeared.

1. Fogging.

Fogging nozzles shall atomize water into a fog-like mist. The fog spray shall be directed and remain visibly suspended above the concrete surface, to increase the humidity of the air and reduce the rate of evaporation. Water from fogging shall not be worked into the surface during finishing operations and shall be removed or allowed to evaporate prior to finishing.

2. Liquid-applied Evaporation Reducers

Evaporation reducers shall be sprayed onto the freshly placed concrete surface to produce an effective monomolecular film that reduces the risk of plastic-shrinkage cracking and rate of evaporation of the bleed water from the concrete surface. Evaporation reducers shall be applied in accordance with manufacturer's recommendations.

Q. Intermediate Curing Methods.

The Fabricator shall initiate intermediate curing methods if concrete finishing has taken place prior to the concrete reaching final set. The freshly finished concrete surface shall be protected from moisture loss, by the continuation of initial curing methods (fogging and evaporation reducers) until final curing methods are applied or by the use of liquid membrane-forming curing compounds (see *Liquid Membrane-Forming Compounds for Curing* section).

R. Final Curing Methods.

The Fabricator shall initiate and apply final curing methods to the concrete immediately after the following conditions are met:

(a) Completion of concrete finishing
(b) Final set of concrete
(c) Concrete has hardened sufficiently enough to prevent surface damage

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During fabrication of Prestressed Concrete Beams, the Fabricator shall maintain the required concrete temperature ranges throughout the entire duration of the final curing method cycle as specified herein. Controlled and gradual termination of the final curing method shall occur after all specified conditions are met. The concrete temperature shall be reduced at a rate not to exceed 36°F per hour until the concrete temperature is within 20°F of the ambient temperature outside of the final curing method enclosure. The Fabricator shall maintain a minimum concrete temperature of 40°F until 100% f'c is attained (see *Handling and Storage* section below).

1. Water Spray Curing.

All exposed concrete surfaces shall remain moist with a continuous fine spray of water throughout the entire duration of the final curing method cycle (see *Table 4: Final Curing Method Cycle for Water Spray*).

Table 4: Final Curing Method Cycle for Water Spray

Sustained Concrete Temperature	Final Curing Method Cycle Duration	Compressive Strength
50°F ≤ °F ≤ 90°F	≥ Five (5) days	≥ 80% f'_c

2. Saturated Covers for Curing.

All exposed concrete surfaces shall remain moist with a continuous application of saturated covers throughout the entire duration of the final curing method cycle (see *Table 5: Final Curing Method Cycle for Saturated Covers*). Saturated covers shall be allowed to dry thoroughly before removal to provide uniform, slow drying of the concrete surface.

Table 5: Final Curing Method Cycle for Saturated Covers

Sustained Concrete Temperature	Final Curing Method Cycle Duration	Compressive Strength
50°F ≤ °F ≤ 90°F	≥ Three (3) days	≥ 80% f'_c

Saturated covers, such as burlap, cotton mats, and other coverings of absorbent materials shall meet the requirements of AASHTO M 182, Class 3. Saturated covers shall be in good condition, free from holes, tears, or other defects that would render it unsuitable for curing concrete. Saturated covers shall be dried to prevent mildew when storing. Prior to application, saturated covers shall be thoroughly rinsed in water and free of harmful substances that are deleterious or cause discoloration to the concrete. Saturated covers shall have sufficient thickness and proper positioning onto the concrete surface to maximize moisture retention.

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Saturated covers shall contain a sufficient amount of moisture to prevent moisture loss from the surface of the concrete. Saturated covers shall be kept continuously moist so that a film of water remains on the concrete surface throughout the entire duration of the final curing method cycle. The Fabricator shall not permit the saturated covers to dry and absorb water from the concrete. Use of polyethylene film (see *Polyethylene Film* section) may be applied over the saturated cover to potentially decrease the need for continuous watering.

3. Sheet Materials for Curing.

All exposed concrete surfaces shall remain moist with a continuous application of curing sheet materials throughout the entire duration of the final curing method cycle (see *Table 6: Final Curing Method Cycle for Curing Sheet Materials*).

Table 6: Final Curing Method Cycle for Sheet Materials

Sustained Concrete Temperature	Final Curing Method Cycle Duration	Compressive Strength
50°F ≤ °F ≤ 90°F	≥ Three (3) days	≥ 80% f'_c

Sheet Materials used for curing, such as polyethylene film, white burlap-polyethylene sheeting, and reinforced paper shall meet the requirements of ASTM C171 and the specifications herein. Sheet materials shall inhibit moisture loss and reduce temperature rise in concrete exposed to radiation from the sun during the final curing method cycle. Adjoining covers shall overlap not less than 12 inches. All edges of the covers shall be secured to maintain a moist environment.

(a) Polyethylene Film.

Polyethylene film shall meet the requirements of ASTM C171, consist of a single sheet manufactured from polyethylene resins, be free of visible defects, and have a uniform appearance. Careful considerations shall be taken by the Fabricator to prevent the film from tearing during storage and application, so as to not disrupt the continuity of the film (polyethylene film reinforced with glass or other fibers is more durable and less likely to be torn). The Fabricator shall monitor the application of the film to prevent uneven spots from appearing (mottling) on the concrete surface, due to variations in temperature, moisture content, or both. The Fabricator shall prevent mottling from occurring on the concrete surface by applying additional water under the film or applying a combination of polyethylene film bonded to absorbent fabric to the concrete surface to retain and evenly distribute the moisture.

Immediately following final finishing, polyethylene film shall be placed over the surface of the fresh concrete surface, so as to not damage the surface of the concrete and shall be placed and weighted so that it remains in contact with the concrete throughout the entire duration of the final curing method cycle. The film shall extend beyond the edges of the concrete surface. The film shall be placed flat on the concrete surface, avoiding wrinkles, to minimize mottling. Edges of adjacent polyethylene film shall overlap a minimum of 6 inches and be tightly sealed with the use of sand, wood planks, pressure-sensitive tape, mastic, or glue to maintain close contact with the concrete surface, retain moisture, and prevent the formation of air pockets throughout the entire duration of the final curing method cycle.

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(b) White Burlap-Polyethylene Sheeting

White burlap-polyethylene sheeting shall meet the requirements of ASTM C171, be securely bonded to the burlap so to avoid separation of the materials during handling and curing of the concrete, and be applied in the same manner as the polyethylene film.

(c) Reinforced Impervious Paper.

Reinforced impervious paper shall meet the requirements of ASTM C171, consist of two sheets of kraft paper cemented together with a bituminous adhesive and reinforced with embedded cords or strands of fiber running in both directions, and be white in color. Reinforced impervious paper shall be treated to prevent tearing when wetted and dried.

Reinforced impervious paper can be reused so long as it is effective in retaining moisture on the concrete surface. The Fabricator shall visually inspect the reinforced impervious paper for all holes, tears, and pin holes from deterioration of the paper through repeated use by holding the paper up to the light. The paper shall be discarded and prohibited from use when the moisture is no longer retained.

After the concrete has hardened sufficiently to prevent surface damage, the concrete surface shall be thoroughly wetted prior to the application of the reinforced impervious paper, and be applied in the same manner as the polyethylene film.

4. Liquid Membrane-Forming Compounds for Curing.

All exposed concrete surfaces shall remain moist with a continuous application of liquid membrane-forming compounds throughout the entire duration of the final curing method cycle (see *Table 7: Final Curing Method Cycle for Liquid Membrane-Forming Compounds*).

Table 7: Final Curing Method Cycle for Liquid Membrane-Forming Compounds

Sustained Concrete Temperature	Final Curing Method Cycle Duration	Compressive Strength
50°F ≤ °F ≤ 90°F	≥ Seven (7) days	≥ 80% f'_c

Liquid membrane-forming compounds shall meet the requirements of ASTM C 1315, Type I, Class A and shall exhibit specific properties, such as alkali resistance, acid resistance, adhesion-promoting quality, and resistance to degradation by ultraviolet light, in addition to moisture-retention capabilities. Liquid membrane-forming compounds shall consist of waxes, resins, chlorinated rubber, or other materials to reduce evaporation of moisture from concrete. Liquid membrane-forming compounds shall be applied in accordance with the manufacturer's recommendations.

Liquid membrane-forming compounds shall be applied immediately after the disappearance of the surface water sheen following final finishing. All exposed surfaces shall be wetted immediately after form removal and kept moist to prevent absorption of the compound, allowing the curing membrane to remain on the concrete surface for proper membrane moisture retention. The concrete shall reach a uniformly damp appearance with no free water on the surface prior to the application of the compound.

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If patching or finishing repairs are to be performed prior to the application of the compound, the Precast Concrete Bridge Element shall be covered temporarily with saturated covers until the repairs are completed and the compound is applied. Only areas being repaired shall be uncovered during this period. While the saturated covers are removed to facilitate the patching process, the work shall continue uninterrupted. If for any reason the work is interrupted, saturated covers shall be placed onto the uncovered concrete surface, until the work continues and is completed, at which time the curing compound shall be applied to the repaired area.

Careful considerations shall be made by the Fabricator to determine if the evaporation rate is exceeding the rate of bleeding, thus causing the surface to appear dry even though bleeding is still occurring. Under such conditions, the application of liquid membrane-forming compounds to the concrete surface shall be delayed, in order to prevent bleed water from being sealed below the concrete surface and avert map cracking of the membrane films, reduction in moisture-retention capability, and reapplication of the compound. To diagnose and prevent this condition, the Fabricator shall place a transparent plastic sheet over a test area of the uncured and unfinished concrete surface and shall determine if any bleed water accumulates under the plastic.

The compound shall be applied in two applications at right angles to each other to ensure uniform and more complete coverage. On very deeply textured surfaces, the surface area to be treated shall be at least twice the surface area of a troweled or floated surface. In such cases, two separate applications may be needed, each at 200 ft^2/gal., with the first being allowed to become tacky before the second is applied.

The curing compound shall be applied by power sprayer, using appropriate wands and nozzles with pressures between 25 and 100 psi. For very small areas such as repairs, the compound shall be applied with a wide, soft-bristled brush or paint roller. The compound shall be stirred or agitated before use and applied uniformly in accordance with the manufacturer's recommended rate. The Fabricator shall verify the application rates are in accordance with the manufacturer's recommended rate.

When the concrete surface is to receive paint, finishes, or toppings that require positive bond to the concrete, it is critical that the curing procedures and subsequent coatings, finishes, or toppings be compatible to achieve the necessary bond

After the termination of the final curing method cycle has occurred, liquid membrane-forming compounds shall be removed by blast-cleaning from any concrete surface that is to receive paint, finishes, plastic concrete from secondary pour, grout, or any other toppings that require bonding to the concrete surface. These surfaces shall be further blast-cleaned to remove the cement matrix down to exposed aggregate to ensure proper bonding to the material. The method used to remove the curing compound shall not damage the reinforcement and coating. Compounds are prohibited on any concrete surface that will have a penetrating or coating type treatment such as a sealer, stain, or waterproofing membrane applied to it.

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5. Accelerated Curing.

Accelerated curing shall use live steam or radiant heat with moisture in accordance with PCI MNL-116 as modified herein. The concrete temperature shall meet the maximum heat increase and cool down rates as specified herein. Concrete temperature monitoring shall meet the requirements of the *Temperature Monitoring* section. Excessive and fluctuating rates of heating and cooling shall be prohibited. The concrete temperature shall not exceed 158°F at any time. The Fabricator shall meet the following accelerated curing sequencing and requirements.

(a) Initial Delay Period.

The initial delay period shall be defined as the duration immediately following the placement of the concrete and the attainment of initial set of the concrete. The Fabricator shall determine the time of initial set in accordance with AASHTO T 197 specifications. Throughout the entire duration of the initial delay period, initial curing shall be implemented. The temperature increase period (see *Temperature Increase Period* section) shall not occur until initial set of the concrete is attained. During the initial delay period, the concrete temperature shall meet the following requirements:

i. Concrete temperature rate of increase shall not exceed 10°F per hour.
ii. Total concrete temperature increase shall not exceed 40°F higher than the placement concrete temperature or 100°F, whichever is less

(b) Temperature Increase Period.

The temperature increase period shall be defined as the duration immediately following the completion of the initial delay period (after initial set) and immediately prior to the start of the constant maximum temperature period. Application of steam to the enclosure shall not occur until the initial delay period is complete. After the initial delay period is complete, all exposed concrete surfaces shall be cured in a moist environment where the concrete temperature increases at a rate not to exceed 36°F per hour.

(c) Constant Maximum Temperature Period.

The constant maximum temperature period shall be defined as the duration immediately following the completion of the temperature increase period and immediately prior to the start of the temperature decrease period. After the temperature increase period is complete, all exposed concrete surfaces shall be cured in a moist environment at a controlled and constant elevated temperature throughout the entire duration of the constant maximum temperature period. Termination of the constant maximum temperature period and the start of the termination decrease period shall occur after all specified conditions are met (see *Table 8: Constant Maximum Temperature Period*).

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Table 8: Constant Maximum Temperature Period

Sustained Concrete Temperature	Constant Maximum Temperature Period	Compressive Strength
120°F ≤ °F ≤ 158°F	6 hrs ≤ Time ≤ 48 hrs	≥ 80% f'_c

(d) Temperature Decrease Period.

After the constant maximum temperature period is complete, the concrete temperature shall be cured in a moist environment at a controlled and reduced rate not to exceed 36°F per hour until the concrete temperature is within 20°F of the ambient temperature outside of the curing enclosure.

S. Release.

The Fabricator shall not release strands or handle the Prestressed Concrete Beam until Quality Control compressive strength cylinders attain a minimum compressive strength of 80% Design Strength (f'_c) or the specified detensioning compression strength as indicated on the approved shop drawings has been achieved. All exposed concrete surfaces shall continue to be cured in conformance with the *Final Curing Methods* sections until completion.

T. Handling and Storage of Prestressed Concrete Beams.

Prestressed Concrete Beams may be exposed to temperatures below freezing (32°F) when the chosen curing cycle has been completed, provided that the following conditions are met:

(a) Prestressed Concrete Beams are protected from precipitation with polyethylene curing covers until 100% f'_c is attained
(b) Prestressed Concrete Beams maintain a minimum concrete temperature of 40°F until 100% f'_c is attained

Prestressed Concrete Beams damaged during handling and storage will be repaired or replaced at MassDOT's direction at no cost to MassDOT. Prestressed Concrete Beams shall be lifted at the designated points by approved lifting devices embedded in the concrete and in accordance with proper lifting and handling procedures. Storage areas shall be smooth and well compacted to prevent damage due to differential settlement. Prestressed Concrete Beams shall be supported on the ground by means of continuous blocking, in accordance with the approved dunnage plan.

Prestressed Concrete Beams shall be loaded on a trailer with blocking as described above, in accordance with the approved dunnage plan. Shock-absorbing cushioning material shall be used at all bearing points during transportation of the Prestressed Concrete Beams. Blocking shall be provided at all locations of tie-down straps. Prestressed Concrete Beams stored prior to shipment shall be inspected by the Contractor prior to being delivered to the site to identify damage that would be cause for repair or rejection.

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U. Repairs and Replacement.

In the event defects are identified, they shall be classified in the following categories and a non-conformance report (NCR) shall be filed if required. The NCR shall be submitted to MassDOT for review. Defects in all categories shall be documented by plant Quality Control personnel and made available to MassDOT upon request. Any required repairs shall utilize materials listed on the MassDOT QCML.

Where noted, defects shall be repaired according to the PCI Northeast Region Guidelines for Resolution of Non-Conformances in Prestressed Concrete Beams, Report Number PCINE-18-RNPCBE. Please note that reference to PCINE-18-RNPCBE is made for repair details only. In the case of conflicts with this Special Provision, this Special Provision shall govern.

1. Category 1, Surface Defects.

Category 1 defects do not need to be repaired, and an NCR does not need to be filed. Surface defects are defined as the following:

(a) Surface voids or bug holes that are less than 5/8-inch in diameter and less than ¼-inch deep, except when classified as Category 4
(b) Cracks less than or equal to 0.006 inches wide
(c) Cracks less than or equal to 0.125 inches wide on surfaces that will receive a concrete overlay or spray-applied membrane waterproofing

2. Category 2, Minor Defects.

Category 2 defects shall be repaired, but an NCR does not need to be filed. Minor defects are defined as the following:

(a) Spalls, honeycombing, surface voids that are less than 2 inches deep and have no dimension greater than 12 inches
(b) Cracks less than or equal to 0.016 inches that will not receive a concrete overlay or spray-applied membrane waterproofing
(c) Broken or spalled corners that will be covered by field-cast concrete

Minor defects shall be repaired according to PCINE-18-RNPCBE. Cracks shall be sealed according to the PCI Repair Procedure #14 in PCINE-18-RNPCBE.

3. Category 3, Major Defects.

For Category 3 defects, the Fabricator shall prepare an NCR that documents the defect and describes the proposed repair procedure. The NCR shall be submitted to MassDOT for approval prior to performing the repair. Major defects are defined as the following:

(a) Spalls, honeycombing and surface voids that are deeper than 2 inches or have any dimension greater than 12 inches, when measured along a straight line
(b) Concentrated area of defects consisting of four or more Category 2 Defects within a 4-square foot area
(c) Exposed reinforcing steel
(d) Cracks greater than 0.016 inches and less than or equal to 0.060 inches in width that will not receive a concrete overlay or spray-applied membrane waterproofing

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(e) Bearing area spalls with dimensions not exceeding 3 inches
(f) Cracks, spalls and honeycombing that will be encased in cast in place concrete need not be repaired, but the limits and location of the defects shall be documented with an NCR

Upon MassDOT approval, defects and cracks shall be repaired according to PCINE-18-RNPCBE and this specification. All repairs shall be completed at the expense of the Contractor.

4. Category 4, Rejectable Defects.

Rejectable defects as determined by the MassDOT Inspector, RMS, and Engineer may be cause for rejection. Fabricator may submit an NCR with a proposed repair procedure, requesting approval. Some rejectable defects are defined as the following:

(a) Surface defects on more than 5% of the surface area which will be exposed to view after installation
(b) Minor defects that in total make up more than 5% of the surface area of the unit
(c) Cracks greater than 0.060 inches in width except as noted in Category 1
(d) Elements fabricated outside of the specified tolerances
(e) MassDOT compressive strength testing that does not meet the specified Design Strength, f'_c

V. Loading.

Prior to the Fabricator loading the Precast Bridge Element on to the truck for shipping, the Fabricator shall provide the MassDOT Plant Inspector and RMS a minimum seven (7) days' notice of the Fabricator's intent to load the Precast Bridge Element. Inspection by the MassDOT Plant Inspector shall take place while the element is still on dunnage in the yard. The element shall not be loaded onto the truck until the MassDOT Plant Inspector has performed the inspection.

W. Shipping.

Prior to shipment, the Fabricator shall perform the following actions and provide the required documentation to the MassDOT Plant Inspector:

(a) Prestressed Concrete Beams shall remain at the Fabricator's plant for a minimum of 7 days after cast date.
(b) QC Inspection Reports shall be signed by the Quality Control Manager and provided to the MassDOT Plant Inspector.
(c) QC Compressive Strength Test Report Forms attaining Design Strength, f'c for the Prestressed Concrete Beam's representative sublot shall be generated by the Fabricator and provided to the MassDOT Plant Inspector.
(d) Certificate of Compliance shall be generated by the Fabricator as described under the Fabricator Quality Control section and provided to the MassDOT Plant Inspector.
(e) All MassDOT RMS approved Corrective Actions submitted on the Non-Conformance Reports (NCR), shall be verified to have been completed by the MassDOT Plant Inspector and Quality Control Manager.
(f) All NCRs shall be signed off by the Quality Control Manager, MassDOT Inspector and MassDOT RMS.

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X. Delivery.

Upon Delivery, the following documentation shall be provided to the MassDOT Resident Engineer or designee:

(a) QC Compressive Strength Test Report Forms attaining Design Strength, f'c for the Prestressed Concrete Beam's representative sublot.
(b) Certificate of Compliance generated by the Fabricator as described under the Fabricator Quality Control section.
(c) QC Inspection Reports signed by the Quality Control Manager.

The Contractor shall inspect the Prestressed Concrete Beams upon receipt at the site. Prestressed Concrete Beams damaged during delivery shall be repaired or replaced at MassDOT's direction at no cost to MassDOT.

CONSTRUCTION METHODS – FIELD CONSTRUCTION

A. General.

All of the Contractor's field personnel involved in the erection and assembly of the Prestressed Concrete Beams shall have knowledge of and follow the approved Erection Procedure and Quality Control Plan for Prestressed Concrete Beam Assembly.

Prior to installation, the following documentation shall be reviewed and confirmed by the Engineer or designee:

(a) QC Compressive Strength Test Report Forms attaining Design Strength, f'_c for the Prestressed Concrete Beam's representative sublot.
(b) Certificate of Compliance generated by the Fabricator as described under the Fabricator Quality Control section.
(c) QC Inspection Reports signed by the Quality Control Manager.

Field construction staff shall verify that the Engineer has accepted all Prestressed Concrete Beams prior to installation.

B. Erection Procedure and Quality Control Plan for Prestressed Concrete Beam Assembly.

Prior to the erection, the Contractor shall submit an Erection Procedure and a Quality Control Plan for Prestressed Concrete Beam Assembly for approval by the Engineer. This submittal shall include computations and drawings for the transport, hoisting, erection and handling of the Prestressed Concrete Beams. The Erection Procedure and Quality Control Plan for Prestressed Concrete Beam Assembly shall be prepared and stamped by a Professional Engineer registered in the Commonwealth of Massachusetts with working knowledge of the Contractor's equipment, approved shop drawings, and materials to build the bridge. The Erection Procedure and Quality Control Plan for Prestressed Concrete Beam Assembly shall, at a minimum, include the following:

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1. Erection Procedure

The Erection Procedure shall be prepared to conform to the requirements of 960.61, Erection and the applicable sections in Chapter 8 of the PCI Design Handbook (seventh edition) for handling, erection, and bracing requirements. At a minimum, the Erection Procedure shall provide:

(a) Steel reinforcing details, and location and details of lifting devices
(b) Minimum concrete compressive strength for handling the Prestressed Concrete Beams.
(c) Concrete stresses stresses during handling, transport, and erection.
(d) Crane capacities, pick radii, sling geometry, and lifting hardware.
(e) Verification that the equipment can handle all pick loads and weights with the required factor of safety.
(f) Evaluation of construction sequence and evaluation of any geometric conflicts in the lifting of the Prestressed Concrete Beams and setting them on the abutments and piers.
(g) Design of crane supports including verification of subgrade for support.
(h) Location and design of all temporary bracing that will be required during erection.

2. Quality Control Plan for Prestressed Concrete Beam Assembly

The Quality Control Plan for Prestressed Concrete Beam Assembly is a document prepared and submitted by the Contractor prior to the start of work which requires the Contractor to identify and detail the sequence of construction in accordance with the project schedule and which clearly identifies all stages of field construction. The assembly procedures for the Prestressed Concrete Beams shall be submitted on full size 24"x36" sheets. This document will be treated as a Construction Procedure and will be reviewed by both the Designer and the District Construction Office.

At a minimum, the Quality Control Plan for Prestressed Concrete Beam Assembly shall include the following:

(a) Listing of the equipment, materials, and personnel including their assigned responsibilities that will be used to erect and assemble the Prestressed Concrete Beams on site.
(b) Documentation of all preparatory work necessary for moving personnel, equipment, supplies, and incidentals to the project site before beginning work.
(c) Detailed schedule showing the sequence of operations that the Contractor will follow to complete the field construction from setting working points and working lines to the casting of closure pours and the curing of the closure pour concrete, as described below and as called for on the plans.
(d) For NEDBT and NEXT D beams, Contractor's means for ensuring that the Prestressed Concrete Beam shall align to the roadway profile and cross slope and means for adjusting the final deck slab elevation.
(e) Timeline and descriptions of Quality Control activities to be followed throughout the field construction operations including methods and procedures for controlling tolerance limits both horizontally and vertically.

C. Survey and Layout.

Working points, working lines, and benchmark elevations shall be established prior to placement of all elements. The Contractor is responsible for field survey as necessary to complete the work. MassDOT reserves the right to perform additional independent survey. If discrepancies are found, the Contractor may be required to verify previous survey data.

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D. Prestressed NEDBT.

1. Beam Layout and Erection.

Prestressed concrete beams shall be installed to the line and grade shown on the plans in accordance with the Contractor's approved Erection Procedure and Assembly Plan. As the beams are being erected, temporary blocking or bracing shall be installed to prevent the beams from tipping over. The detail and calculations for this bracing shall be included with the erection procedure submittal.

Immediately prior to erecting the beams, the closure pour shear keys shall be cleaned at the job site of all dust, dirt, and carbonation using a high-pressure water blast. In addition, the surfaces of the shear keys shall be wetted so that the surfaces shall have a Saturated Surface Dry (SSD) condition for at least 24 hours prior to the placement of the closure pour concrete.

As the beams are being erected, the Contractor shall monitor the width of the closure pours and the out-to-out width of the beams top flanges so that, after all beams are erected, the actual overall width of the bridge deck shall not deviate from the dimension shown on the plans beyond a tolerance of +0 inches and -1 inches. In order to achieve this, the Contractor may vary the width of the closure pours within the tolerances specified on the plans.

2. Diaphragms.

After the intermediate reinforced concrete diaphragms have been poured and allowed to reach a minimum of 70% of the required 28-day strength, the temporary bracing may be removed. The placement of the deck concrete will not be permitted until these concrete diaphragms have been installed and have reached this minimum strength.

The sequence for placing the abutment end diaphragm, integral abutment diaphragm and the pier diaphragm concrete shall be as shown on the plans.

3. Closure Pour Concrete Placement.

Prior to placing the closure pour concrete, the abutments and piers shall be prepared for the placement of the closure pour concrete as called for on the plans.

The closure pour shear keys shall be free of materials such as paint, oil, curing compound, bond breaker, dirt etc. that will inhibit bonding. The closure pour shear keys shall be hydro-blasted with equipment that can remove asphaltic material, oils, dirt, rubber, curing compounds, paint carbonation, laitance, and other potentially detrimental materials, which may interfere with the bonding of the closure pour concrete and precast concrete.

The exposed reinforcing steel in the precast slab shall be protected from damage during the cleaning of the closure pour shear keys. Damaged epoxy coating of steel reinforcement shall be repaired, and the reinforcing steel shall be cleaned as directed by the Engineer.

The Contractor shall cut the lifting devices off below the top of the beam, and the recesses shall be filled with mortar (M4.02.15). The Contractor shall also remove projections and fill all depressions in the tops of the beams with mortar (M4.02.15).

After the formwork has been removed, all threaded inserts that have been cast into the beams for support of the formwork shall be plugged with a grout of the same color as that of the precast concrete.

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PRECAST PILE CAP UNITS
PRECAST ABUTMENT UNITS
PRECAST APPROACH SLAB UNITS
PRECAST WINGWALLS
PRECAST HIGHWAY GUARDRAIL TRANSITIONS

A. General.

The work under this Heading consists of fabricating, transporting and installing precast pile cap units, precast abutment stem units, precast approach slab units, precast wingwalls, precast highway guardrail transitions and includes all necessary labor, materials, and equipment to complete the work as shown on the Plans. The work shall conform with the MassDOT Standard, Supplemental, and Interim Specifications and the requirements of the current AASHTO LRFD Bridge Construction Specifications, supplemented by the current relevant provisions of the latest edition of PCI MNL-116 (The Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products), except as noted herein.

QUALITY ASSURANCE

A. General.

Quality Assurance includes all the planned and systematic actions necessary to provide confidence that a product or facility will perform satisfactorily in service. It is an all-encompassing term that includes Quality Control (performed by the Fabricator) and Acceptance (performed by MassDOT). Quality Control is the system used by the Contractor and Fabricator to monitor and assess their production processes at the plant facility and installation activities at the project site to ensure that the final product will meet the specified level of quality. Acceptance includes all factors used by MassDOT to determine the corresponding value for the product. MassDOT Acceptance inspection at the plant facility is intended as a means of evaluation of compliance with contract requirements. Contractor and Fabricator Quality Control activities and MassDOT Acceptance activities shall remain independent from one another. MassDOT Acceptance activities shall not replace Fabricator Quality Control activities.

B. Fabricator Quality Control.

Quality Control shall be performed by the Fabricator to ensure that the product is fabricated in conformance with the specifications herein. The Fabricator shall maintain a Quality Control system to monitor, assess, and adjust placement and fabrication processes to ensure the Precast Concrete Bridge Element(s) meet the specified level of quality, through sufficient Quality Control sampling, testing, inspection, and corrective action (where required). The Fabricator's Quality Control system shall address all key activities during the placement and fabrication and shall be performed in conformance with the Fabricator's NPCA or PCI Certification. Quality Control documentation shall meet the requirements of the *Fabricator Quality Control – Documentation* section below. Upon request, Fabricator Quality Control documentation shall be provided to the MassDOT Plant Inspector.

1. Plant.

Prior to the fabrication of Precast Concrete Bridge Elements, the Fabricator's precast concrete plant shall obtain the following:

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(a) Certification by the National Precast Concrete Association (NPCA) Plant Certification Program or Precast/Prestressed Concrete Institute (PCI) Plant Certification Program, for the applicable types of Precast Concrete Bridge Element(s) being fabricated
(b) MassDOT Prequalification
(c) MassDOT Mix Design Approval

All concrete for a given Precast Concrete Bridge Element shall be produced by a single company and plant, unless otherwise approved by the Engineer.

2. Personnel.

The Fabricator shall provide adequate training for all QC personnel in accordance with NPCA or PCI certification. There shall be sufficient personnel trained and certified to perform the tests listed under Subsection M4.02.13, Part D. At a minimum, the Fabricator's Quality Control Personnel shall maintain the following qualifications and certifications:

(a) QC Manager with an active NETTCP Field Technician or ACI Concrete Field Testing Technician – Grade I certification or higher, and a minimum of 4 years continuous experience in the manufacture of Precast Concrete Bridge Elements for state transportation departments. The QC Manager shall be on site while the batch plant is producing and placing concrete for MassDOT projects.
(b) A Technician/Inspector having the Precast/Prestressed Concrete Institute (PCI) Technician/Inspector Level I or NorthEast Transportation Training and Certification Program (NETTCP) Precast Concrete Inspector, or higher.

The Contractor shall submit to the Engineer a copy of the Fabricator's Quality Control Personnel required qualifications, as specified above.

3. Laboratory.

The Fabricator shall provide a room of sufficient size to house all equipment and to adequately perform all testing. The room shall have either a separate moisture storage room or curing box for concrete cylinders, and it shall be thermostatically controlled to maintain temperatures consistent with AASHTO T 23. It shall include a desk and file cabinet for proper record keeping, and have good lighting and ventilation. This room shall be kept for testing and quality control and not used for any other purpose. An additional desk and file cabinet shall be provided for exclusive use of the Engineer. No exception from these requirements will be allowed without the express written permission of the Engineer.

4. Testing Equipment.

At a minimum, the Fabricator's plant facility shall have the following testing equipment:

(a) Air Content Meter Type A or B: AASHTO T 152
(b) Air Content Meter Volumetric Method: AASHTO T 196 (Required for Lightweight Concrete)
(c) Slump Cone: AASHTO T 119
(d) Cylinder Molds AASHTO M 205

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(e) Concrete Testing Machine: AASHTO T 22
(f) Screening Sieve: AASHTO T 27, AASHTO T 11
(g) Curing Box: AASHTO T 23
(h) Spread Test Base Plate for Self-Consolidating Concrete (SCC): ASTM C1611
(i) All other equipment prescribed by AASHTO and ASTM standards for the tests to be performed by the Fabricator as specified

5. Inspection.

Quality Control personnel shall monitor and inspect the fabrication of each Precast Concrete Bridge Element. Quality Control personnel shall report all inspection activities on Quality Control Inspection Reports and non-conformances on Non-Conformance Reports (NCRs) throughout the entire fabrication process, as speciefied herein.

6. Temperature Monitoring.

At a minimum, the Fabricator shall monitor, record, and report the temperatures of the form, ambient temperatures surrounding the concrete, and temperatures of the concrete continuously, without interruption as specified below:

- Prior to placement of concrete to verify that $Ti \geq 50°F$.
- Immediately after placement to verify that $T_i \geq 50°F$ is maintained.
- Throughout the entire duration of the curing cycle, at regular intervals not to exceed one hour until 100% Design Strength (f'_c) is attained and concrete has cooled to within 40°F of the ambient temperature surrounding the Precast Concrete Bridge Element.

At a minimum, the temperature measuring devices shall record and report the temperature of the concrete to the nearest 2°F. At least two temperature sensors (thermocouples) shall be positioned to record the maximum and minimum anticipated concrete temperatures. The anticipated minimum temperature shall be measured with one or more thermocouples at a distance no greater than 2 inches from the surface of the thinnest section. The anticipated maximum temperature shall be measured with one or more thermocouples at the center of the thickest section. Proposed temperature measurement locations shall be submitted to the Engineer for approval. Temperature recording devices shall be located within the curing enclosure and calibrated as required by PCI MNL-116 Section 4.18.4. Maximum heat increase and cool down rates shall comply with PCI MNL-116, Section 4.19. The Contractor shall furnish temperature logs recorded at a minimum frequency of once per hour to the Inspector as required, with each post-pour QC inspection report.

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7. Sampling and Testing.

At a minimum, the Fabricator shall perform random Quality Control sampling and testing as specified in *Table 1: Quality Control Sampling and Testing*. The Fabricator shall perform additional Quality Control sampling and testing on concrete that has been retempered with admixtures or hold-back water during fabrication. Test Specimens shall conform to the requirements of Section M4.02.13 of the MassDOT Standard and Supplemental Specifications and AASHTO R 60, with the exception of the Stripping (80% f'_c) set of cylinders. Stripping (80 % f'_c) cylinders shall be cured in the same location and environment as the Precast Bridge Elements they represent. If approved by the Engineer, compressive strength cylinder match curing equipment, that maintains the same concrete conditions that the corresponding Precast Bridge Element is exposed to, may be utilized in lieu of Stripping (80 % f'_c) field cured cylinders, with the use of thermocouples, controllers, and heaters.

Table 1: Quality Control Sampling and Testing

Quality Characteristic	Test Method	Sample Size	Specification Limit	Lot Size [(c)]	Sublot Size [(d)]	Frequency	Point of Sampling
Slump (in.) [(a)]	AASHTO T 119	Per AASHTO	≤ 8 in. or as approved by the Engineer	Total Quantity of Concrete (cy) produced on a Contract, per Type of Element fabricated, per Mix Design	20 cy	One (1) per Sublot or fraction thereof	Point of Discharge
Air Content (%)	AASHTO T 152	Per AASHTO	5% ≤ % ≤ 8%				
Temperature (°F)	AASHTO T 309	Per AASHTO	50°F ≤ °F ≤ 90°F				
Compressive Strength (psi)	AASHTO T 22 AASHTO T 23	Stripping Cylinders: One (1) set of Three (3) 4 x 8 in.	≥ 80% f'_c at Stripping				
		7-day Cylinders: One (1) set of Three (3) 4 x 8 in.	For Information at 7 days				
		28-day Cylinders: One (1) set of Three (3) 4 x 8 in.	≥ 100% f'_c at 28 days				
		56-day Cylinders: One (1) set of Three (3) 4 x 8 in.	≥ 100% f'_c at 56 days [(b)]				

Notes:

(a) Self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.
(b) 56-day Compressive Strength test specimens shall require testing only when 28-day Compressive Strength test specimens have failed to meet Design Strength (f'_c).

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(c) Lot shall be defined as a specific quantity of material from a single source, produced or placed by the same controlled process.
(d) Sublot shall be defined as an equal division or part of a Lot from which a sample of material is obtained in order to assess the Quality Characteristics of the Lot.

8. Certificate of Compliance.

The Fabricator shall provide a Certificate of Compliance in accordance with Standard Specifications, Division I, Section 6.01, stating that QC test cylinders have achieved the design strength, f'_c. A Certificate of Compliance shall accompany each shipment and shall be presented to the MassDOT Resident Engineer or designee upon delivery to the site.

9. Documentation.

At a minimum, the Fabricator shall maintain a filing system for the following QC records and documentation. All QC records and documentation shall be made available to MassDOT upon the request of the Department.

(a) Current MassDOT Approved Mix Design Sheet(s) and Approval Letter(s)
(b) PCI or NPCA Certification
(c) Current Qualifications and Certifications for QC Manager(s) and QC Technician(s)
(d) Most current set of Approved Shop Drawings
(e) Approved Placement, Finishing and Curing Plan
(f) Approved Dunnage Plan
(g) Fabricator Certificate of Compliance for each fabricated Precast Concrete Bridge Element
(h) Admixture Manufacturer's Certification of Compliance for each approved Admixture
(i) Completed QC Inspection Report for each fabricated Precast Concrete Bridge Element
(j) Identification Number for each fabricated Precast Concrete Bridge Element
(k) Time and date of casting of each fabricated Precast Concrete Bridge Element
(l) Date of stripping of each fabricated Precast Concrete Bridge Element
(m) Batch Ticket Printout reporting the quantity of concrete produced for each batch of concrete produced
(n) Concrete temperature records for each Precast Concrete Bridge Element fabricated
(o) QC Test Report Forms for each sublot of concrete produced
(p) Non-Conformance Reports (NCRs)
(q) Documentation of Repairs (if applicable)

C. Acceptance.

MassDOT will perform Acceptance inspection, sampling, and testing during fabrication and installation, to evaluate the quality and degree of compliance of the fabricated Precast Concrete Bridge Element to MassDOT specifications. Additionally, MassDOT Inspectors will monitor the Fabricator's Quality Control activities to ensure the Fabricator is properly administering Quality Control in conformance with the Fabricator's NPCA or PCI Certification. Acceptance inspection and test results not meeting MassDOT specifications will result in Non-conformance Reports (NCR) being issued by MassDOT to the Fabricator or Contractor for corrective action. Final Acceptance for the fabricated Precast Concrete Bridge Elements shall be determined by MassDOT.

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1. Inspection.

A MassDOT Inspector will be assigned to perform Acceptance activities during fabrication, which includes the inspection of the materials, work procedures, and Precast Concrete Bridge Elements. At least seven (7) days prior to the scheduled start of fabrication, the Fabricator shall contact the MassDOT Research and Materials Section (RMS) to provide notice of the scheduled fabrication start date. The Fabricator shall complete the following activites prior to notifying MassDOT RMS of the scheduled start date:

(a) Receive approval for all submitted Fabricator cement concrete mix designs from the MassDOT Research and Materials Section for the current year, as specified under the *Mix Design* section and *Table 3: Trial Batch Sampling Testing for New Mix Designs*. Self-consolidating concrete shall meet the requirements of M4.02.17.
(b) Receive approval for the submitted Fabricator Placement, Finishing, and Curing Plan from the MassDOT Research and Materials Section, as specified under the *Placement, Finishing, and Curing Plan* section.
(c) Receive Engineer of Record approved shop drawings from the MassDOT Research and Materials Section as specified under the *Shop Drawings* section.
(d) Participate in the pre-production meeting, as described under the *Pre-Production Meeting* section (if required).

Prior to the start of fabrication, the Fabricator shall review the fabrication schedule with the MassDOT Inspector. Fabrication shall only proceed when:

(a) The QC Inspector and MassDOT Inspector are present to inspect the Precast Concrete Bridge Element(s) being fabricated.
(b) The QC Manager is present at the Fabricator's plant.

The Fabricator shall grant access to all required areas of the Fabricator's plant to the MassDOT Inspector, during the hours of fabrication. Fabrication without MassDOT Inspector access to required areas is prohibited, and will result in the rejection of the fabricated Precast Concrete Bridge Element(s).

Additionally, the MassDOT Inspector will monitor the adequacy of the Fabricator's Quality Control activities. MassDOT Inspector Acceptance activities performed at the Fabricator's plant shall remain independent from the Fabricator, and does not replace the Fabricator's required Quality Control activities.

2. Sampling and Testing.

At a minimum, the MassDOT Inspector will perform random Acceptance sampling and testing for each Sublot of concrete produced as specified in *Table 2: Acceptance Sampling and Testing.* The MassDOT Inspector will also perform Acceptance sampling and testing on concrete that has been retempered with admixtures or hold-back water during production. Test Specimens will conform to the requirements of Section M4.02.13 of the MassDOT Standard and Supplemental Specifications and AASHTO R 60.

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Table 2: Acceptance Sampling and Testing

Quality Characteristic	Test Method	Sample Size	Specification Limit	Lot Size [c]	Sublot Size [d]	Frequency	Point of Sampling
Slump (in.) [a]	AASHTO T 119	Per AASHTO	≤ 8 in. or as approved by the Engineer	Total Quantity of Concrete (cy) produced on a Contract, per Type of Element fabricated, per Mix Design	20 cy	One (1) per Sublot or fraction thereof	Point of Discharge
Air Content (%)	AASHTO T 152	Per AASHTO	5% ≤ % ≤ 8%				
Temperature (°F)	AASHTO T 309	Per AASHTO	50°F ≤ °F ≤ 90°F				
Compressive Strength (psi)	AASHTO T 22 AASHTO T 23	7-day Cylinders: One (1) set of Three (3) 4 x 8 in.	For Information at 7 days				
		28-day Cylinders: One (1) set of Three (3) 4 x 8 in.	≥ 100% f'c at 28 days				
		56-day Cylinders: One (1) set of Three (3) 4 x 8 in.	≥ 100% f'c at 56 days [b]				

Notes:

(a) Self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.
(b) 56-day Compressive Strength test specimens shall require testing only when 28-day Compressive Strength test specimens have failed to meet Design Strength (f'c).
(c) Lot shall be defined as a specific quantity of material from a single source, produced or placed by the same controlled process.
(d) Sublot shall be defined as an equal division or part of a Lot from which a sample of material is obtained in order to assess the Quality Characteristics of the Lot.

MATERIALS

A. Materials.

Materials shall meet the following specifications (if applicable):

General	M4.00.00
Portland Cement	M4.01.0
Blended Hydraulic Cements	M4.01.1
Fly Ash	M4.01.2
Cement Concrete	M4.02.00
Cement	M4.02.01

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Cement Mortar	M4.02.15
Aggregates	M4.02.02
Lightweight Aggregates	M4.02.03
Water	M4.02.04
Cement Concrete Additives	M4.02.05
Proportioning	M4.02.06
Mixing and Delivery	M4.02.10
Test Specimens	M4.02.13
Mortar for Filling Keyways	M4.04.0
Slag	AASHTO M 302
High Performance Cement Concrete	M4.06.1
Self-Consolidating Concrete (SCC)	M4.02.17
Controlled Density Fill – Non-Excavatable	M4.08.0
Reinforcing Bars	M8.01.0
Epoxy Coated Reinforcing Bars	M8.01.7
Galvanized Reinforcing Bars	M8.01.8
Welded Wire Reinforcement	M8.01.2
Mechanical Reinforcing Bar Splicer	M8.01.9
Lifting Devices	PCI MNL-116
Corrugated Metal Pipe	AASHTO M 36

1. Cement Concrete Mix Design.

The cement concrete shall be comprised of specified proportions of water and MassDOT approved aggregates, cement, supplementary cementitious materials (SCMs), and admixtures to form a homogenous composition. Cement concrete for Precast Concrete Bridge Elements shall meet the requirements of M4.06.1 High Performance Cement Concrete, with the exception that the "Total Cementitious Content" specified shall be considered the "Maximum Allowable Cementitious Content". When used, self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.

Prior to production of cement concrete, the Fabricator shall report and submit all proposed mix design formulations and its constituent materials onto the MassDOT Cement Concrete Mix Design Sheet to the MassDOT Research and Materials Section for review and approval. All mix design yields shall be designed for 1.0 cubic yards of concrete, with an allowable tolerance of +/- 1.0 %. All liquids incorporated into the proposed mix design(s) shall include both water and admixtures in the liquid mass calculation.

During production of cement concrete, the Fabricator shall not alter the previously approved mix design formulation or its constituent materials. Proposed alterations in source, type, batch quantity, or gradation to any of the constituent materials of the previously approved mix design formulation shall require a new MassDOT Mix Design Sheet submission to the MassDOT Research and materials Section for review and approval. Fabrication shall not occur without prior MassDOT mix design approval.

The Fabricator shall notify MassDOT RMS to schedule trial batch testing for the new mix design(s). Trial batch testing shall meet the following requirements:

(a) Performed by a qualified laboratory and/or AASHTO accredited laboratory.
(b) Performed and/or sampled in the presence of a MassDOT Inspector.
(c) Meet the requirements as specified in *Table 3: Trial Batch Sampling Testing for New Mix Designs*. Self-consolidating concrete (SCC) shall meet M4.02.17.

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Failure to perform all of the required trial batch testing or provide MassDOT RMS trial batch test results within the Specification Limits (as specified in Table 3) will result in the disqualification of the Fabricator's proposed mix design(s).

Table 3: Trial Batch Sampling and Testing for New Mix Designs

Quality Characteristic	Test Method	Sample Size	Specification Limit	Performed By
Slump [(a)]	AASHTO T 119	Per AASHTO	Max. 8 inches or as approved by the Engineer	Quality Control
Air Content (AC)	AASHTO T 152	Per AASHTO	5% ≤ AC ≤ 8%	Quality Control
Temperature (°F)	AASHTO T 309	Per AASHTO	50°F ≤ °F ≤ 90°F	Quality Control
Compressive Strength [(b)]	AASHTO T 22 AASHTO T 23	28-day Cylinders: One (1) set of Three (3) 4 x 8 in.	Lab Mixed $f'_{cr} = 1.3\ f'_c$ at 28 days Batch Mixed $f'_{cr} = 1.2\ f'_c$ at 28 days	MassDOT
Alkali-Silica Reaction (ASR) [(d)]	ASTM C 1567	Per ASTM	M4.02.00	Quality Control
Resistance to Chloride Ion Penetration Chloride Ion Penetration [(e)]	AASHTO T 358 [(f)]	28-day Cylinders: One (1) set of Three (3) 4 x 8 in.	Resistivity ≥ 21 kΩ-cm at 28 days	MassDOT
Freeze/Thaw Durability [(c)]	AASHTO T 161 (Procedure A)	Per AASHTO	Relative Dynamic Modulus of Elasticity after 300 cycles ≥ 80%	Quality Control

Notes:

(a) Self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.

(b) Trial batch compressive strength testing shall be performed by MassDOT. Laboratory mixed trial batch compressive strength results shall achieve 130% Design Strength (f'_c). Batch-mixed trial batch compressive results shall achieve 120% f'_c. Acceptance will be based on compressive strength testing performed by MassDOT.

(c) If an AASHTO accredited laboratory is preparing the trial batch test specimens, MassDOT Acceptance presence is not required. If the Fabricator is preparing the trial batch test specimens, MassDOT Acceptance presence is required during trial batch test specimen preparation.

(d) Alkali Silica Reaction (ASR) testing shall meet the requirements of M4.02.00. Independent laboratories performing ASR testing shall be listed on the MassDOT Quality Construction Materials List (QCML).

(e) Calcium nitrite shall be removed from mix designs containing the admixture and replaced by an equivalent quantity of water when preparing Chloride Ion Penetration resistance trial batch test specimens.

(f) The Wenner probe tip spacing "a" shall be 1.5.

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2. Vertical Adjustment Assembly.

Vertical Adjustment Assembly details and material requirements shall be as shown on the plans. Alternate devices may be used provided that they are adjustable and can support the anticipated loads. The design of the leveling devices, with necessary calculations, shall be submitted to the Engineer of Record for approval.

3. Grout.

Grout used for shear keys, vertical adjustment assembly voids, and hand holes shall be in accordance with M4.04.0.

4. Reinforcement.

All reinforcing steel shall be coated Grade 60 unless otherwise noted on the plans. Mechanical reinforcing bar splicers shall be epoxy coated.

5. Threaded Inserts.

Threaded inserts are permissible to facilitate forming the keyway pours. Threaded inserts shall be hot dip galvanized or made of stainless steel. The number of threaded inserts shall be minimized, and the inserts shall not come in contact with the reinforcing steel.

6. Corrugated Metal Pipe.

Corrugated Metal Pipe to be used for forming voids as specified on the plans shall be fabricated from steel and shall have a protective metallic coating of zinc (galvanizing).

CONSTRUCTION METHODS – PLANT FABRICATION

A. Shop Drawings.

Prior to performing any work under this Section, the Contractor shall receive approval for all shop drawings for the Precast Concrete Bridge Element being worked on and any special Contract requirements, provided that a complete shop drawing package is provided. The Contractor shall not order materials or begin work before receiving approved shop drawings. MassDOT will reject Precast Concrete Bridge Elements that deviate from the approved drawings or are fabricated prior to receiving written approval of the shop drawings. The Contractor shall bear full responsibility and costs for all materials ordered or work performed prior to the approval of the shop drawings or written authorization from MassDOT.

Contractor shall submit scaled shop drawings to the Engineer of Record for review and approval. Upon approval, the Engineer of Record will forward two (2) sets of scaled, full size (minimum 24x36") paper copies of the Approved (or Approved As Noted) shop drawings to the MassDOT Director of Research and Materials. Calculations are not to be included in any submittal to the Research and Materials Section. An approval stamp shall appear on every shop drawing sheet. Wet-stamping or wet-signing is not required, provided that the stamp and reviewer name are legible. The Fabricator's name and address shall appear on each sheet.

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Resubmittal of "Approved as Noted" shop drawings is not necessary for minor revisions, provided that the correction can be clearly understood and is unambiguous without possibility of misinterpretation. Shop drawings with questions or comments that require a response and/or additional information from the Fabricator must be resubmitted.

Detailed shop drawings shall be prepared in accordance with the relevant provisions of Subsection 5.02 and shall, at a minimum, contain the following:

(a) Number and type and/or piece mark of the precast concrete bridge element including overall length, width and height.
(b) Skew angle.
(c) Location, size and geometry of all steel reinforcement, including mechanical reinforcing bar splicers to be used for connecting Precast Concrete Bridge Elements together in the field.
(d) Location and details of all inserts, anchors, Vertical Adjustment Assemblies, and any other items required to be cast into the Precast Concrete Bridge Elements (whether detailed on the plans by the Engineer of Record or provided for the Contractor's convenience). Precast Concrete Bridge Elements shall not be fired or drilled into for attachment purposes. All hardware shall be galvanized except as noted.
(e) Locations and details of the lifting devices, including supporting calculations, type and amount of any additional reinforcing required for lifting. The Fabricator shall design all lifting devices based on the no cracking criteria in Chapter 8 of the PCI Design Handbook (7^{th} edition).
(f) The minimum compressive strength required prior to handling the precast concrete bridge element.

The shop drawings shall not include procedures for placement, finishing, and curing of concrete. These details shall be included in the Placement, Finishing and Curing Plan that is to be submitted to MassDOT Research and Materials Section as described under *Placement, Finishing, and Curing Plan*.

B. Fabrication.

All Precast Concrete Bridge Elements shall be fabricated in accordance with the latest edition of PCI MNL-116 as modified herein.

C. Placement, Finishing and Curing Plan.

At least 30 days prior to start of fabrication, the Contractor shall submit the Fabricator's proposed Placement, Finishing and Curing Plan to the Engineer for approval by MassDOT Research and Materials Section. This shall be an independent submittal, separate from the fabrication shop drawings. The Placement, Finishing and Curing Plan shall include the following:

(a) Method of Mixing
(b) Method of Placement
(c) Method of Consolidation
(d) Method of Finishing
(e) Method of Initial Curing
(f) Method of Intermediate Curing
(g) Method of Final Curing
(h) Moisture Retention Materials and Equipment (water spray equipment, saturated covers, sheet materials, liquid membrane-forming compounds, accelerated curing equipment, etc.)

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(i) Cylinder Curing Methods, Location, and Environmental Control (temperature, humidity, etc.)
(j) Temperature Monitoring, Recording, and Reporting

D. Dunnage Plan Shop Drawings.

At least 30 days prior to the start of fabrication, the Contractor shall submit proposed Dunnage Plan Shop Drawings to the Engineer of Record for review and approval. This shall be an independent submittal, separate from the fabrication shop drawings. Upon approval, the Engineer of Record will forward two (2) sets of scaled, full size (minimum 24"x36") paper copies of the Approved (or Approved As Noted) Dunnage Plan to the MassDOT Director of Research and Materials. Calculations are not to be included in any submittal to the Research and Materials Section. The Dunnage Plan shall include the following:

(a) Proposed layout of the Precast Concrete Bridge Elements for storage in yard and during shipping
(b) Support and blocking point locations
(c) Support and blocking materials

E. Pre-Production Meeting.

The Contractor shall notify the MassDOT Research and Materials Section to determine if a pre-production meeting will be required to review the specification, shop drawings, curing plan, schedule, and discuss any specific requirements. The meeting shall be held prior to scheduling a MassDOT Inspector (refer to Section *Quality Assurance – Precast Concrete, C. Acceptance, A. Inspection*), and at least seven (7) days prior to the scheduled casting of any Precast Concrete Bridge Element or control section. The Contractor shall schedule the meeting, which shall include representatives of the Fabricator and MassDOT.

F. Reinforcement.

The reinforcing bars shall be installed in accordance with Section 901.62 of the Supplemental Specifications, including tolerances for cover and horizontal spacing of bars. Components of mechanical reinforcing bar splicers shall be set with the tolerances shown on the plans. The reinforcing bars and mechanical reinforcing bar splicers shall be assembled into a rigid cage that will maintain its shape in the form and which will not allow individual reinforcing bars to move during the placement of concrete. This cage shall be secured in the form so that the clearances to all faces of the concrete, as shown on the plans, shall be maintained.

Where reinforcing bars are to protrude from one Precast Concrete Bridge Element in order to mate with reinforcing bar splicers in a second precast concrete element, the fabricator shall set the reinforcing bars and the reinforcing bar splicers with a template in order to ensure proper fit up within the tolerances specified on the plans.

G. Tolerances.

Fabrication shall comply with tolerances specified on the plans. Tolerances for steel reinforcement placement shall be in accordance with 901.62. In the absence of specifications on the plans, tolerances shall comply with the latest version of the PCI MNL 135, Precast Tolerance Manual.

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H. Forms.

Concrete shall be cast in rigidly constructed forms, which will maintain the Precast Concrete Bridge Elements within specified tolerances to the shapes, lines and dimensions shown on the approved fabrication drawings. Forms shall be constructed from flat, smooth, non-absorbent material and shall be sufficiently tight to prevent the leakage of the plastic concrete. When wood forms are used, all faces in contact with the concrete shall be laminated or coated with a non-absorbent material. All worn or damaged forms, which cause irregularities on the concrete surface or damage to the concrete during form removal, shall be repaired or replaced before being reused. Any defects or damage of more than "Category 2, Minor Defects" made to the concrete, due to form work, stripping or handling, shall be subject to repair or rejection, as defined in the *Repairs and Replacement* section. If threaded inserts are cast into the elements for support of formwork, the inserts shall be recessed a minimum of 1 inch and shall be plugged after use with a grout of the same color as that of the precast cement concrete.

I. Mixing of Concrete.

The concrete shall be proportioned and mixed in conformance with the Fabricator's MassDOT approved mix design and M4.02.10 Mixing and Delivery Fabrication shall not occur without prior MassDOT mix design approval. The Fabricator shall provide copies of batch tickets to the MassDOT Plant Inspector. The MassDOT Plant Inspector will verify if the batch ticket quantities are within the tolerances of the Fabricator's MassDOT approved mix design.

J. Placement of Concrete.

Prior to the placement of concrete, the temperature of the forms shall be greater than or equal to 50°F. Quality Control inspection shall be performed by the Fabricator as specified in the *Fabricator Quality Control* section. Placement of the concrete shall not proceed until the MassDOT Plant Inspector is present to perform inspection and begin monitoring Fabricator Quality Control inspection activities, and is in compliance with specifications. The MassDOT Plant Inspector shall inspect and accept the placement of the reinforcing steel prior to the placement of concrete into the forms. The Fabricator shall verify all materials and equipment required for protecting and curing the concrete are readily available and meet the requirements of the *Final Curing Methods* section below. All items encased in the concrete shall be accurately placed in the position shown on the Plans and firmly held during the placing and setting of the concrete. Clearance from the forms shall be maintained by supports, spacers, or hangers and shall be of approved shape and dimension.

During placement, the concrete shall maintain a concrete temperature range between 50°F and 90°F. The Fabricator shall minimize the time to concrete placement (measured from start of mixing to completion of placement). In no event shall time to placement exceed 90 minutes. The Fabricator shall perform additional Quality Control sampling and testing on concrete that has been retempered with admixtures or hold-back water during the placement of the concrete as specified in the *Fabricator Quality Control* section above. Delays or shutdowns of over 30 minutes shall not be allowed during the continuous filling of individual forms.

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K. Consolidation of Concrete.

Suitable means shall be used for placing concrete to prevent segregation or displacement of reinforcing steel or forms. The concrete shall be thoroughly consolidated by external or internal vibrators or a combination of both. Vibrators shall not be used to move concrete within the forms. Vibrators shall be used as specified in 901.63C and as directed by the Engineer. Concrete shall be placed and consolidated in a way that minimizes the presence of surface voids or bug holes on the formed surfaces. When used, self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.

L. Finishing of Concrete.

The finish of the Precast Concrete Bridge Elements shall be as indicated on the plans. Where Precast Concrete Bridge Elements have keyways for grout or closure pours, the surfaces of these shear keys shall be abrasive blasted prior to shipment. The Fabricator may utilize a surface retarder with water blast, sandblast, or a combination of both to achieve the desired keyway finish. At a minimum, the profile of the keyway surfaces shall be similar to that of 60 grit sand paper. The exposed reinforcing steel in the precast slab shall be protected from damage during the cleaning of the keyways. Damaged epoxy coating of steel reinforcement shall be repaired, and the reinforcing steel shall be cleaned as directed by the Engineer.

The Fabricator shall permanently mark each precast concrete bridge element with its type and/or piece mark, date of casting, and supplier identification either by stamp markings in fresh concrete, waterproof paint, or other approved means on a surface that will not be exposed after assembly.

M. Exposed Surfaces of Precast Concrete Bridge Elements.

As soon as conditions permit, before the concrete has fully hardened, all dirt, laitance, and loose aggregate shall be removed from the exposed concrete surfaces. Contractor shall not allow foot traffic on the uncured concrete until it has reached sufficient strength to prevent damage.

N. Exposed Surfaces of Closure Pour Shear Keys.

The closure pour shear key cast in the sides of the beam flanges shall have an exposed aggregate finish. The closure pour reinforcing steel and its coating shall not be damaged by the process for creating the exposed aggregate surface. Fabricator may utilize a surface retarder with water blast, abrasive blast, or a combination of both to achieve the desired shear key finish. The abrasive blast shall use oil free compressed air. The profile of the shear key surfaces shall be similar to that of 60 grit sand paper.

O. Initial Curing Methods.

After the placement of concrete and prior to concrete finishing, the Fabricator shall initiate initial curing methods when the concrete surface begins to dry, to reduce moisture loss from the surface. Application of one or more of the following initial curing methods shall occur immediately after the bleed water sheen has disappeared.

1. Fogging.

Fogging nozzles shall atomize water into a fog-like mist. The fog spray shall be directed and remain visibly suspended above the concrete surface, to increase the humidity of the air and reduce the rate of evaporation. Water from fogging shall not be worked into the surface during finishing operations and shall be removed or allowed to evaporate prior to finishing.

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2. Liquid-applied Evaporation Reducers

Evaporation reducers shall be sprayed onto the freshly placed concrete surface to produce an effective monomolecular film that reduces the risk of plastic-shrinkage cracking and rate of evaporation of the bleed water from the concrete surface. Evaporation reducers shall be applied in accordance with manufacturer's recommendations.

P. Intermediate Curing Methods.

The Fabricator shall initiate intermediate curing methods if concrete finishing has taken place prior to the concrete reaching final set. The freshly finished concrete surface shall be protected from moisture loss, by the continuation of initial curing methods (fogging and evaporation reducers) until final curing methods are applied or by the use of liquid membrane-forming curing compounds (see *Liquid Membrane-Forming Compounds for Curing* section).

Q. Final Curing Methods.

The Fabricator shall initiate and apply final curing methods to the concrete immediately after the following conditions are met:

(a) Completion of concrete finishing
(b) Final set of concrete
(c) Concrete has hardened sufficiently enough to prevent surface damage

During fabrication of Precast Concrete Bridge Elements, the Fabricator shall maintain the required concrete temperature ranges throughout the entire duration of the final curing method cycle as specified herein. Controlled and gradual termination of the final curing method shall occur after all specified conditions are met. The concrete temperature shall be reduced at a rate not to exceed 36°F per hour until the concrete temperature is within 20°F of the ambient temperature outside of the final curing method enclosure. The Fabricator shall maintain a minimum concrete temperature of 40°F until 100% f'c is attained (see *Handling and Storage* section below).

1. Water Spray Curing.

All exposed concrete surfaces shall remain moist with a continuous fine spray of water throughout the entire duration of the final curing method cycle (see *Table 4: Final Curing Method Cycle for Water Spray*).

Table 4: Final Curing Method Cycle for Water Spray

Sustained Concrete Temperature	Final Curing Method Cycle Duration	Compressive Strength
50°F ≤ °F ≤ 90°F	≥ Five (5) days	≥ 80% f'_c

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2. Saturated Covers for Curing.

All exposed concrete surfaces shall remain moist with a continuous application of saturated covers throughout the entire duration of the final curing method cycle (see *Table 5: Final Curing Method Cycle for Saturated Covers*). Saturated covers shall be allowed to dry thoroughly before removal to provide uniform, slow drying of the concrete surface.

Table 5: Final Curing Method Cycle for Saturated Covers

Sustained Concrete Temperature	Final Curing Method Cycle Duration	Compressive Strength
50°F ≤ °F ≤ 90°F	≥ Three (3) days	≥ 80% f'_c

Saturated covers, such as burlap, cotton mats, and other coverings of absorbent materials shall meet the requirements of AASHTO M 182, Class 3. Saturated covers shall be in good condition, free from holes, tears, or other defects that would render it unsuitable for curing concrete. Saturated covers shall be dried to prevent mildew when storing. Prior to application, saturated covers shall be thoroughly rinsed in water and free of harmful substances that are deleterious or cause discoloration to the concrete. Saturated covers shall have sufficient thickness and proper positioning onto the concrete surface to maximize moisture retention.

Saturated covers shall contain a sufficient amount of moisture to prevent moisture loss from the surface of the concrete. Saturated covers shall be kept continuously moist so that a film of water remains on the concrete surface throughout the entire duration of the final curing method cycle. The Fabricator shall not permit the saturated covers to dry and absorb water from the concrete. Use of polyethylene film (see *Polyethylene Film* section) may be applied over the saturated cover to potentially decrease the need for continuous watering.

3. Sheet Materials for Curing.

All exposed concrete surfaces shall remain moist with a continuous application of curing sheet materials throughout the entire duration of the final curing method cycle (see *Table 6: Final Curing Method Cycle for Curing Sheet Materials*).

Table 6: Final Curing Method Cycle for Sheet Materials

Sustained Concrete Temperature	Final Curing Method Cycle Duration	Compressive Strength
50°F ≤ °F ≤ 90°F	≥ Three (3) days	≥ 80% f'_c

Sheet Materials used for curing, such as polyethylene film, white burlap-polyethylene sheeting, and reinforced paper shall meet the requirements of ASTM C171 and the specifications herein. Sheet materials shall inhibit moisture loss and reduce temperature rise in concrete exposed to radiation from the sun during the final curing method cycle. Adjoining covers shall overlap not less than 12 inches. All edges of the covers shall be secured to maintain a moist environment.

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(a) Polyethylene Film.

Polyethylene film shall meet the requirements of ASTM C171, consist of a single sheet manufactured from polyethylene resins, be free of visible defects, and have a uniform appearance. Careful considerations shall be taken by the Fabricator to prevent the film from tearing during storage and application, so as to not disrupt the continuity of the film (polyethylene film reinforced with glass or other fibers is more durable and less likely to be torn). The Fabricator shall monitor the application of the film to prevent uneven spots from appearing (mottling) on the concrete surface, due to variations in temperature, moisture content, or both. The Fabricator shall prevent mottling from occurring on the concrete surface by applying additional water under the film or applying a combination of polyethylene film bonded to absorbent fabric to the concrete surface to retain and evenly distribute the moisture.

Immediately following final finishing, polyethylene film shall be placed over the surface of the fresh concrete surface, so as to not damage the surface of the concrete and shall be placed and weighted so that it remains in contact with the concrete throughout the entire duration of the final curing method cycle. The film shall extend beyond the edges of the concrete surface. The film shall be placed flat on the concrete surface, avoiding wrinkles, to minimize mottling. Edges of adjacent polyethylene film shall overlap a minimum of 6 inches and be tightly sealed with the use of sand, wood planks, pressure-sensitive tape, mastic, or glue to maintain close contact with the concrete surface, retain moisture, and prevent the formation of air pockets throughout the entire duration of the final curing method cycle.

(b) White Burlap-Polyethylene Sheeting

White burlap-polyethylene sheeting shall meet the requirements of ASTM C171, be securely bonded to the burlap so to avoid separation of the materials during handling and curing of the concrete, and be applied in the same manner as the polyethylene film.

(c) Reinforced Impervious Paper.

Reinforced impervious paper shall meet the requirements of ASTM C171, consist of two sheets of kraft paper cemented together with a bituminous adhesive and reinforced with embedded cords or strands of fiber running in both directions, and be white in color. Reinforced impervious paper shall be treated to prevent tearing when wetted and dried.

Reinforced impervious paper can be reused so long as it is effective in retaining moisture on the concrete surface. The Fabricator shall visually inspect the reinforced impervious paper for all holes, tears, and pin holes from deterioration of the paper through repeated use by holding the paper up to the light. The paper shall be discarded and prohibited from use when the moisture is no longer retained.

After the concrete has hardened sufficiently to prevent surface damage, the concrete surface shall be thoroughly wetted prior to the application of the reinforced impervious paper, and be applied in the same manner as the polyethylene film.

4. Liquid Membrane-Forming Compounds for Curing.

All exposed concrete surfaces shall remain moist with a continuous application of liquid membrane-forming compounds throughout the entire duration of the final curing method cycle (see *Table 7: Final Curing Method Cycle for Liquid Membrane-Forming Compounds*).

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Table 7: Final Curing Method Cycle for Liquid Membrane-Forming Compounds

Sustained Concrete Temperature	Final Curing Method Cycle Duration	Compressive Strength
50°F ≤ °F ≤ 90°F	≥ Seven (7) days	≥ 80% f'_c

Liquid membrane-forming compounds shall meet the requirements of ASTM C 1315, Type I, Class A and shall exhibit specific properties, such as alkali resistance, acid resistance, adhesion-promoting quality, and resistance to degradation by ultraviolet light, in addition to moisture-retention capabilities. Liquid membrane-forming compounds shall consist of waxes, resins, chlorinated rubber, or other materials to reduce evaporation of moisture from concrete. Liquid membrane-forming compounds shall be applied in accordance with the manufacturer's recommendations.

Liquid membrane-forming compounds shall be applied immediately after the disappearance of the surface water sheen following final finishing. All exposed surfaces shall be wetted immediately after form removal and kept moist to prevent absorption of the compound, allowing the curing membrane to remain on the concrete surface for proper membrane moisture retention. The concrete shall reach a uniformly damp appearance with no free water on the surface prior to the application of the compound.

If patching or finishing repairs are to be performed prior to the application of the compound, the Precast Concrete Bridge Element shall be covered temporarily with saturated covers until the repairs are completed and the compound is applied. Only areas being repaired shall be uncovered during this period. While the saturated covers are removed to facilitate the patching process, the work shall continue uninterrupted. If for any reason the work is interrupted, saturated covers shall be placed onto the uncovered concrete surface, until the work continues and is completed, at which time the curing compound shall be applied to the repaired area.

Careful considerations shall be made by the Fabricator to determine if the evaporation rate is exceeding the rate of bleeding, thus causing the surface to appear dry even though bleeding is still occurring. Under such conditions, the application of liquid membrane-forming compounds to the concrete surface shall be delayed, in order to prevent bleed water from being sealed below the concrete surface and avert map cracking of the membrane films, reduction in moisture-retention capability, and reapplication of the compound. To diagnose and prevent this condition, the Fabricator shall place a transparent plastic sheet over a test area of the uncured and unfinished concrete surface and shall determine if any bleed water accumulates under the plastic.

The compound shall be applied in two applications at right angles to each other to ensure uniform and more complete coverage. On very deeply textured surfaces, the surface area to be treated shall be at least twice the surface area of a troweled or floated surface. In such cases, two separate applications may be needed, each at 200 ft^2/gal., with the first being allowed to become tacky before the second is applied.

The curing compound shall be applied by power sprayer, using appropriate wands and nozzles with pressures between 25 and 100 psi. For very small areas such as repairs, the compound shall be applied with a wide, soft-bristled brush or paint roller. The compound shall be stirred or agitated before use and applied uniformly in accordance with the manufacturer's recommended rate. The Fabricator shall verify the application rates are in accordance with the manufacturer's recommended rate.

ITEM 995.01 (Continued)

When the concrete surface is to receive paint, finishes, or toppings that require positive bond to the concrete, it is critical that the curing procedures and subsequent coatings, finishes, or toppings be compatible to achieve the necessary bond

After the termination of the final curing method cycle has occurred, liquid membrane-forming compounds shall be removed by blast-cleaning from any concrete surface that is to receive paint, finishes, plastic concrete from secondary pour, grout, or any other toppings that require bonding to the concrete surface. These surfaces shall be further blast-cleaned to remove the cement matrix down to exposed aggregate to ensure proper bonding to the material. The method used to remove the curing compound shall not damage the reinforcement and coating. Compounds are prohibited on any concrete surface that will have a penetrating or coating type treatment such as a sealer, stain, or waterproofing membrane applied to it.

5. Accelerated Curing.

Accelerated curing shall use live steam or radiant heat with moisture in accordance with PCI MNL-116 as modified herein. The concrete temperature shall meet the maximum heat increase and cool down rates as specified herein. Concrete temperature monitoring shall meet the requirements of the *Temperature Monitoring* section. Excessive and fluctuating rates of heating and cooling shall be prohibited. The concrete temperature shall not exceed 158°F at any time. The Fabricator shall meet the following accelerated curing sequencing and requirements.

(a) Initial Delay Period.

The initial delay period shall be defined as the duration immediately following the placement of the concrete and the attainment of initial set of the concrete. The Fabricator shall determine the time of initial set in accordance with AASHTO T 197 specifications. Throughout the entire duration of the preset period, initial curing shall be implemented. The temperature increase period (see *Temperature Increase Period* section) shall not occur until initial set of the concrete is attained. During the initial delay period, the concrete temperature shall meet the following requirements:

iii. Concrete temperature rate of increase shall not exceed 10°F per hour.
iv. Total concrete temperature increase shall not exceed 40°F higher than the placement concrete temperature or 100°F, whichever is less

(b) Temperature Increase Period.

The temperature increase period shall be defined as the duration immediately following the completion of the initial delay period (after initial set) and immediately prior to the start of the constant maximum temperature period. Application of steam to the enclosure shall not occur until the initial delay period is complete. After the initial delay period is complete, all exposed concrete surfaces shall be cured in a moist environment where the concrete temperature increases at a rate not to exceed 36°F per hour.

ITEM 995.01 (Continued)

(c) Constant Maximum Temperature Period.

The constant maximum temperature period shall be defined as the duration immediately following the completion of the temperature increase period and immediately prior to the start of the temperature decrease period. After the temperature increase period is complete, all exposed concrete surfaces shall be cured in a moist environment at a controlled and constant elevated temperature throughout the entire duration of the constant maximum temperature period. Termination of the constant maximum temperature period and the start of the termination decrease period shall occur after all specified conditions are met (see *Table 8: Constant Maximum Temperature Period*).

Table 8: Constant Maximum Temperature Period

Sustained Concrete Temperature	Constant Maximum Temperature Period	Compressive Strength
120°F ≤ °F ≤ 158°F	6 hrs ≤ Time ≤ 48 hrs	≥ 80% f'_c

(d) Temperature Decrease Period.

After the constant maximum temperature period is complete, the concrete temperature shall be cured in a moist environment at a controlled and reduced rate not to exceed 36°F per hour until the concrete temperature is within 20°F of the ambient temperature outside of the curing enclosure.

R. Stripping.

The Fabricator shall not strip forms or handle the Precast Concrete Bridge Element until Quality Control compressive strength cylinders attain a minimum compressive strength of 80% Design Strength (f'_c) or the value indicated on the approved drawings has been achieved. After removal from the form, all exposed concrete surfaces shall continue to be cured in conformance with the *Final Curing Methods* sections until completion.

S. Handling and Storage of Precast Concrete Bridge Elements.

Precast Concrete Bridge Elements may be exposed to temperatures below freezing (32°F) when the chosen curing cycle has been completed, provided that the following conditions are met:

(a) Precast Concrete Bridge Elements are protected from precipitation with polyethylene curing covers until 100% f'_c is attained
(b) Precast Concrete Bridge Elements maintain a minimum concrete temperature of 40°F until 100% f'_c is attained

Precast Concrete Bridge Elements damaged during handling and storage will be repaired or replaced at MassDOT's direction at no cost to MassDOT. Precast Concrete Bridge Elements shall be lifted at the designated points by approved lifting devices embedded in the concrete and in accordance with proper lifting and handling procedures. Storage areas shall be smooth and well compacted to prevent damage due to differential settlement. Precast Concrete Bridge Elements shall be supported on the ground by means of continuous blocking, in accordance with the approved dunnage plan.

ITEM 995.01 (Continued)

Precast Concrete Bridge Elements shall be loaded on a trailer with blocking as described above, in accordance with the approved dunnage plan. Shock-absorbing cushioning material shall be used at all bearing points during transportation of the Precast Concrete Bridge Elements. Blocking shall be provided at all locations of tie-down straps. Precast Concrete Bridge Elements stored prior to shipment shall be inspected by the Contractor prior to being delivered to the site to identify damage that would be cause for repair or rejection.

T. Repairs and Replacement.

In the event defects are identified, they shall be classified in the following categories and a non-conformance report (NCR) shall be filed if required. The NCR shall be submitted to MassDOT for review. Defects in all categories shall be documented by plant Quality Control personnel and made available to MassDOT upon request. Any required repairs shall utilize materials listed on the MassDOT QCML.

Where noted, defects shall be repaired according to the PCI Northeast Region Guidelines for Resolution of Non-Conformances in Precast Concrete Bridge Elements, Report Number PCINE-18-RNPCBE. Please note that reference to PCINE-18-RNPCBE is made for repair details only. In the case of conflicts with this Special Provision, this Special Provision shall govern.

1. Category 1, Surface Defects.

Category 1 defects do not need to be repaired, and an NCR does not need to be filed. Surface defects are defined as the following:

(a) Surface voids or bug holes that are less than 5/8-inch in diameter and less than ¼-inch deep, except when classified as Category 4
(b) Cracks less than or equal to 0.006 inches wide
(c) Cracks less than or equal to 0.125 inches wide on surfaces that will receive a field-cast concrete overlay

2. Category 2, Minor Defects.

Category 2 defects shall be repaired, but an NCR does not need to be filed. Minor defects are defined as the following:

(a) Spalls, honeycombing, surface voids that are less than 2 inches deep and have no dimension greater than 12 inches
(b) Cracks less than or equal to 0.016 inches that will not receive a concrete overlay
(c) Broken or spalled corners that will be covered by field-cast concrete

Minor defects shall be repaired according to PCINE-18-RNPCBE. Cracks shall be sealed according to the PCI Repair Procedure #14 in PCINE-18-RNPCBE.

3. Category 3, Major Defects.

For Category 3 defects, the Fabricator shall prepare an NCR that documents the defect and describes the proposed repair procedure. The NCR shall be submitted to MassDOT for approval prior to performing the repair. Major defects are defined as the following:

ITEM 995.01 (Continued)

(a) Spalls, honeycombing and surface voids that are deeper than 2 inches or have any dimension greater than 12 inches, when measured along a straight line
(b) Concentrated area of defects consisting of four or more Category 2 Defects within a 4-square foot area.
(c) Exposed reinforcing steel
(d) Cracks greater than 0.016 inches and less than or equal to 0.060 inches in width that will not receive a concrete overlay
(e) Bearing area spalls with dimensions not exceeding 3 inches
(f) Cracks, spalls and honeycombing that will be encased in cast in place concrete need not be repaired, but the limits and location of the defects shall be documented with an NCR

Upon MassDOT approval, defects and cracks shall be repaired according to PCINE-18-RNPCBE and this specification. All repairs shall be completed at the expense of the Contractor.

4. Category 4, Rejectable Defects.

Rejectable defects as determined by the MassDOT Inspector, RMS, and Engineer may be cause for rejection. Fabricator may submit an NCR with a proposed repair procedure, requesting approval. Some rejectable defects are defined as the following:

(a) Surface defects on more than 5% of the surface area which will be exposed to view after installation
(b) Minor defects that in total make up more than 5% of the surface area of the unit
(c) Cracks greater than 0.060 inches in width except as noted in Category 1
(d) Elements fabricated outside of the specified tolerances
(e) MassDOT compressive strength testing that does not meet the specified Design Strength, f'_c

U. Loading.

Prior to the Fabricator loading the Precast Bridge Element on to the truck for shipping, the Fabricator shall provide the MassDOT Plant Inspector and RMS a minimum seven (7) days' notice of the Fabricator's intent to load the Precast Bridge Element. Inspection by the MassDOT Plant Inspector shall take place while the element is still on dunnage in the yard. The element shall not be loaded onto the truck until the MassDOT Plant Inspector has performed the inspection.

V. Shipping.

Prior to shipment, the Fabricator shall perform the following actions and provide the required documentation to the MassDOT Plant Inspector:

(a) Precast Concrete Bridge Elements shall remain at the Fabricator's plant for a minimum of 7 days after cast date.
(b) QC Inspection Reports shall be signed by the Quality Control Manager and provided to the MassDOT Plant Inspector.
(c) QC Compressive Strength Test Report Forms attaining Design Strength, f'c for the Precast Concrete Bridge Element's representative Sublot shall be generated by the Fabricator and provided to the MassDOT Plant Inspector.

ITEM 995.01 (Continued)

(d) Certificate of Compliance shall be generated by the Fabricator as described under the Fabricator Quality Control section and provided to the MassDOT Plant Inspector.
(e) All MassDOT RMS approved Corrective Actions submitted on the Non-Conformance Reports (NCR), shall be verified to have been completed by the MassDOT Plant Inspector and Quality Control Manager.
(f) All NCRs shall be signed off by the Quality Control Manager, MassDOT Inspector and MassDOT RMS.

W. Delivery.

Upon Delivery, the following documentation shall be provided to the MassDOT Resident Engineer or designee:

(a) QC Compressive Strength Test Report Forms attaining Design Strength, f'c for the Precast Concrete Bridge Element's representative sublot.
(b) Certificate of Compliance generated by the Fabricator as described under the Fabricator Quality Control section.
(c) QC Inspection Reports signed by the Quality Control Manager.

The Contractor shall inspect Precast Concrete Bridge Elements upon receipt at the site. Precast Concrete Bridge Elements damaged during delivery shall be repaired or replaced at MassDOT's direction at no cost to MassDOT.

CONSTRUCTION METHODS – FIELD CONSTRUCTION

A. General.

All of the Contractor's field personnel involved in the erection and assembly of the Precast Concrete Bridge Elements shall have knowledge of and follow the approved Erection Procedure and Quality Control Plan for Precast Concrete Bridge Element Assembly.

Prior to installation, the following documentation shall be reviewed and confirmed by the Engineer or designee:

(a) QC Compressive Strength Test Report Forms attaining Design Strength, f'c for the Precast Concrete Bridge Element's representative sublot.
(b) Certificate of Compliance generated by the Fabricator as described under the Fabricator Quality Control section.
(c) QC Inspection Reports signed by the Quality Control Manager.

ITEM 995.01 (Continued)

Field construction staff shall verify that the Engineer has accepted all Precast Concrete Bridge Elements prior to installation.

B. Erection Procedure and Quality Control Plan for Precast Pile Cap Units, Precast Abutment Stem Units, Precast Approach Slab Units, Precast Wingwalls, and Precast Highway Guardrail Transitions.

Prior to the erection, the Contractor shall submit an Erection Procedure and a Quality Control Plan for Precast Pile Cap Units, Precast Abutment Stem Units, Precast Approach Slab Units, Precast Wingwalls, and Precast Highway Guardrail Transitions for approval by the Engineer. This submittal shall include computations and drawings for the transport, hoisting, erection and handling of the Precast Concrete Bridge Elements. The Erection Procedure and Quality Control Plan for Precast Pile Cap Units, Precast Abutment Stem Units, Precast Approach Slab Units, Precast Wingwalls, and Precast Highway Guardrail Transitions shall be prepared and stamped by a Professional Engineer registered in the Commonwealth of Massachusetts with working knowledge of the Contractor's equipment, approved shop drawings, and materials to build the bridge. The Erection Procedure and Quality Control Plan for Precast Pile Cap Units, Precast Abutment Stem Units, Precast Approach Slab Units, Precast Wingwalls, and Precast Highway Guardrail Transitions shall, at a minimum, include the following:

1. Erection Procedure

The Erection Procedure shall be prepared to conform to the requirements of 960.61, Erection and the applicable sections in Chapter 8 of the PCI Design Handbook (seventh edition) for handling, erection, and bracing requirements. At a minimum, the Erection Procedure shall provide:

(a) Minimum concrete compressive strength for handling the Precast Concrete Bridge Elements.
(b) Concrete stresses during handling, transport, and erection.
(c) Crane capacities, pick radii, sling geometry, and lifting hardware.
(d) Verification that the equipment can handle all pick loads and weights with the required factor of safety.
(e) Evaluation of construction sequence and evaluation of any geometric conflicts in the lifting of the Precast Concrete Bridge Elements and setting them as shown on the plans.
(f) Design of crane supports including verification of subgrade for support.
(g) Location and design of all temporary bracing that will be required during erection.

Non-shrink grout and concrete materials, approved by the Engineer, shall be placed as shown on the plans. Fill joints, keyways, and voids, in strict accordance with the specifications and manufacturer's recommendations and instructions.

For footings, approach slabs and highway guardrail transitions, once these Precast Concrete Bridge Elements have been set to the correct horizontal and vertical alignment, the void between them and the supporting soil shall be filled with Controlled Density Fill – Non-Excavatable to the limits as shown on the plans. Add additional grout ports in the footings to facilitate the bedding process if required. Controlled Density Fill material to be used on this project shall be Type 1 Very Flowable/Non-Excavatable (M4.08.0), and the producer and mix design shall be listed on the Qualified Construction Materials List.

Joints shall be filled flush to the top with non-shrink grout, and any vertical misalignment between adjacent elements shall be feathered out on a slope of 1 to 12.

ITEM 995.01 (Continued)

Curing of grout or concrete shall be performed in strict accordance with the specifications and manufacturer's recommendations. Filling shall not be completed in cold weather when either the ambient temperature or the precast member's temperature is below the manufacturer's recommendation. No localized heating of either the precast members or of the air surrounding the element will be permitted in an attempt to reach application temperatures.

If the joints or voids are not filled within five days after the Precast Bridge Elements are erected, the Contractor shall cover and protect the openings from weather and debris until they are filled.

2. Quality Control Plan for Precast Concrete Bridge Element Assembly

The Quality Control Plan for Precast Pile Cap Units, Precast Abutment Stem Units, , Precast Approach Slab Units, Precast Wingwalls, and Precast Highway Guardrail Transitions is a document prepared and submitted by the Contractor prior to the start of work which requires the Contractor to identify and detail the sequence of construction in accordance with the project schedule and which clearly identifies all stages of field construction. The assembly procedures for the Precast Pile Cap Units, Precast Abutment Stem Units, Precast Approach Slab Units, Precast Wingwalls, and Precast Highway Guardrail Transitions shall be submitted on full size 24"x36" sheets. This document will be treated as a Construction Procedure and will be reviewed by both the Designer and the District Construction Office. The approval of this document will serve as a guideline for setting interim concrete and grout strengths and curing procedures to allow construction to proceed without waiting for the final in-service strengths to be achieved.

The following list details the minimum criteria that should be included in the Quality Control Plan for Precast Pile Cap Units, Precast Abutment Stem Units, Precast Approach Slab Units, Precast Wingwalls, and Precast Highway Guardrail Transitions:

(a) A detailed schedule showing the sequence of operations that the Contractor will follow. The schedule shall include a timeline for installation of all major elements of the bridge accounting for the installation of temporary works and cure times of grouts or closure pour concrete and other selected materials.

(b) Calculations that support the schedule outlined above should be included verifying that the selected materials have adequate interim strength to proceed from one step to another. Final material strengths are not normally required until the bridge is opened to vehicular traffic. The minimum factor of safety of two (2) will be required for the interim strength of grouts and closure pour concrete before construction is allowed to proceed to subsequent steps. The factor of safety is applied to the service loads that are supported by the elements and materials during various stages of construction. For example, if the Contractor calculates that the grout between the precast pier cap and pier wall requires a strength of 100 psi to support the dead load of the beams in the next step, a cylinder break of 200 psi will be required prior to allowing the pier cap to be loaded with the beams. The required strength of materials for subsequent construction stages shall also be calculated and the material strength verified.

(c) The Contractor is responsible for determining the center of gravity for all elements. Special care shall be used for unusual elements that are not symmetric. These elements may require special lifting hardware to allow for installation in a plumb or flat position.

ITEM 995.01 (Continued)

(d) Plan of the work area, depicting items such as temporary earth support, utilities within the immediate vicinity of the work, drainage structures, etc. The Contractor shall coordinate the various subcontractors that will need to occupy the same area and shall ensure that there are no conflicts. For example, if the Contractor is having different Subcontractors prepare and submit plans for temporary earth support and demolition, and the earth support is required to be installed prior to the demolition, it shall be the Contractor's responsibility to ensure that the Quality Control Plan for Precast Concrete Bridge Element Assembly submission allows both operations to be performed without field modification.
(e) Details of all equipment that shall be employed for the construction of the bridge.
(f) Methods of providing temporary support of the elements. Include methods of adjusting and securing the element after placement.
(g) Vertical Adjustment Assemblies to be used as a means of setting precast concrete footings to the correct elevations.
(h) Procedures for controlling the overall horizontal dimensions and the vertical elevations as each precast concrete bridge element is erected by using the tolerance limits of the joints as detailed on the plans.
(i) Methods for curing grout.
(j) Proposed methods for installing non-shrink grout and the sequence and equipment for the grouting operation.
(k) Methods for sealing the keyways in preparation for filling with non-shrink grout, including the use of backer rods. The Contractor shall not assume that the backer rods will restrain the pressure from the grout in vertical grout joints. Provide additional forming to retain the backer rod.

C. Survey and Layout.

Working points, working lines, and benchmark elevations shall be established prior to placement of all elements. The Contractor is responsible for field survey as necessary to complete the work. MassDOT reserves the right to perform additional independent survey. If discrepancies are found, the Contractor may be required to verify previous survey data.

D. Preparation of Closure Pour Keyways.

Immediately prior to erecting the Precast Concrete Bridge Elements, the closure pour shear keys shall be cleaned at the job site of all dust, dirt, carbonation, laitance, and other potentially detrimental materials which may interfere with the bonding of the closure pour concrete and precast concrete using a high-pressure water blast. The exposed reinforcing steel in the precast concrete shall be protected from damage during the cleaning of the keyways. Damaged epoxy coating of steel reinforcement shall be repaired, and the reinforcing steel shall be cleaned as directed by the Engineer. The surfaces of the shear keys shall be wetted so that the surfaces shall have a Saturated Surface Dry (SSD) condition for at least 24 hours prior to the placement of the closure pour concrete.

ITEM 995.01 (Continued)

E. Erection.

The elements shall be placed in the sequence and according to the methods outlined in the Erection Procedure and Quality Control Plan for Precast Pile Cap Units, Precast Abutment Stem Units, Precast Approach Slab Units, Precast Wingwalls, and Precast Highway Guardrail Transitions. As the erection proceeds, the Contractor shall constantly monitor the assembly to ensure that the precast concrete bridge element is within proper horizontal and vertical location and tolerances prior to releasing it from the crane and setting the next unit. The Contractor may use shims to maintain proper setting tolerances.

The concrete elements shall be lifted only by the lifting devices, and the utmost care shall be taken to prevent distortion of the elements during handling, transportation or storage.

Suitable spreaders shall be used during lifting so that only a vertical pull will be made on the lifting device. A non-vertical lifting force may be permitted if prior written approval is given by the Engineer. This approval will be contingent on the Contractor demonstrating by calculations, prepared by a Professional Engineer registered in Massachusetts, that the elements will not be damaged by the non-vertical lifting force and by documentation that the capacity of the lifting devices is adequate for the non-vertical lifting force.

Precast components shall be pre-bed with non-shrink grout thicker than shim stacks prior to placing other precast elements on top of them.

After all Precast Concrete Bridge Elements have been placed, the actual overall dimensions of the structure both horizontal and vertical, as laid out shall not deviate from the nominal dimensions shown on the plans beyond a tolerance of +0 inches and -1 inches. Once the layout of Precast Concrete Bridge Elements has been accepted by the Engineer, the Contractor shall cut all lifting devices off below the surfaces of the elements.

F. Filling of Blockouts for Lifting Devices and Threaded inserts.

If the blockouts in the Precast Concrete Bridge Elements where the lifting devices were located will be exposed and visible after assembly is complete, the Contractor shall fill these blockouts with Cement Mortar (M4.02.15) or grout.

After the formwork has been removed, all threaded inserts that have been cast into the precast concrete bridge deck for support of the formwork shall be filled with a grout of the same color as that of the precast concrete.

ITEM 995.01 (Continued)

SCHEDULE OF BASIS FOR PARTIAL PAYMENT

Within ten (10) days after the Notice to Proceed, the Contractor shall submit on his/her proposal form a schedule of unit prices for the major component Sub-Items that make up Item 995.01 as well as his/her total bridge structure Lump Sum cost for Bridge Structure No. C-20-004 (5YQ). The bridge structure Lump Sum breakdown quantities provided in the proposal form are estimated and not guaranteed. The total of all partial payments to the Contractor shall equal the Lump Sum contract price regardless of the accuracy of the quantities furnished by the Engineer for the individual bridge components. The cost of labor and materials for any Item not listed but required to complete the work shall be considered incidental to Item 995.01 and no further compensation will be allowed.

Sub Item	Description	Quantity	Unit	Unit Price	Total
482.31	Sawing & Sealing Joints in Asphalt Pavement at Bridges	50	FT		
904.3	5000 psi, 3/4 in., 685 HP Cement Concrete	20	CY		
904.32	8000 psi, 3/8 in., HP Cement Concrete	33	CY		
910.1	Steel Reinforcement for Structures - Epoxy Coated	6100	LB		
922.	Laminated Elastomeric Bearing Pad without Anchor Bolts	8	EA		
930.60	Precast Approach Slab Units	8	EA		
930.61	Precast Abutment Units	8	EA		
930.62	Precast Wingwalls	4	EA		
930.63	Precast Pile Cap Units	10	EA		
930.64	Precast Concrete Highway Guardrail Transition	4	EA		
931.21	Prestressed Concrete Deck Bulb Tee Beams (NEDBT40)	338	FT		
965.	Membrane Waterproofing for Bridge Decks	2,125	SF		
970.	Damp-Proofing	1,215	SY		
975.1	Metal Bridge Railing (3 Rail), Steel (Type S3-TL4)	201	FT		

Total Lump Sum Price for Item 995.01 =

The above schedule applies only to Bridge No. C-20-004 (5YQ). Payment for similar materials and construction at locations other than at this bridge structure shall not be included under this Item.

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DETAIL SHEETS

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THE COMMONWEALTH OF MASSACHUSETTS
MassDOT - HIGHWAY DIVISION
TEN PARK PLAZA, BOSTON, MA

PRELIMINARY ESTIMATE OF QUANTITIES - DETAIL SHEETS

Town: Conway **Road:** NORTH POLAND ROAD

Station: 10+10.00 TO 16+00.00 **Class**: Rural – Bridge Replacement

Date: August 3, 2024

Item 101. CLEARING AND GRUBBING

LOCATION	STA. TO	STA.	LT/RT
N. POLAND RD	11+50	11+87	LT
	13+00	13+25	LT

Item 102. SELECTIVE CLEARING AND THINNING

LOCATION	STA. TO	STA.	LT/RT
N. POLAND RD	10+20	10+53	LT
	10+50	11+50	RT
	11+50	12+70	RT

Item 102.2 TREE TRIMMING

LOCATION	STA. TO	STA.	LT/RT
N. POLAND RD	10+51	11+33	RT
	11+62	12+55	RT

Item 104. TREE REMOVED - DIAMETER 24 INCHES AND OVER

LOCATION	STA. TO	LT/RT
N. POLAND RD	12+45	RT

Item 201. CATCH BASIN

LOCATION	STR. NO.	STA.	LT/RT
N. POLAND RD	CBCI-1	14+56	RT
	CB-2	14+85	RT

Item 205.1 LEACHING BASIN – 6 FOOT DIAMETER

LOCATION	STR. NO.	STA.	LT/RT
N. POLAND RD	LB-2	14+57	RT
	LB-3	14+67	RT
	LB-4	14+78	RT

Item 242.12 12 INCH REINFORCED CONCRETE PIPE FLARED END

LOCATION	STA. TO	LT/RT
N. POLAND RD	14+91	RT

Item 506. GRANITE CURB TYPE VB – STRAIGHT

LOCATION	CURB	STA. TO	STA.	LT/RT
N. POLAND RD	STRAIGHT	13+36.94	13+67.03	LT
	STRAIGHT	13+44.13	14+68.25	RT

Item 514. GRANITE CURB INLET – STRAIGHT

LOCATION	STR. NO.	STA.	LT/RT
N. POLAND RD	CBCI-1	14+56	RT

Item 767.121 SEDIMENT CONTROL BARRIER

LOCATION	STA to	STA	LT/RT
North Poland Rd	10+15.31	12+71.47	LT
	11+58.64	12+73.71	RT
	12+89.90	14+62.49	LT
	13+11.58	16+00.0	RT
	15+02.50	16+00.0	LT

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DRAWINGS AND SKETCHES

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CONWAY
NORTH POLAND ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	----	09	40
PROJECT FILE NO.	609082		

CURB TIE & GRADING PLAN

609082_HD(4657 TIE).DWG Plotted on 21-Jul-2023 12:03 PM

Curve Table			
Curve #	Delta	Radius	Length
C4	0°33'34"	345.00	3.37
C5	18°03'55"	321.00	101.21

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	10+00.00	3013712.342	320974.761		N11°09'23"W 139.26'	11+39.26	3013848.973	320947.815
C1	11+39.26	3013848.973	320947.815	R=335.00' Δ=15°46'27" L=92.23' T=46.41'		12+31.49	3013935.880	320917.817
L2	12+31.49	3013935.880	320917.817		N26°55'51"W 131.76'	13+63.25	3014053.351	320858.141
C2	13+63.25	3014053.351	320858.141	R=333.00' Δ=24°11'08" L=140.57' T=71.35'		15+03.82	3014188.223	320822.411
C3	15+03.82	3014188.223	320822.411	R=125.00' Δ=35°36'56" L=77.70' T=40.15'		15+81.52	3014262.052	320842.280
L3	15+81.52	3014262.052	320842.280		N32°52'13"E 93.49'	16+75.00	3014340.571	320893.019

Total fence length: 800 Feet

Red = Limit of turtle protection barrier
Blue = Construction gate

BEGINING OF PROJECT
STA. 10+50.00
N 3014199.4594
E 320824.8797
MEET EXISTING

END OF PROJECT
STA. 15+55.00
N 3014238.4262
E 320830.3497
MEET EXISTING

Turtle protection barrier integrated into water control structures such as cofferdams and supersacks

0 20 50 100
SCALE: 1" = 20'

FOR PROFILE SEE SHEET 08

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PROJECT UTILITY COORDINATION FORM

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Project Utilities Coordination (PUC) Form

CONTACTS AND GENERAL UTILITY INFORMATION

Printed: 4/19/2024

City/Town:	Project File #:	PUC Completed by:	Utility Pole Set:	
Conway	609082	Shane Burdick	Eversource	
Route/Street:	**Resident Engineer:**	**Mass DOT PM:**	**Scheduled Ad Date:**	**Total Poles Relocated:**
North Poland Road over Poland Brook	*TBD*	Courtney Sulerud	8/3/2024	3 temp 5 perm

Consultant:	Contact:	Cell #	Office #	Email
BETA Group, Inc.	Christopher Jones	(781) - 408 - 9839		cjones@beta-inc.com

Utility Company	Contact	Office #	Cell #	Email	Scope, Budget, Duration Submitted		Reimbursement			Potential for District Initiated Early Relocation *		Utilities On Bridge/Structure		Utilities Underground (UG) /Aerial (OH)	
					Yes	No	Agreement	Non-Reimb'le	Notes	YES	NO	YES	NO	UG	OH
Eversource	Mike Santos	(413) 787-9354		michael.santos@eversource.com	X		X				X		X		X
Comcast	Bob Payne	(413) 427-3411		bob@paynegang.com	X		X				X		X		X
Pike (Verizon)	Steve Klaubert	(413)-246-9792		sklaubert@pike.com	X		X				X		X		X
Eversource	Nicholas Langone	(413)-787-9022		nicholas.langone@eversource.com											
Comcast	Tom Brown	(617) 279-7859		Thomas_Brown@cable.comcast.com											
Verizon	Paul Styspeck	(413) 787-1845	(413) 575-7058	paul.m.styspeck@verizon.com											

Utility Relocation Notes for MassDOT Contractor

Unless otherwise noted by Contract, the MassDOT Contractor is to provide the District Construction Office with 7 Calendar Days advance notification in order to validate the current progress and provide the required 30 Days advance notice-to-proceed for the first Utility - and each subsequent Utility. These advance notifications are to be identified in the Contractor's Schedules (Pre-Con preparation, Baseline, Subnets, and Updated/Monthly Schedules) as specified in Subsection 8.02 (for DBB Contracts) and/or Section 9 (of DB Contracts). Note: The durations included below do not include these lead-times. See Additional 'Important Basis notes for Contractor' - on last PUC Form page.

Additional notes:

The Contractor will be responsible to provide and maintain temporary access for the setting and removal of the temporary pole on the West side of the bridge near STATION 13+05 LT. Access for this pole will be paid for under Item 118. Providing access to all the other poles is incidental to the contract.

Suggested Sequence of Relocation (Based on Consultant proposed construction staging)

The sequence as detailed on the following pages is based on the consultants proposed staging plan. This information was compiled through meetings that included all of the utilities listed below along with the designer and the Town of Conway. The information provided is the best available information prior to project advertisement.

Is 'enabling' (prep) work, by the Contractor, necessary prior to the start of the first series of utility relocations:	Yes	No
	X	

Has any of the Utility work been identified to work concurrently	Yes	No
		X

4/19/2024
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massDOT Massachusetts Department of Transportation Highway Division

	RESPONSIBLE PARTY		DESCRIPTION - Utility Relocation Phases, Tasks and Activities	Estimated Duration (Work Days) by Utilities (Lead time not included)	Concurrent / Exclusive Utility Work Contractor note: In planning and executing the work, the Access Restraints listed in the Special Provisions, takes precedence over the checklist in these 4 columns.				Access Restraint & Limitations of Operations Notes Should an AR be considered for the Contractor ?	
					Exclusive Utility on site	Concurrent Utilities	Contractor Off-Site	Contractor Concurrent		
	C = Contractor	U = Utility Co.			Utility working with no other Utilities in vicinity	Utility working with other Utilities on site	No Contractor physical construction operations on-site (while Utility	Contractor and Utility are working on-site - but NOT in the same vicinity	Potential Access Restraint (Yes/No)	Reason/Note (optional)
Phase 1	C		Enabling work by the Contractor includes: * 90-day initial lead time required prior to first pole set / scheduled move due to supply shortages. * Site clearing must be completed prior to DOT staking pole locations. * DOT will stake pole locations within 5 workdays of being notified clearing has been completed. * Eversource will require 5 workdays after the staking for the poles to clear their DIG-SAFE. * Contractor to schedule a utility meeting to confirm all poles are staked correctly at least 30 days prior to first pole set / scheduled move. Required access to set poles should be discussed at this meeting. Temporary access as needed shall be installed by the contractor. * It is anticipated that removal of the temporary access may delay installation of the guardrail on the North-West side until the temporary utility poles have been removed.							
			UTILITY OPERATIONS - Pole Set / Temporary Overhead Relocation							
Task: 1			***Utility Co. - Eversource***							
		U	Install poles	2	X		X		Yes	
		U	Frame poles	1	X		X		Yes	
		U	Install/remove Conductor	1	X		X		Yes	
			Sub-Total	**4**						
Task: 2			***Utility Co. - Comcast***							
		U	Run strand and coax attaching to temporary poles	2	X		X		Yes	
		U	Splice and activate coax	1	X		X		Yes	
		U	Delash fiber and move to temporary poles. Relash fiber	2	X		X		Yes	
		U	Wreck out old strand and coax	1	X		X		Yes	
			Sub-Total	**6**						
Task: 3			***Utility Co. - Verizon***							
		U	Verizon to place new PAG's & strand where necessary	2	X		X		Yes	
		U	Verizon place slack cable and splice.	5	X		X		Yes	
		U	Verizon transfer all cables, drops, and equipment to temporary poles.	2	X		X		Yes	
			Sub-Total	**9**						
Task: 4			***Utility Co. - Eversource***							
		U	Remove Poles	1	X		X		Yes	
			Sub-Total	**1**						
Phase 2	C		Enabling' work by the Contractor - Contractor to complete bridge construction. * It is anticipated that removal of the temporary access may delay installation of the guardrail on the North-West side until the temporary utility poles have been removed.							
			UTILITY OPERATIONS - Pole Set / Temporary Overhead Relocation							
Task: 1			***Utility Co. - Eversource***							
		U	Install poles	1	X		X		Yes	
		U	Frame Poles	1	X		X		Yes	
		U	Install/remove Conductor	2	X		X		Yes	
			Sub-Total	**4**						
Task: 2			***Utility Co. - Comcast***							
		U	Run strand and coax attaching to new poles	2	X		X		Yes	
		U	Splice and activate coax	1	X		X		Yes	
		U	Delash fiber and move to permanent poles. Relash fiber.	2	X		X		Yes	
		U	Wreck out old strand and coax	1	X		X		Yes	
			Sub-Total	**6**						
Task: 3			***Utility Co. - Verizon***							
		U	Verizon to place new PAG's & strand where necessary on permanent poles	2	X		X		Yes	
		U	Verizon transfer all cables, drops, and equipment to permanent poles.	5	X		X		Yes	
		U	Verizon to trim out/remove copper cable slack and place fiber loop on new poles	3	X		X		Yes	
		U	Verizon remove PAG's on temp poles, 100% VZ anchor	2	X		X		Yes	
			Sub-Total	**12**						
Task: 4			***Utility Co. - Eversource***							
		U	Remove Poles	1	X		X		Yes	
			Sub-Total	**1**						

RESPONSIBLE PARTY		DESCRIPTION - Utility Relocation Phases, Tasks and Activities	Estimated Duration (Work Days) by Utilities (Lead time not included)	Concurrent / Exclusive Utility Work Contractor note: In planning and executing the work, the Access Restraints listed in the Special Provisions, takes precedence over the checklist in these 4 columns.				Access Restraint & Limitations of Operations Notes Should an AR be considered for the Contractor ?	
C = Contractor	U = Utility Co.			Exclusive Utility on site	Concurrent Utilities	Contractor Off-Site	Contractor Concurrent	Potential Access Restraint (Yes/No)	Reason/Note (optional)
				Utility working with no other Utilities in vicinity	Utility working with other Utilities on site	No Contractor physical construction operations on-site (while Utility	Contractor and Utility are working on-site - but NOT in the same vicinity		

IMPORTANT BASIS NOTES - FOR CONTRACTOR

1	Unless otherwise specified in the MassDOT Construction Contract, or unless specifically noted within this PUC Form, these durations (herein) are based upon the Contractor providing *unimpeded access* to the Utility company to perform Utility relocations (see Note 5 - Access).
2	"Concurrent Utilities" operations noted herein, are to signify those Utility Company operations that can be worked concurrently (e.g. Utility A and Utility B work on-site together) - MassDOT and the Contractor are to prepare NTPs to Utilities accordingly.
3	"Potential Access Restraints" noted within this PUC Form are for planning purposes. See MassDOT Contract for Contractual Access Restraints (refer to Subsections 8.02, 8.03, and/or 8.06 for Design Bid Build Contracts and Volume II Section 9 for Design Build Contracts).
4	Utility non-work periods - For planning purposes, the durations above contain some non work days (contingency) for New England conditions (precipitation, high temperatures, low temperatures, snow, ice). Gas line work and underground conduit installations however, typically have a seasonal restriction and can NOT be installed from 15-November to 15-March. Municipally Owned Electric and Gas Utilities are also restricted from proceeding from 15-November to 15-March. The Contractor shall (and the CTD plan) reflect this calendar restriction within the schedule (unless otherwise noted).
5	Access - Unless otherwise noted in the Contract, and in addition to the 'enabling' notes above, the Contractor must provide safe and unimpeded access (for trucks, lifts, cranes, etc.) to the Utilities, to allow for the proposed relocation(s) - including but not limited to snow removal, clearing and grubbing, guard rail removal, barrier removal, tree removal, and grading. Any costs associated with these tasks are deemed to be incidental to the project.
6	For all MassDOT construction contracts issued after January 2014, the new Utility Coordination/documentation specification is required. This is Section 8.14 in Design-Bid-Build Contracts (see Design-Build index reference for applicable section #).
7	Prior to starting any and all enabling work for Utilities, the Contractor is to plan in advance with submittals and approved durations.
8	* Potential District Initiated Early Utility Relocation - if noted herein, the District reserves the right to initiate early utility relocation in advance of the Contract NTP. In submitting a bid price and in the development/basis of the Baseline Schedule, the Contractor shall not plan the Work with the potential benefit of any form of 'early utility relocation.' As a requirement of the Baseline submission, unless otherwise noted in this Specification, the earliest that the first Utility company is to receive the 30 days advance notification to mobilize to the site, will be 7 calendar days after the pre-construction meeting and never sooner than 7 days after the Contract NTP.

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DOCUMENT A00810

MassDOT Herbicide Use Report

MassDOT Herbicide Use Report

Date Submitted:

Use multiple sheets for multiple application techniques or sites as needed.

Contractor Performing Work:

Project or Contract No:

Town/s:

Associated Route:

Project Description:

Treatment Description:

Area Treated (as applicable)

Acres: **Sq Yds:** **Miles:**

Weeds Targeted:

Gallons Formula Used:

Date/Time Began:

Application Method:

Date/Time End:

Product Used:

Name: _____	Name: _____	Name: _____
EPA Reg. No: _____	EPA Reg. No: _____	EPA Reg. No: _____
% Active Ingredient	% Active Ingredient	% Active Ingredient
Dry: _____	Dry: _____	Dry: _____
Liquid: _____	Liquid: _____	Liquid: _____
Formulation (dilution rate): _____	Formulation (dilution rate): _____	Formulation (dilution rate): _____

Additional products used (surfactants, etc.) or other information:

Applicators:	**License Numbers:**

Upon completion, please submit form to MassDOT District Engineer and Landscape Design Section in Boston office.
11-16-2017

Temporary Traffic Control

Typical Details and
Massachusetts Guidelines
for MassDOT, Municipalities,
Utilities, and Contractors

SHEET INDEX (1 OF 3)

SHEET INDEX (2 OF 3)

STATIONARY OPERATIONS (CONT.) **PAGE**

MOBILE OPERATIONS

SHEET INDEX (3 OF 3)

INTRODUCTION

This guide has been prepared to assist in the planning and installing of temporary traffic controls in maintenance, utility, or short-term construction work areas (work lasting 10 hours or less). This guide serves to assist with the many decisions that must be made for each work site. Special planning for traffic control is necessary on a case by case basis because conditions can vary widely among work locations. **Since this guide cannot cover every situation, representative illustrations covering typical short-term construction, maintenance, and utility operations are presented**.

All typical traffic control device setups illustrated should be considered as guides. The traffic control devices that are shown, the arrangement or position of the devices, and the distances prescribed in the tables are based on the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) and the Massachusetts Amendments to the MUTCD (MA Amendments), but these illustrations only present minimum standards. The provision of safe work zones for all roadway users and roadway workers affected by these activities is paramount. Traffic controls may be expanded or improved upon whenever deemed necessary. Traffic movement through the work site all traffic control devices shall be periodically observed and inspected at all locations.

If necessary, Part 6 of the MUTCD and the MA Amendments, Chapter 17 (Work Zone Management) of MassDOT's Project Development & Design Guide, and the “Traffic Engineering and Safety Section” of the MassDOT web site: (https://www.massdot.state.ma.us/highway/Departments/TrafficandSafetyEngineering.aspx), as well as MassDOT District offices can provide additional guidance, information, and suggestions for work zone setups.

RESPONSIBILITIES FOR TRAFFIC CONTROL

Short-term construction, maintenance, and utility work on or near the roadway creates a potentially hazardous situation, typically requiring the use of temporary traffic controls. These controls are important to protect both work crews and the road users. It is the responsibility of each maintenance foreman to establish and maintain safe and effective controls.

Usually the supervisor, working with the crew, plans the traffic control procedures for proposed work sites. The foreman is responsible for re-questing, storing, and maintaining all traffic control devices necessary for their crews.

The foreman is responsible for placing the devices according to these guidelines. They must inspect each installation and observe traffic flow through the area. The foreman is generally authorized to make adjustments to the original installations that, in their judgment, are necessary to improve the control of traffic and establish greater safety.

All necessary traffic control devices must be installed before work begins and properly maintained during the work period. They must also be removed as soon as they are no longer relevant to the roadway conditions.

In situations such as night time road or lane closures, detours, or other unusual conditions on state highways, the District Traffic Maintenance Engineer (DTME) should be advised. If the DTME is absent, the section foreman shall follow the instructions of the District Maintenance Engineer.

TRAFFIC CONTROL DEVICES

Traffic control devices regulate the movement of road users, warn of unexpected or unusual roadway conditions, and inform them how to maneuver safely through or around the work area. All signs, channelizing devices, barricades, and other miscellaneous traffic control devices should work together to guide traffic safely and efficiently. Common temporary traffic control devices are outlined and described below.

Signs

Temporary traffic control zone (TTCZ) signs are the primary means of providing information and directions to roadway users. All signs must be retroreflective per MassDOT's latest standard.

Warning signs call attention to unexpected conditions and to situations that might not be readily apparent to road users on or adjacent to a roadway. Warning signs alert road users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations. Nearly all warning signs for construction and work areas have black legends and borders on a fluorescent orange background.

Regulatory signs shall be used to inform road users of selected traffic laws or regulations and indicate the applicability of the legal requirements. Regulatory signs typically have black legends and borders on a white background.

Channelizing Devices

When used properly, traffic cones, reflectorized plastic drums, and barricades guide traffic through the work area along an appropriate travel path. It takes roadway users a certain distance along the roadway to safely move away from the upcoming active work site. These transition distances are based on the following taper length (L) formulas:

L = $WS^2/60$ for speeds of 40 mph or less; or

L = WS for speeds of 45 mph or more; where

- L = minimum length of taper in feet,
- S = posted speed limit or typical travel speed in miles per hour prior to the work, and
- W = width of lane closure in feet.

The spacing of channelizing devices (in feet) is approximately equal to the existing speed of traffic (in mph).

Warning Lights

Rotating beacons and other flashing lights mounted on work vehicles, signs, or channelizing devices help alert roadway users to the work area. They may also be used to warn roadway users of hazards within the work area. The first 10 drums in any taper shall be equipped with sequential flashing lights.

Arrow Boards

Arrow boards are a special type of sign that are highly visible work zone warning devices. They are particularly effective on highways, where both speed and volume are high. Arrow boards in the non-directional, CAUTION, mode (four corner flashing) may be used to indicate that a shoulder is closed. Arrow boards in the arrow mode shall only be used when a travel lane is dropped on a multi-lane road and one lane of traffic must merge with another. All arrow boards should be located at the beginning of each lane or shoulder closure taper without extending outside of it. Arrow boards shall flash at a rate of 25 to 40 flashes per minute. Arrow boards shall not be used to indicate a lane shift.

BASIC REQUIREMENTS

In every work situation, the temporary traffic control setup must: Give roadway users sufficient advance warning of the work area; advise roadway users of the proper actions to take and travel paths to follow; and provide protection to roadway users, workers, and the work area. These three general requirements can be met as outlined below.

Provide Advance Warning

Warning devices along the approaches to a work area alert roadway Users to changes to road and operating conditions. Roadway users are usually alerted to these dangers via a sign or series of signs installed in the same order as the roadway user generally would expect to see them on long-term construction projects.

The initial project limit sign is usually a general warning such as “ROAD WORK 1500 FT”. Other operational warning signs then provide the roadway user with more specific information about the situation. A minimum of three advance warning signs (the initial project limit sign and two operational warning signs) is recommended when work is located on the traveled way. Warning lights and flags can be used to attract attention to the signs. A highly visible work area helps reinforce the advance warnings.

Advise and Direct Travelers

Operational warning signs provide information to the road-way user such as the type of work being performed, special conditions to watch for, or actions to take. These include signs such as, SHOULDER WORK, RIGHT LANE CLOSED, DETOUR 500 FT, ROAD CLOSED to THRU TRAFFIC, POLICE OFFICER AHEAD, etc. All of these signs must be located far enough in advance of the work area that the roadway user has sufficient time to react to them appropriately. For projects in Urban Areas, see detail: Typical Device Spacing for minimum sign spacing.

Protect Travelers, Workers, and the Work Area

The primary protection of any work area is its own visibility. Traffic cones, reflectorized plastic drums, portable breakaway barricades, etc. are used to make the work area visible and separate workers from traffic.

Other devices, such as flashing lights, flags, delineators, temporary lighting, and portable changeable message signs (PCMS) can be used to provide additional emphasis and visibility.

Workers must protect themselves by being alert to their work situation, wearing safety vests and hard hats, and by facing traffic whenever possible.

Work vehicles can also add protection when they are equipped with truck mounted attenuators, rotating beacons, flashing lights, flashing arrow boards, etc. and are parked between workers and oncoming traffic. However, workers should not position themselves between two closely parked vehicles. No private personal vehicles are allowed within the work site.

PLANNING GUIDELINES

Decisions regarding selection of work area traffic control devices require a knowledge and understanding of the specifics of each work zone. As there may be vast differences between situations, three main variables need to be considered prior to determining the need for, or the selection of, traffic control devices: 1) location of work, 2) type of roadway, and 3) speed of traffic.

Compiling information about these variables will help with planning a safe work area control. Each of these variables is explained below.

Location of Work

The choice of traffic controls needed for a short-term construction, maintenance, or utility operation depends upon the work zone's location. As a general rule, the closer the active work site is to the roadway, the more control devices are needed. Work can take place:

- Away from the shoulder or edge of pavement. No special devices are needed if work is confined to an area 15 or more feet from the edge of the shoulder. A general warning sign, such as ROAD WORK AHEAD, should be used if workers and equipment must occasionally move closer to the roadway.
- On or near the shoulder/ edge of pavement. This area should be signed as if work were on the road itself, since it is part of the roadway users' recovery area. Advance warning and operational signs are needed, as well as channelization devices to direct traffic and keep the work area visible to roadway users.
- On the median of a divided highway. Work in this location may require traffic control in both directions of traffic. Advance warning and channelization devices should be used if the median is narrow.
- On the roadway. This condition requires detailed protection for workers and sufficient warning to roadway users. Advance warning must provide a general message that work is taking place as well as information about specific hazards and specific actions the roadway user must take.

TYPE OF ROADWAY

The characteristics of the roadway also have an important influence on the selection of work area traffic control. The roadway, itself, may present special hazards. You should plan for maximum protection, using the worst hazard present as your guide to signing the work area. Some general considerations are described below for road conditions.

One-way roads: A one-way road requires signage on both sides of the road if it carries two or more lanes in one direction, ensuring roadway users in all lanes are alerted and informed.

Two-way roads:

- **Undivided:** Two-way, undivided roads will usually require controls for both directions of traffic. When the active work site is well off the roadway, controls for the opposite lane may be eliminated.
- **Divided:** Work on divided multi-lane roadways can often be handled as work along a one-way road (i.e. signs are provided along both sides of the roadway along the direction affected). If the work is in the median, both directions of traffic must be controlled, and both approaches should be double signed (i.e. have all 3 advance warning signs on both sides of each direction).

EFFECTS OF SPEED ON WORK ZONES

Speed is an important consideration in the use of work area traffic control devices. As a general rule, the greater the speed of traffic approaching a work area, the greater the size, number, and spacing of control devices.

Size. The standard size for most warning signs is 36 x 36 inches on conventional roadways and 48 x 48 inches on freeways and expressways. Signs larger than the standard 36 x 36 inches may be desirable on high-speed conventional roads.

Position. Install signs far enough in advance of the work area so the roadway users have time to react to them (see charts associated with diagrams for spacing).

OTHER FACTORS

Sight Obstructions. To ensure safety, work areas must be visible. Assess the placement of the temporary traffic control devices by driving through the area, and determine if the devices can be easily seen and provide sufficient time for roadway users to react in a safe manner. Extra precaution should be enacted in areas where horizontal or vertical curves may obstruct a roadway user's clear view of road activities ahead.

Police/Flaggers. It should be noted that the MUTCD does not require police/flaggers for stationary setups. If police/flaggers are used, a police/flagger ahead sign should be used in advance of any point where the police/flagger is stationed to control road users.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL

1. PLAN YOUR WORK

Inspect location of work area and its surroundings.

Analyze:

- Location of work in relation to the traveled way, intersecting road-ways, driveways, and sight distances;
- Type of roadway and traffic involved; and
- Volume and speed of traffic.

Meet and discuss the work and necessary traffic control with the crew.

Study representative illustrations in this guide to develop a temporary traffic control plan (TTCP).

Other Considerations:

- Base your traffic control plan on the premise that all roadway users are unfamiliar with the area.
- The closer the work area location is to traffic, the more controls are needed.
- Plan for maximum protection.
- Select and inspect the temporary control devices needed (including all warning signs), if they are not in good condition, REPLACE THEM!
- Then collect and transport them to the work site.
- Determine their proper placement.
- Install signs and other traffic control devices prior to allowing personnel or equipment onto the roadway.
- Make sure signs are reflective, accurate, clean, and meet specifications. Completely cover any existing permanent signs that will conflict with the messages of the new work area control signs.

2. INSTALLING/REMOVING TEMP. TRAFFIC CONTROL DEVICES

Care must be exercised when installing and removing temporary traffic control (TTC) devices. The traffic control needed to perform the operation safely is dictated by the location on the roadway the operation will occur: in a shoulder or a lane, in the left lane or right, etc. In all cases, installing TTC begins and ends as a mobile operation.

A shadow vehicle with a truck mounted attenuator (TMA) shall be used to protect workers installing and removing TTC devices on all roadways with a posted speed limit of 45 MPH or greater as directed by the engineer. TTC devices shall not be installed or removed from a shadow vehicle with a TMA. TTC devices shall be installed or removed from a work operation vehicle only and a shadow vehicle with a TMA shall be used to protect the workers installing or removing the devices.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL (CONT.)

3. INSTALL TRAFFIC CONTROL DEVICES AT WORK SITE

FOR LOWER SPEED (≤ 40 MPH) ROADWAYS:

1) All devices shall be installed in order with the flow of traffic.

2) Where one direction of traffic is being affected, the first sign installed should be the sign farthest from the work site, and on the same side as the work.

3) Where two directions of traffic are affected, install signs for opposing traffic first, starting with the sign farthest from the work area. When signs for opposing traffic have been installed, install signs on the same side as the work area, again beginning with the sign farthest from the active work site.

4) Once signs are in place, other traffic control devices shall be installed in the same manner as the signs.

FOR HIGHER SPEED (≥ 45 MPH) ROADWAYS:

1) All devices shall be installed in order with the flow of traffic.

2) Install all advance warning signs, beginning with the ROAD WORK XXX (W20-1) sign and ending with the END ROAD WORK/DOUBLE FINES END (MA-R2-10E) sign.

3) Install all signs beginning with the opposite side which will be closed (for a right lane closure; first, install all signs on the left side (shoulder) and then install all signs on the right side (shoulder). No signs shall be erected on the roadway unless delineated by traffic control devices.

4) If required, install shoulder taper as the mobile operation advances.

5) Install arrow board on the shoulder prior to the merging taper or as close to the beginning of the merging taper as possible.

6) Install channelizing devices to form a merging taper. Use of a shadow vehicle with a TMA during installation is required on roads with speed limits of 45 MPH or greater or as directed by the Engineer.

7) Install traffic control devices along the buffer space at the appropriate spacing.

8) Continue placing devices along the work space at the appropriate spacing.

9) Install devices for the termination area as necessary.

10) Place the shadow vehicle with a TMA in advance of the first work crew or hazard approached by motorists. Multiple shadow vehicles may be required based on the number of lane and shoulder closures implemented.

4. INSPECT WORK AREA SIGNING AND CONTROL DEVICES

1) Assess the placement of the temporary traffic control devices by driving through the work area. All approaches to the work zone should be checked.

2) Ensure roadway users will have sufficient time to read signs and react in a safe manner.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL (CONT.)

3) Check visibility of entire work area. If approaching roadway users can't see the work area well, or if they can't see ahead to traffic that may already be queued on the approach because of the work, additional traffic control devices should be deployed.

4) Check to ensure the proper temporary traffic control devices are positioned to protect workers from traffic (where possible).

5) Ensure all workers wear safety vests, hard hats, and all other necessary safety equipment. All worker safety gear should be in good condition. All reflective gear should be clean and highly visible in the dark.

6) Record in the log book the number and location of all signs and devices.

Considerations:

- Work area signs should never be blocked from view or obscured by vegetation, existing signs, or other obstructions.
- Flags, flashing lights, and edge line traffic cones can be used to improve visibility.

5. REMOVE TRAFFIC CONTROL DEVICES AT WORK SITE

All workers and equipment should be clear from work site BEFORE removing signs and other devices.

FOR LOWER SPEED (≤ 40 MPH) ROADWAYS:

1) Remove signs and other devices within the delineated area when work is complete.

2) Remove other traffic control devices in the reverse order in which they were installed

3) Remove signs in the reverse order in which they were installed (i.e. sign closest to the work area to be removed first).

4) When the operation is complete, uncover any existing permanent signs covered in Step 2.

5) Record in the log book the time at which the signs were removed.

FOR HIGHER SPEED (≥ 45 MPH) ROADWAYS:

All TTC devices for a stationary lane closure on a multi-lane roadway, except advance warning signs, should be removed against the flow of traffic in the following sequence:

1) Remove the channelizing devices starting from the end of the activity area working back to the widest part of the merging taper.

2) A shadow vehicle with TMA shall be positioned to protect workers removing devices and work backwards as the setup is removed from the roadway.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL (CONT.)

3) Place the removal vehicle on the shoulder, and remove the channelizing devices from the merging taper by hand onto the work vehicle.

4) Remove the arrow board once traffic is clear and it is safe to do so.

5) Circle back and moving with the flow of traffic, remove the advance warning signs starting with the opposite side from previous lane closure first.

6) At no time shall workers run across the multilane roadway to remove signs on both sides of the road simultaneously.

7) Record in the log book the time at which the signs were removed

RAMP FACILITIES

At all times it is necessary to control the on and off-ramp traffic during the installation and breakdown of traffic control devices. Use of temporary traffic slow-downs or rolling roadblocks is recommended to allow for the safety of workers handing temporary traffic control devices on ramp facilities. A shadow vehicle with a TMA shall be used to protect the workers installing or removing the devices. At no time shall the work operation vehicle be used as the shadow vehicle with the TMA.

USE OF THIS GUIDE

Illustrations showing minimum standards for short-term construction, maintenance, and utility operations are arranged in this guide by type of operation. The users of this guide should compare all illustrated examples and examine their differences. After gathering information about the work zones using the general guidelines as outlined, proceed as follows:

1) Turn to the Index. Consider the type of operations and the type of roadway upon which work will occur.

2) Select the figure that most closely matches the conditions where you plan to work. Remember that all diagrams represent minimum standards.

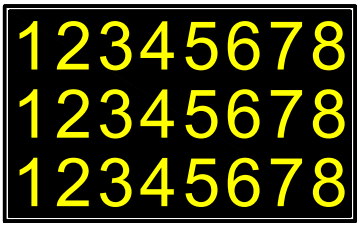
3) Read the title of the illustration to ensure that it is appropriate to your location. Study the layout of traffic control devices and read all notes.

4) Consult the appropriate tables, as directed on each illustration to determine taper length and proper spacing of signs. Notice that distances change when speeds change. Also note that these are guidelines, only, and they must be adapted to your specific work area.

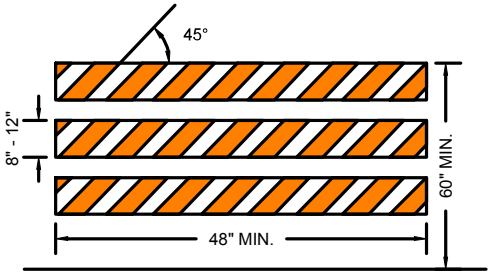
5) Use the **"PROCEDURES FOR WORK AREA TRAFFIC CONTROL"** for assistance in completing all necessary steps to provide effective and safe work area traffic control.

massDOT Massachusetts Department of Transportation Highway Division PAGE 10	Work Zone Safety Standard Details and Drawings	FIGURE 1 TYPICAL TRAFFIC CONTROL DEVICES NOT TO SCALE

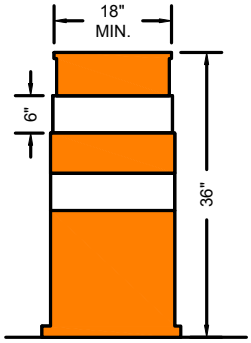
SIGN



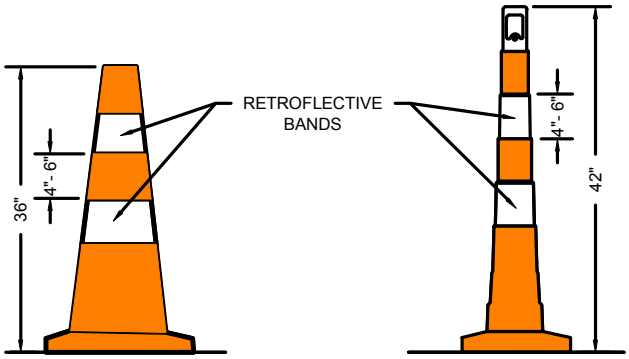
PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)



TYPE III BARRICADE

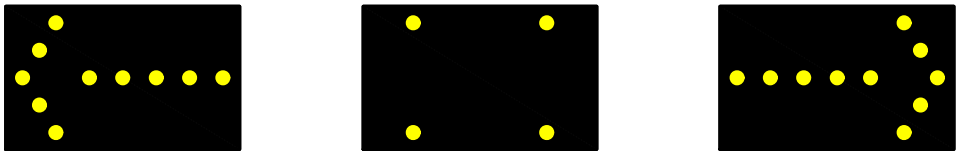


DRUM



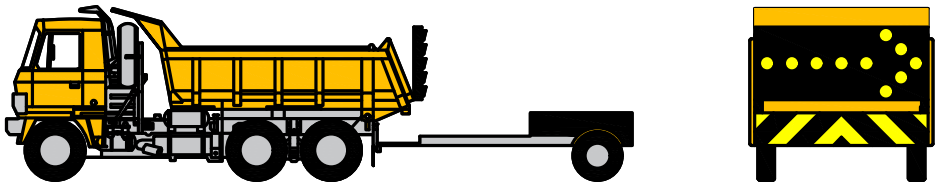
CONES

Cones may be used for all daytime operations. For night work, drums should be used to form the taper(s) and cones can be used along the tangent section of the work setup.



LEFT CAUTION RIGHT

ARROW BOARD (WITH MODE)



TRUCK MOUNTED ATTENUATORS

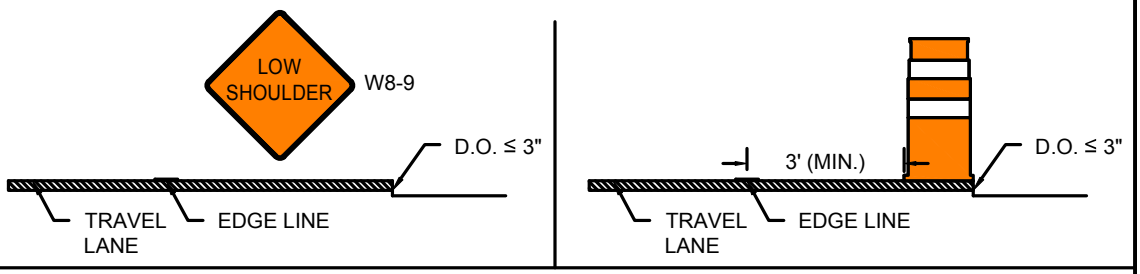
Truck Mounted Attenuators (TMA) shall be positioned between the start of the work area and the end of the designated buffer zone. The TMAs are to be positioned in each temporarily closed lane. This includes shoulders (≥8 feet) whether combined with a travel lane closure or being closed alone. These TMA conditions are required on roadways with speeds of 45 MPH or greater. TMAs can be used on other roadways at the discretion of the engineer. TMAs shall be used for the deployment and removal of all traffic control devices, including all advance warning signs.

SHORT-TERM PAVEMENT EDGE DROP-OFFS

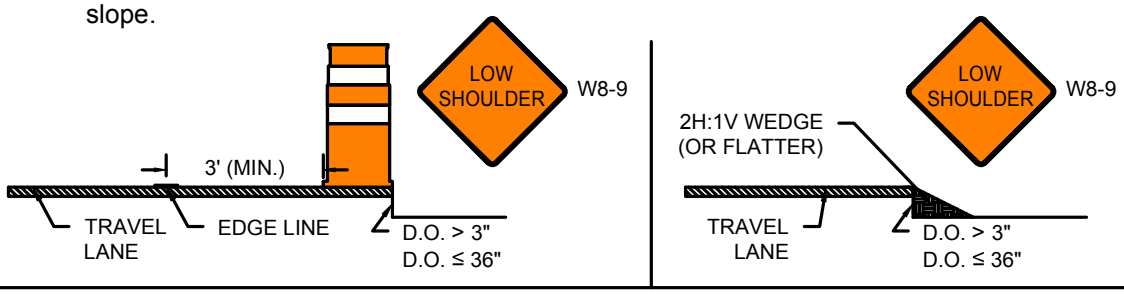
Note that this guidance is adopted from the Roadside Design Guide*, 4th Edition.*

Pavement drop-offs may occur during paving, excavation, and other construction activities. Drop-offs create hazards for vehicles if not properly mitigated. The following applies for all roads with speed limits greater than 30 mph; for roads with speed limits of 30 mph or less, treatments for pavement edge drop-offs are at the discretion of the Engineer. Drop-offs between adjacent, open travel lanes should not exceed 2", and any drop-off in excess of 3" should not be left unattended without one of these mitigation measures applied.

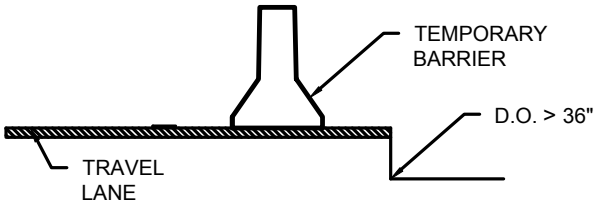
- Shoulder drop-offs 3" or less adjacent to a shoulder or active travel lane should be mitigated by:
  - ✓ A W8-9 (LOW SHOULDER) sign in advance of and at regular intervals throughout the treatment; or
  - ✓ The placement of drums on the traffic side of the drop-off.



- Shoulder drop-offs greater than 3" but less than or equal to 36" should be mitigated by:
  - ✓ A W8-9 (LOW SHOULDER) sign in advance of and at regular intervals throughout the treatment and the placement of drums on the traffic side off the drop-off, offset at least 3' from the travel lane; or
  - ✓ A W8-9 (LOW SHOULDER) sign in advance of and at regular intervals throughout the treatment and the placement of a temporary wedge of material along the face of the drop-off. The wedge should consist of stable material placed on a 2H:1V or flatter slope.



- Shoulder drop-offs greater than 36" must be protected by temporary barrier.



massDOT Massachusetts Department of Transportation Highway Division

Work Zone Safety Standard Details and Drawings

FIGURE 2
PAVEMENT EDGE
DROP-OFF GUIDANCE
NOT TO SCALE

massDOT Massachusetts Department of Transportation Highway Division PAGE 12	Work Zone Safety Standard Details and Drawings	TYPICAL DEVICE SPACING

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	320	305	20	55
45-55	500 / 1000 / 1000	660	495	40	40
60-65	1000 / 1600 / 2600	780	645	40	50

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

MINIMUM SPACING OF ADVANCE WARNING SIGNS FOR URBAN ROADWAYS	
ROAD TYPE	DISTANCE BETWEEN SIGNS
URBAN (LOW SPEED)	100 FT
URBAN (HIGH SPEED)	350 FT

NOTES

1. 40 FT = 10 FT PAVEMENT MARKING + 30 FT SKIP

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

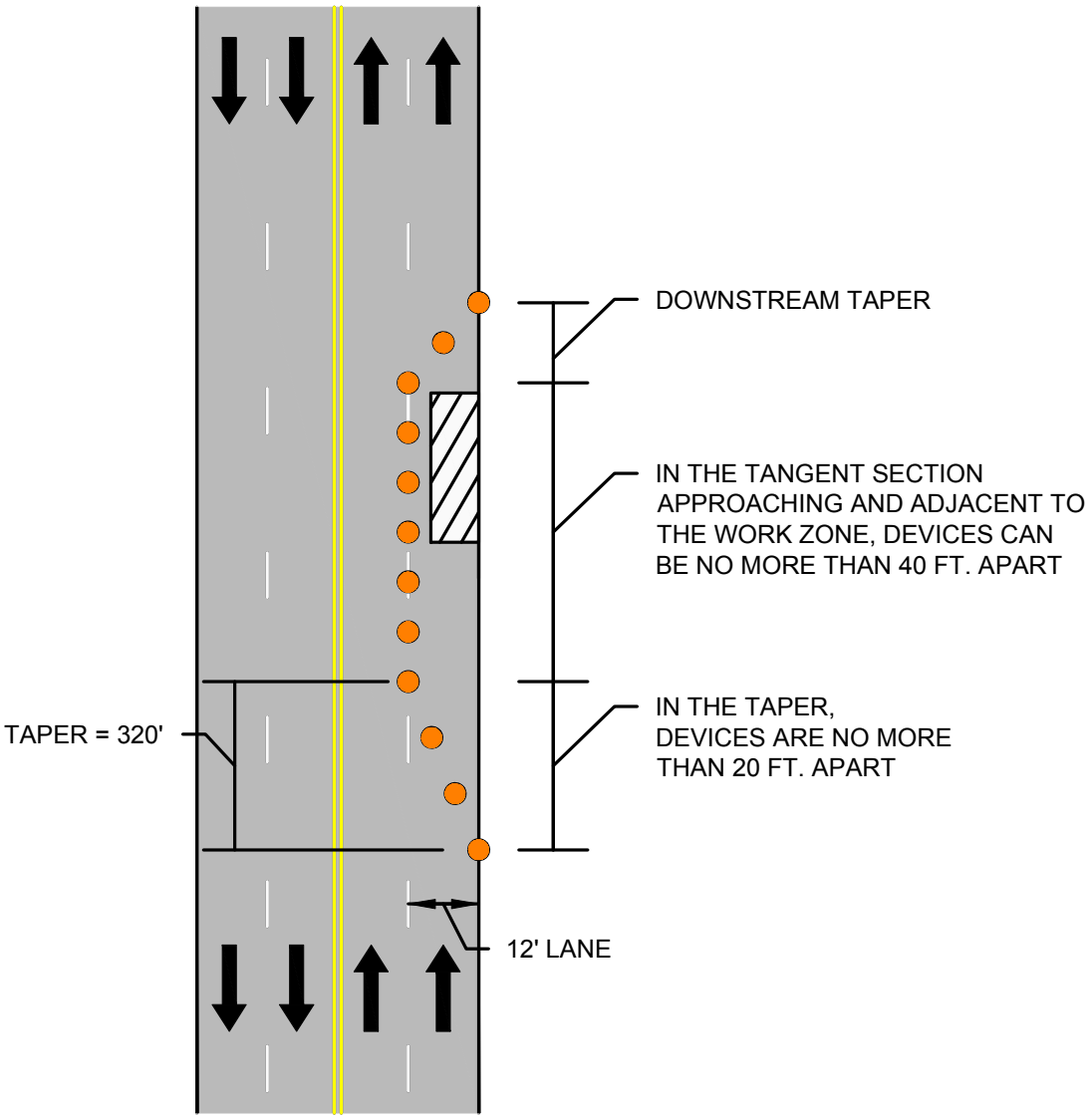
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 13	Work Zone Safety Standard Details and Drawings	FIGURE 3 TYPICAL DEVICE SPACING (AT 30 MPH)

Guidance for Flagging Operations

NOTE:
A flagger shall always be aware of their surroundings and have a good escape route. A flagger shall never be positioned directly beside or against construction equipment. When a flagger is required to direct traffic in an area where the escape route is partially blocked by a traversable obstruction such as a guardrail, the flagger shall be physically capable of traversing that obstruction. Prior to commencing a project, the supervisor in charge shall review the project, including guardrail areas, for safe flagging stations. The supervisor in charge shall clearly communicate with the flagger(s), indicating any locations where they cannot safely perform their duties.

Each flagger shall be equipped with the following high visibility clothing, signaling, and safety devices:

1) A white protective hard hat with a minimum level of reflectivity per the requirements of ANSI, Type I, Class E&G;
2) A clean, unfaded, untorn lime/yellow reflective safety vest and pants meeting the requirements of ANSI 107 Class 3 with the words "Traffic Control" on the front and rear panels in minimum two (2) inch (50 millimeter) high letters;
3) A 24 inch "STOP/SLOW" traffic paddle conforming to the requirements of Part 6E.03 of the Manual on Uniform Traffic Control Devices (MUTCD), a weighted, reflectorized red flag, flagger station advance warning signage, and two-way radios capable of providing clear communication within the work zone between flaggers, the Contractor, and the Engineer. The traffic paddle shall be mounted on a pole of sufficient length to be seven feet above the ground as measured from the bottom of the paddle;
4) A working flashlight with a minimum of 15,000 candlepower and a six inch red attachable wand, a whistle with a working lanyard, and a First Aid kit that complies with the requirements of ANSI Z308.1; and
5) An industrial/safety type portable air horn that complies with the requirements of the U.S. Coast Guard.

A "STOP/SLOW" paddle should be the primary hand-signaling device. It shall have an octagonal shape on a rigid handle. Flag use should be limited to emergency situations.

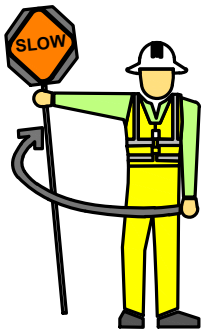
TO STOP TRAFFIC

Properly Trained Flaggers

- Give clear messages to drivers.
- Allow distance for drivers to react.
- Coordinate with other flaggers.
- Use standard signaling methods.

Properly Equipped Flaggers

- Use approved stop/slow paddles.
- Use approved safety apparel.
- Use retroreflective equipment.
- Use hand held radios, as needed.
- All flaggers shall wear safety apparel that meets ANSI Class 3 requirements. The combination of vest and pants is required.



TO LET TRAFFIC PROCEED

Proper Flagging Stations

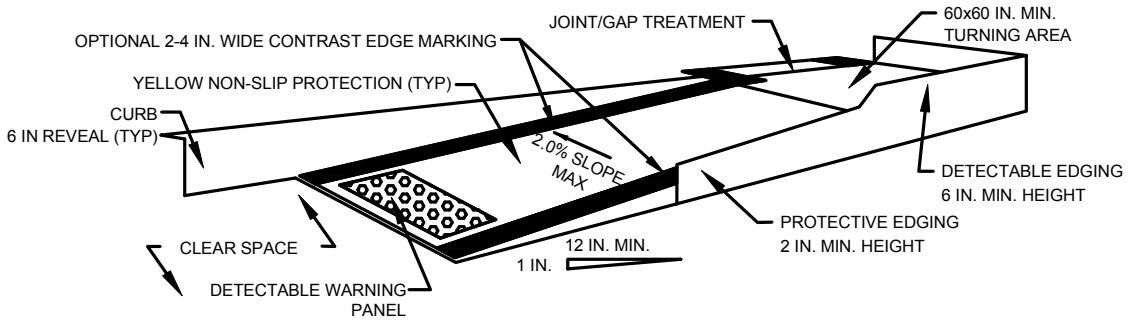
- Good approach sight distance.
- Highly visible to traffic.
- Stand alone away from other machinery and people.
- Stand on right edge of pavement or shoulder- proceed to centerline only when first vehicle has come to stop.
- Have a good escape route.

TO ALERT AND SLOW TRAFFIC

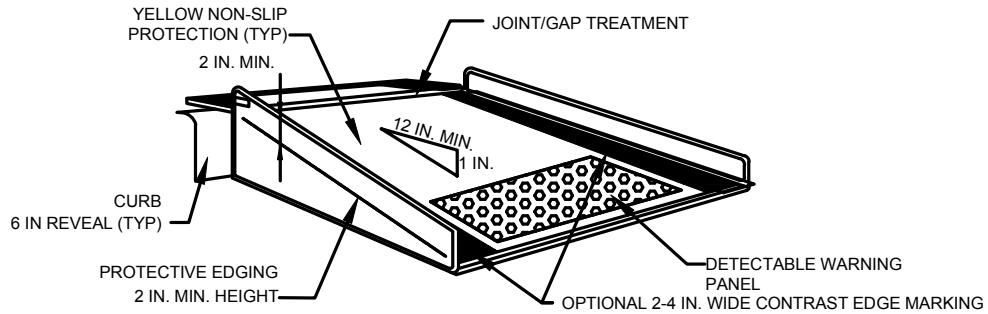
Proper Advance Warning Signs

- Always use warning signs.
- Allow for reaction distance from signs.
- Remove signs if no longer necessary or not flagging.
- Use free hand in up-and-down motion to help slow traffic.

massDOT Massachusetts Department of Transportation Highway Division PAGE 16	Work Zone Safety Standard Details and Drawings	FIGURE 4 TYPICAL PEDESTRIAN DEVICES (1 OF 2) NOT TO SCALE



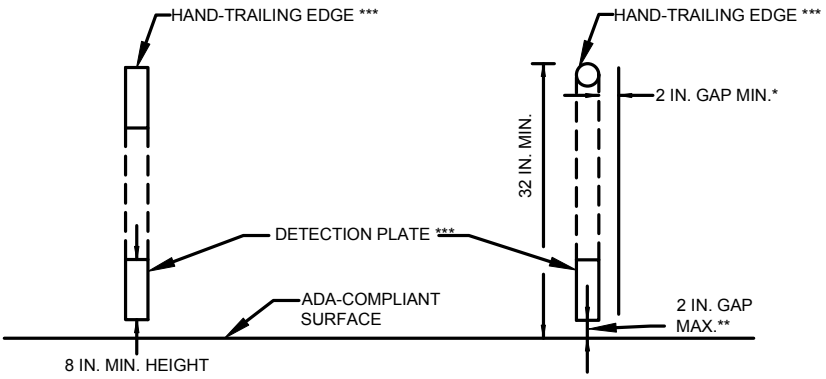
TEMPORARY CURB RAMP-PARALLEL TO CURB



TEMPORARY CURB RAMP-PERPENDICULAR TO CURB

NOTES:

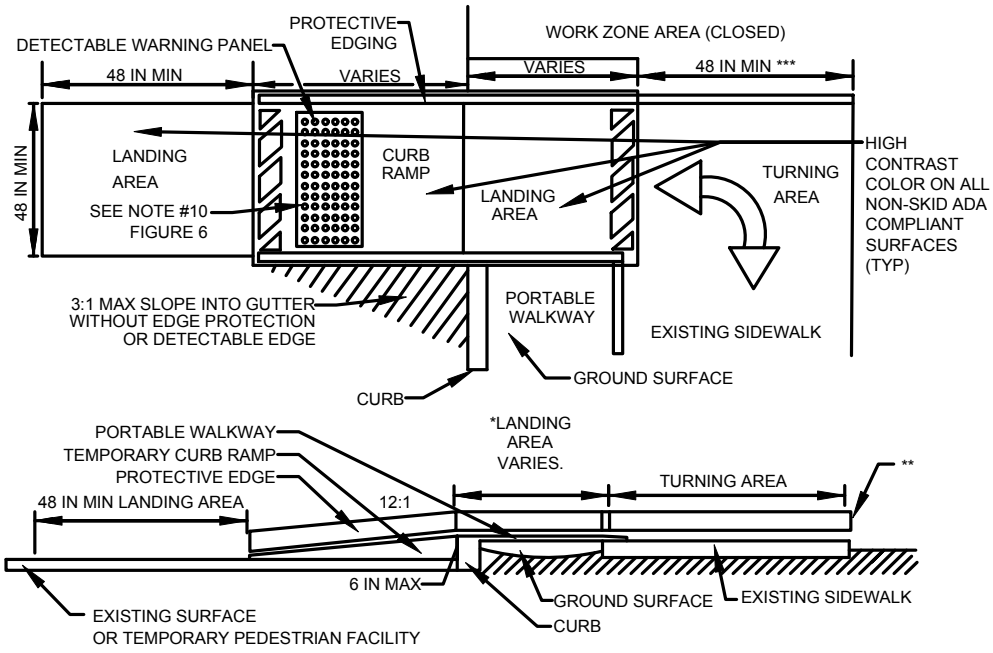
1. CURB RAMPS SHALL BE 60 IN. MINIMUM WIDTH WITH A FIRM, STABLE, AND NON-SLIP SURFACE.
2. PROTECTIVE EDGING WITH A 2 IN. MINIMUM HEIGHT SHALL BE INSTALLED WHEN THE CURB RAMP OR LANDING PLATFORM HAS A VERTICAL DROP OF 6 IN. OR GREATER OR HAS A SIDE APRON SLOP STEEPER THAN 1:3 (33%). PROTECTIVE EDGING SHOULD BE CONSIDERED WHEN THE CURB RAMPS OR LANDING PLATFORMS HAVE A VERTICAL DROP OF 3 IN. OR MORE.
3. PROTECTABLE EDGING WITH 6 IN. MINIMUM HEIGHT AND CONTRASTING COLOR SHALL BE INSTALLED ON ALL CURB RAMP LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).
4. THE CURB RAMP WALKWAY AND LANDING AREA SURFACE SHALL BE OF A SOLID CONTINUOUS CONTRASTING COLOR ABUTTING UP TO THE EXISTING SIDEWALK.
5. CURB RAMPS AND LANDINGS SHOULD HAVE A 1:50 (2%) MAX CROSS-SLOPE.
6. CLEAR SPACE OF 48x48 IN. MINIMUM SHALL BE PROVIDED ABOVE AND BELOW THE CURB RAMP.
7. WATER FLOW IN THE GUTTER SYSTEM SHALL HAVE MINIMAL RESTRICTION.
8. LATERAL JOINTS OR GAPS BETWEEN SURFACES SHALL BE LESS THAN 0.5 IN. WIDTH.
9. CHANGES BETWEEN SURFACE HEIGHTS SHOULD NOT EXCEED 0.5 IN. LATERAL EDGES SHOULD BE VERTICAL UP TO 0.25 IN. HIGH, AND BEVELED AT 1:2 BETWEEN 0.25 IN. AND 0.5 IN. HEIGHT.
10. IF A TEMPORARY PEDESTRIAN RAMP LEADS TO A CROSSWALK, THEN A DETECTABLE WARNING PAD MUST BE ADHERED TO THE BASE OF THE RAMP. IF IT LEADS TO A PROTECTED PEDESTRIAN BYPASS THAT DOES NOT CONFLICT WITH VEHICULAR TRAFFIC, THEN A PAD SHALL NOT BE INSTALLED ON THE RAMP.



CROSS SECTION VIEW

PEDESTRIAN CHANNELIZING DEVICE

* THERE SHALL BE A 2 INCH GAP BETWEEN THE HAND-TRAILING EDGE AND ITS SUPPORT.
** A MAXIMUM 2 INCH GAP BETWEEN THE BOTTOM OF THE BOTTOM RAIL AND THE SURFACE MAY BE USED TO PROVIDE DRAINAGE.
*** THE HAND-TRAILING EDGE AND DETECTION PLATE SHALL BE CONTINUOUS THROUGHOUT THE LENGTH OF THE PATH SUCH THAT A PEDESTRIAN USER WITH A LONG CANE CAN FOLLOW IT.



TEMPORARY CURB RAMP

* LANDING AREA USED TO OVERLAP NON-ADA COMPLIANT SURFACES.
** DETECTABLE EDGE REMOVED IF A CONTINUOUS SIDEWALK.
*** 60 IN. IF AN OBSTRUCTION IS AT BACK OF SIDEWALK.

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Work Zone Safety Standard Details and Drawings

FIGURE 5
TYPICAL PEDESTRIAN DEVICES
(2 OF 2)
NOT TO SCALE

massDOT Massachusetts Department of Transportation Highway Division PAGE 18	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED WORK NEAR CURVE

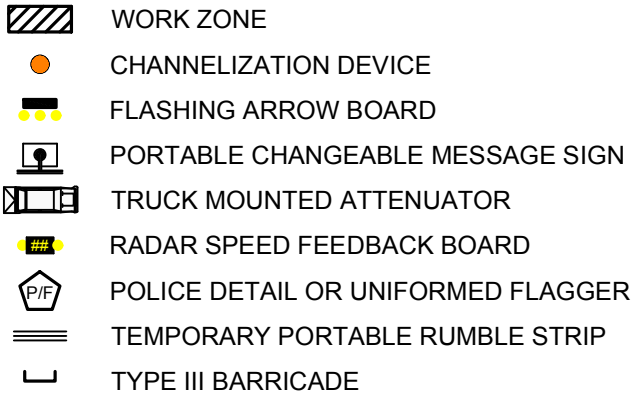
POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	50	100	20	30
45-55	500 / 1000 / 1000	100	150	40	20

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

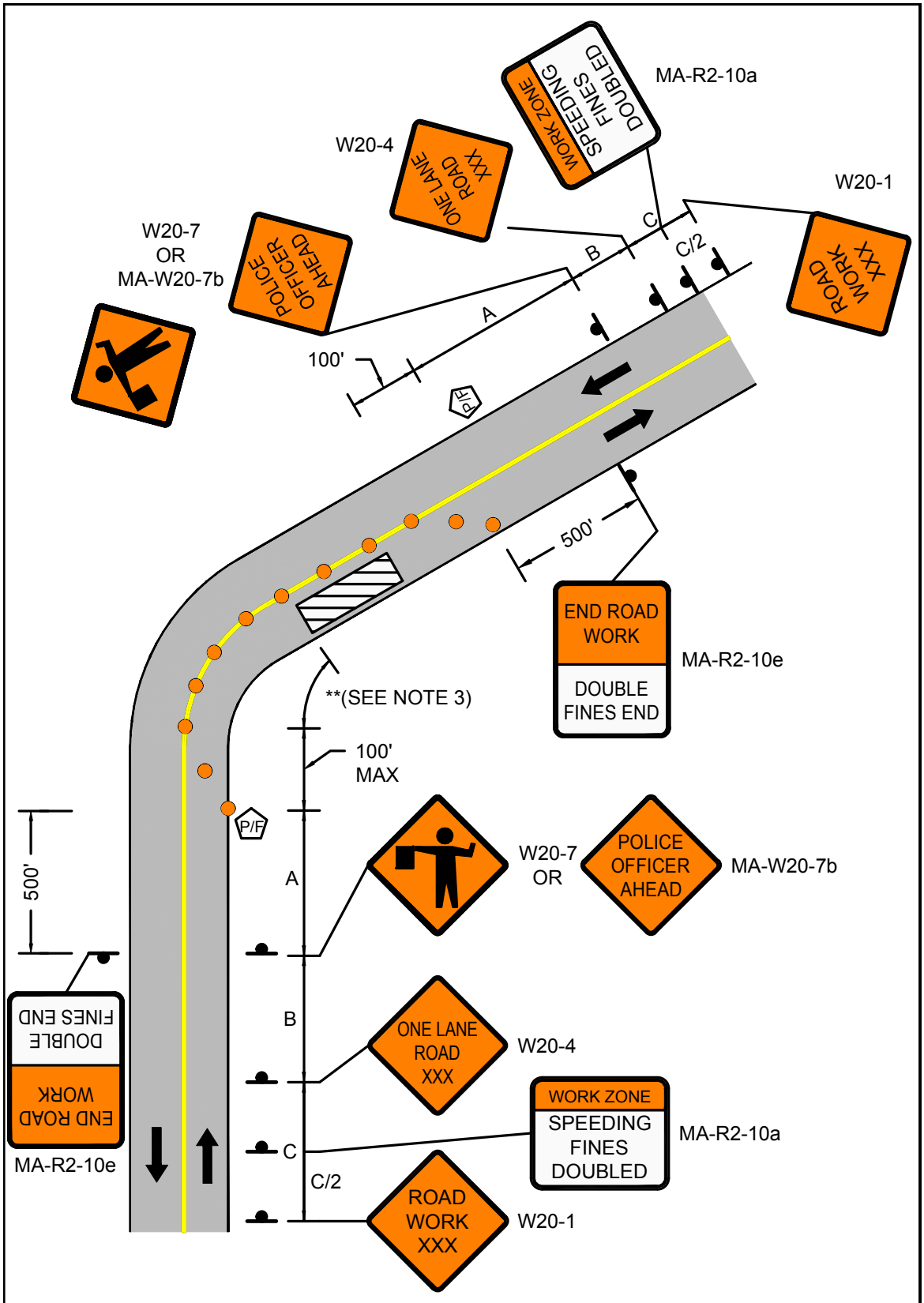
NOTES

1. IF POLICE DETAIL/UNIFORMED FLAGGER SUPPORT IS REQUIRED, PROVIDE TWO UNITS.
2. MA-R2-10a LOCATED AT C/2.
3. ** = EXTEND ENOUGH SO TAPER IS BEFORE CURVE

LEGEND



NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 19	Work Zone Safety Standard Details and Drawings	FIGURE 6 STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED WORK NEAR CURVE

massDOT Massachusetts Department of Transportation Highway Division PAGE 20	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	50	100	20	30
45-55	500 / 1000 / 1000	100	150	40	20

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED REGULATORY OR WORK ZONE SPEED	SEPARATION BETWEEN RUMBLE STRIPS
36-mph to 55-mph	15-feet
35-mph and under	10-feet

NOTES

1. IF POLICE DETAIL/UNIFORMED FLAGGER SUPPORT IS REQUIRED, PROVIDE TWO UNITS.
2. MA-R2-10a LOCATED AT C/2.
3. ** OPTIONAL AT THE ENGINEER'S DISCRETION.
4. *** SHALL BE DEPLOYED IF RUMBLE STRIPS ARE PRESENT.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

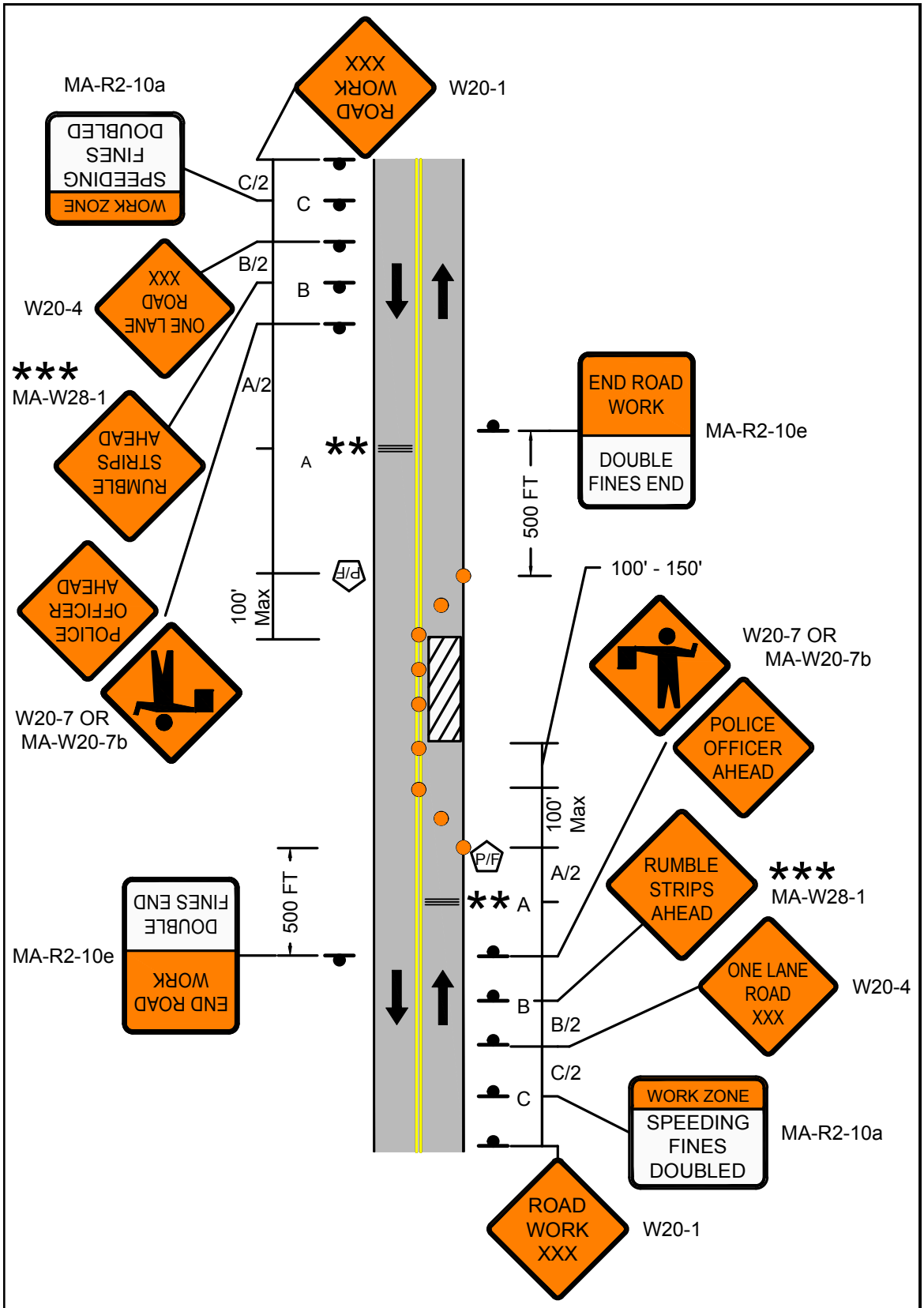
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 21	Work Zone Safety Standard Details and Drawings	FIGURE 7 STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 22	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY SHOULDER CLOSED

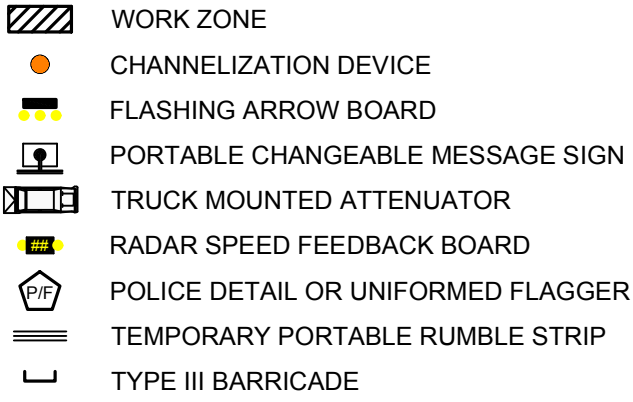
POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		SHOULDER TAPER LENGTH (L/3) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	110	305	20	45
45-55	500 / 1000 / 1000	220	495	40	30
60-65	1000 / 1600 / 2600	260	645	40	35

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

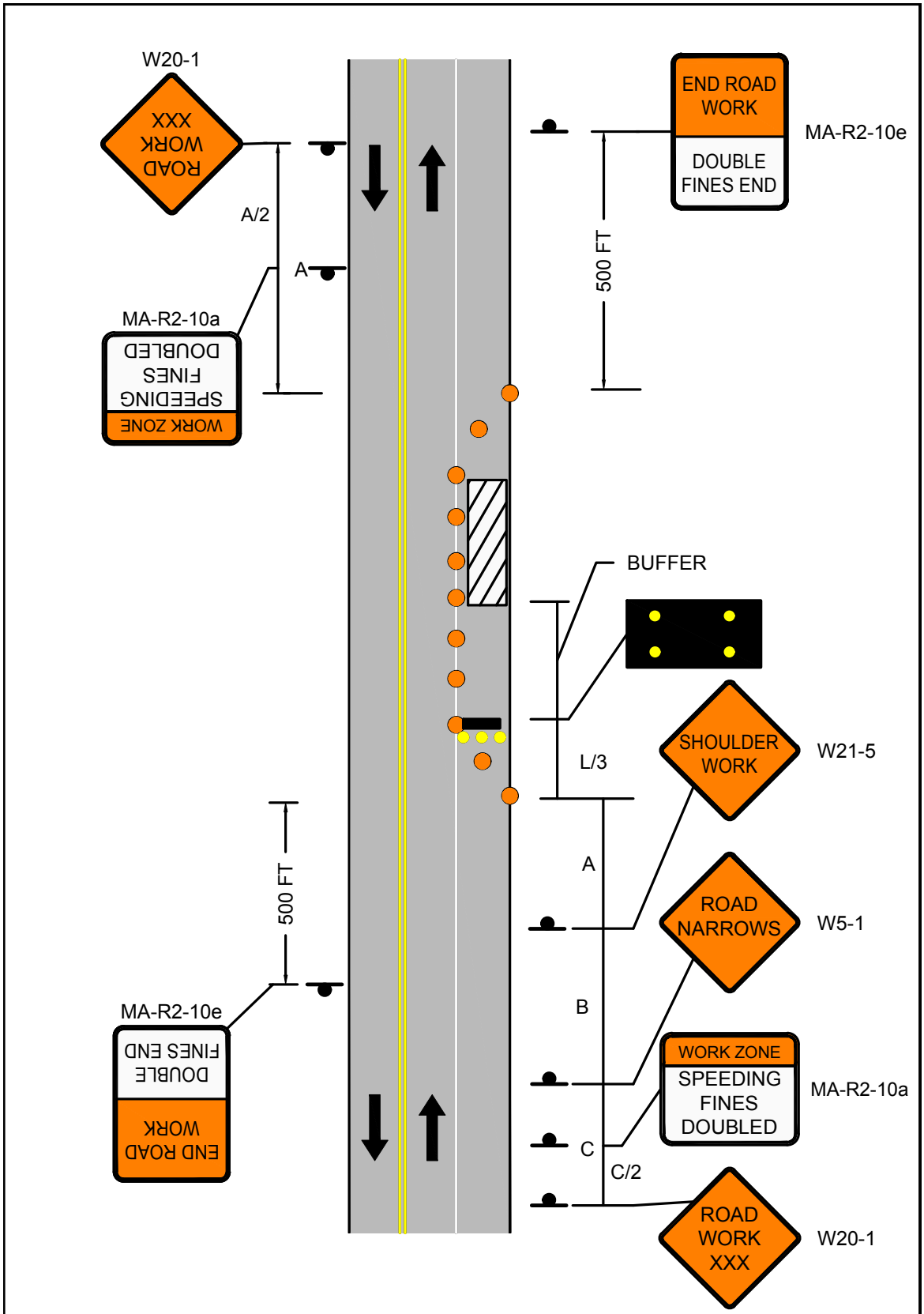
NOTES

1. MA-R2-10a at C/2 and A/2.

LEGEND



NOT TO SCALE



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Work Zone Safety Standard Details and Drawings

FIGURE 8
STATIONARY OPERATIONS
TWO LANE UNDIVIDED ROADWAY
SHOULDER CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 24	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY WITH TRAVERSABLE SHOULDER HALF OF ROADWAY CLOSED MAINTAIN TWO-WAY TRAFFIC

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)				
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE SHIFT LENGTH (L/2) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	160	305	20	125
45-55	220	330	495	40	100
60-65	260	390	645	40	115

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

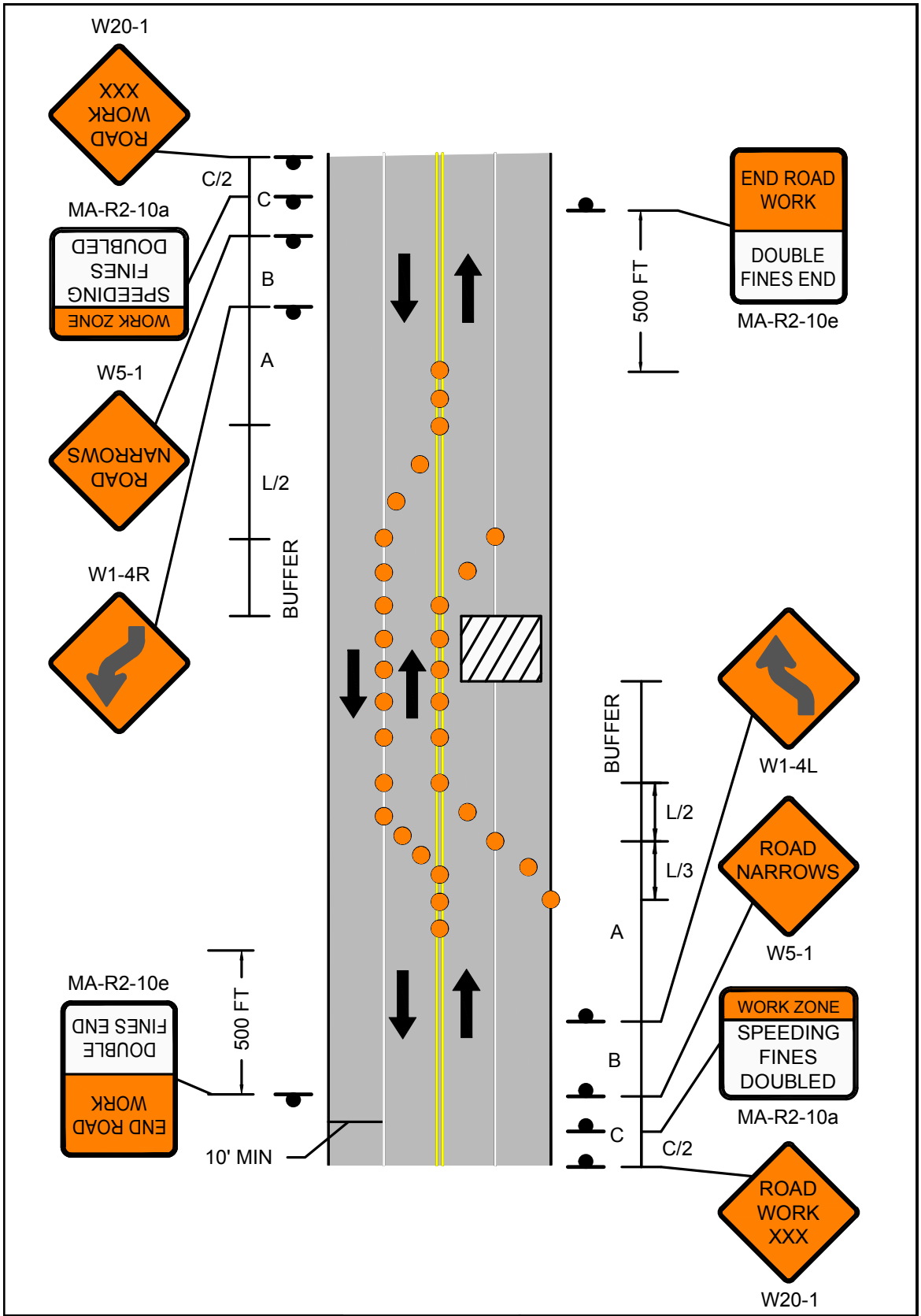
NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND

- WORK ZONE
- CHANNELIZATION DEVICE
- FLASHING ARROW BOARD
- PORTABLE CHANGEABLE MESSAGE SIGN
- TRUCK MOUNTED ATTENUATOR
- RADAR SPEED FEEDBACK BOARD
- POLICE DETAIL OR UNIFORMED FLAGGER
- TEMPORARY PORTABLE RUMBLE STRIP
- TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division

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Work Zone Safety Standard Details and Drawings

FIGURE 9
STATIONARY OPERATIONS
TWO LANE UNDIVIDED ROADWAY
WITH TRAVERSABLE SHOULDER
HALF OF ROADWAY CLOSED
MAINTAIN TWO-WAY TRAFFIC

massDOT Massachusetts Department of Transportation Highway Division PAGE 26	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY RIGHT LANE CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELATION DEVICES (DRUMS OR CONES)				
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	305	20	60
45-55	220	660	495	40	50
60-65	260	780	645	40	55

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT A/2 AND C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

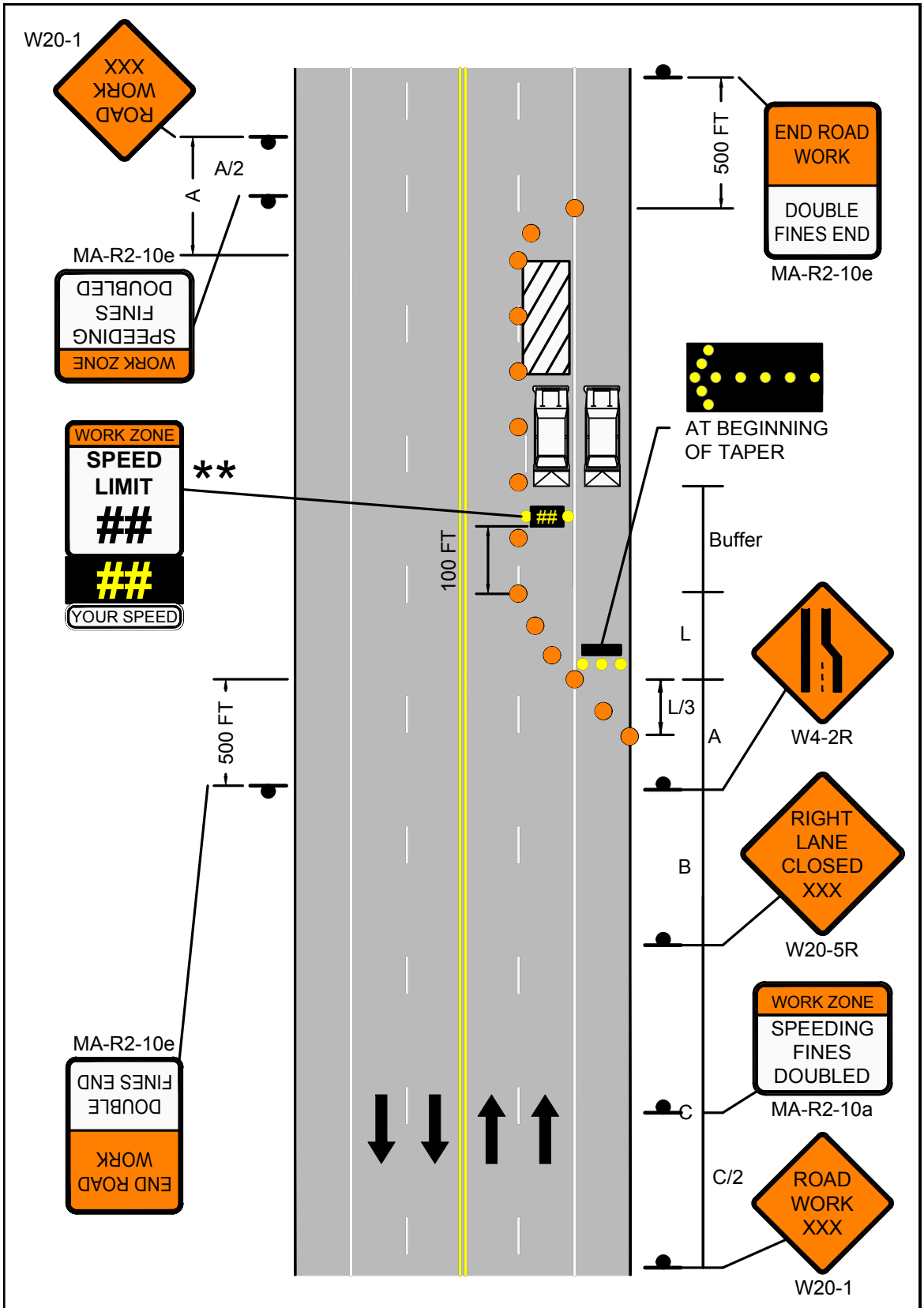
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 27	Work Zone Safety Standard Details and Drawings	FIGURE 10 STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY RIGHT LANE CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 28	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY LEFT LANE CLOSED

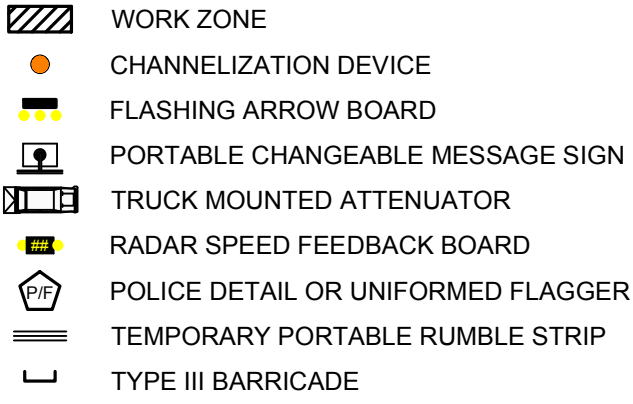
POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	320	305	20	105
45-55	500 / 1000 / 1000	660	495	40	80
60-65	1000 / 1600 / 2600	780	645	40	100

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

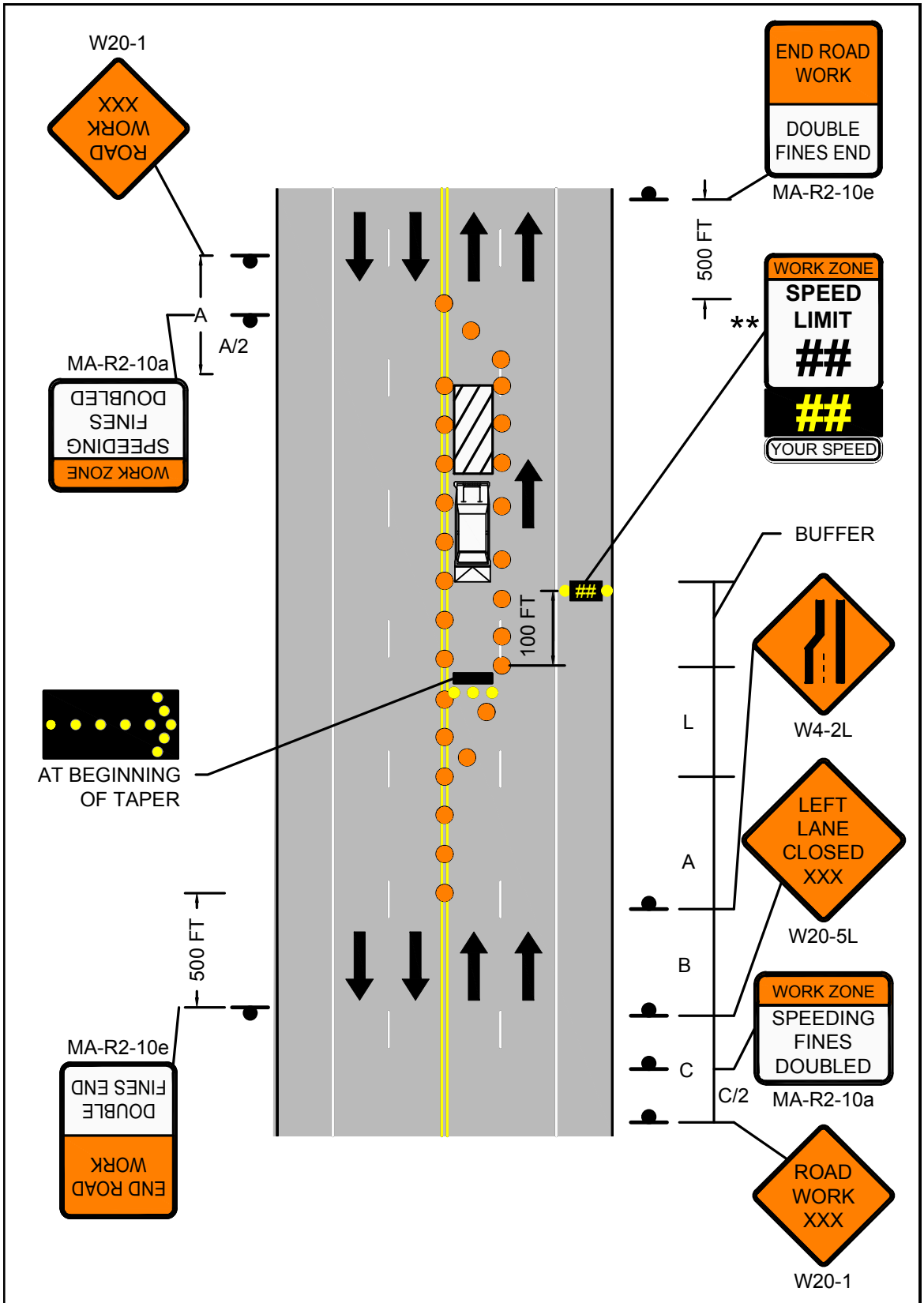
NOTES

1. MA-R2-10a LOCATED AT A/2 AND C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION. 2' OFFSET FROM EDGE OF TRAVEL LANE TO RADAR SPEED FEEDBACK BOARD IS REQUIRED. BOARD MAY BE MOVED FULLY OR PARTIALLY OFF PAVED SHOULDER, IF REQUIRED.

LEGEND



NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 29	Work Zone Safety Standard Details and Drawings	FIGURE 11 STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY LEFT LANE CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 30	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)					
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	TRAVEL LANE SHIFT LENGTH (L/2) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	160	305	20	140
45-55	220	660	330	495	40	120
60-65	260	780	390	645	40	140

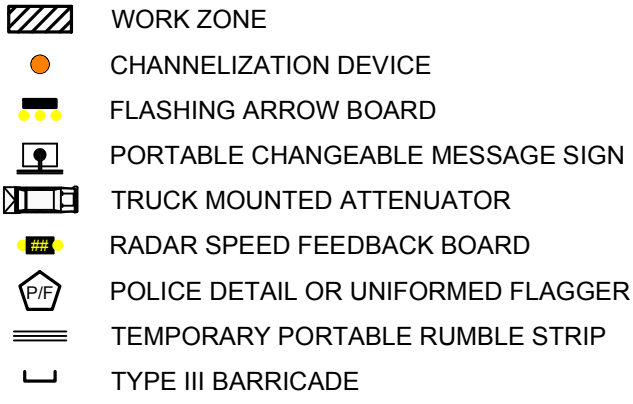
* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.
3. W1-4L SHALL BE PLACED AT THE MIDDLE OF THE TANGENT.

LEGEND



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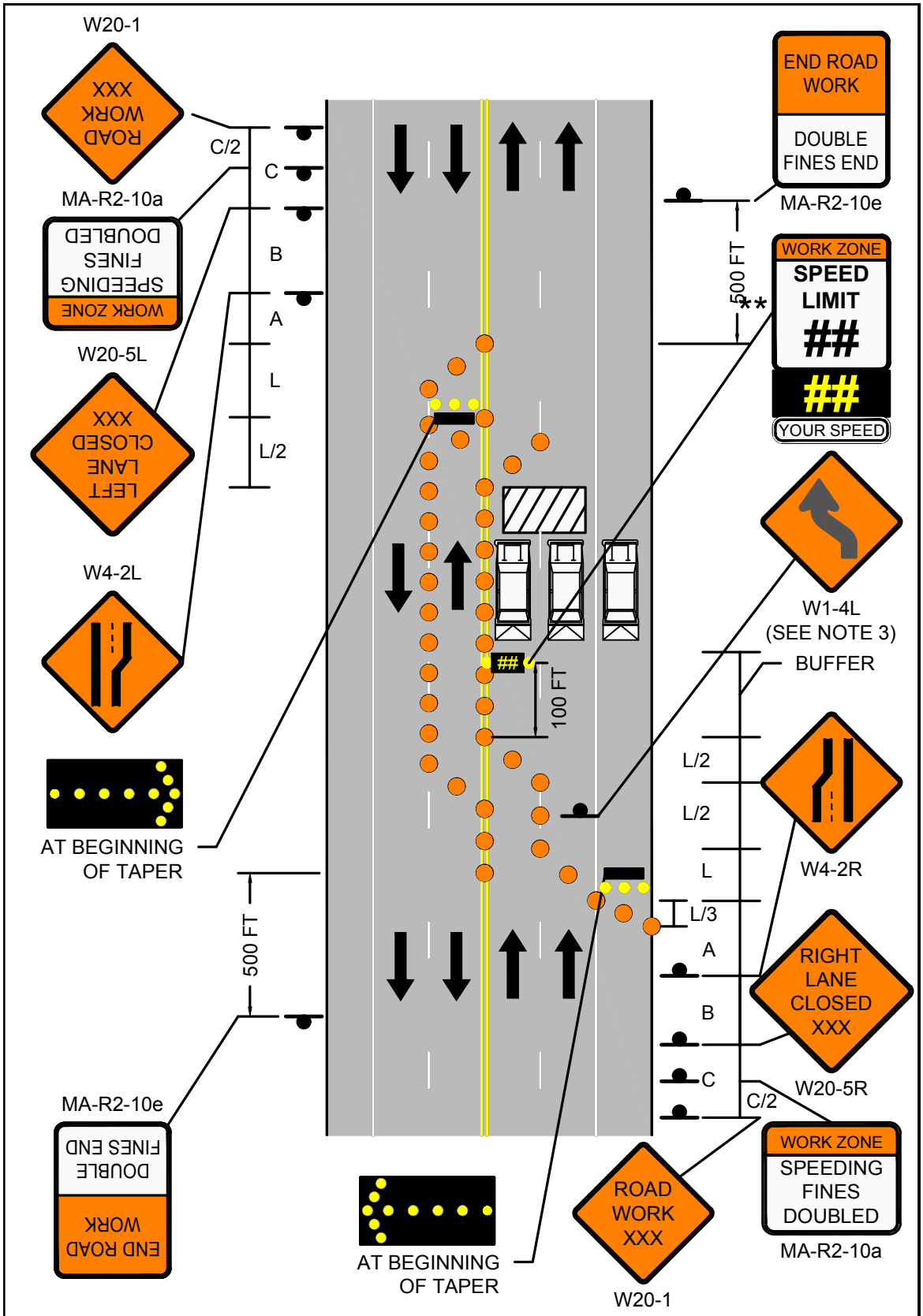


massDOT Massachusetts Department of Transportation Highway Division PAGE 31	Work Zone Safety Standard Details and Drawings	FIGURE 12 STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 32	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT LANE CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)				
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	305	20	60
45-55	220	660	495	40	50
60-65	260	780	645	40	55

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

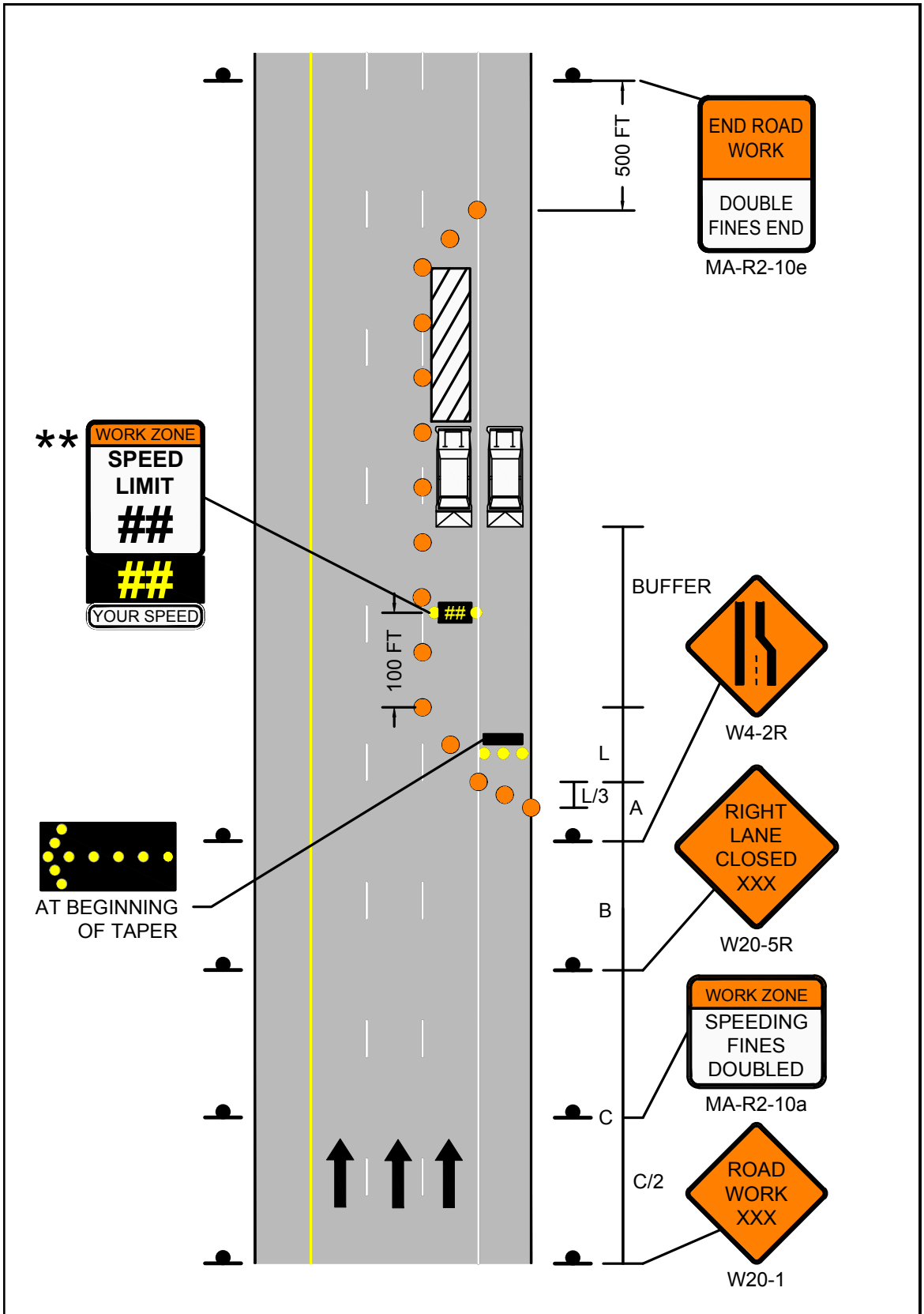
NOTES

1. MA-R2-10a LOCATED AT C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.

LEGEND

- WORK ZONE
- CHANNELIZATION DEVICE
- FLASHING ARROW BOARD
- PORTABLE CHANGEABLE MESSAGE SIGN
- TRUCK MOUNTED ATTENUATOR
- RADAR SPEED FEEDBACK BOARD
- POLICE DETAIL OR UNIFORMED FLAGGER
- TEMPORARY PORTABLE RUMBLE STRIP
- TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 33	Work Zone Safety Standard Details and Drawings	FIGURE 13 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT LANE CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 34	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY LEFT LANE CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)				
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	305	20	60
45-55	220	660	495	40	50
60-65	260	780	645	40	55

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

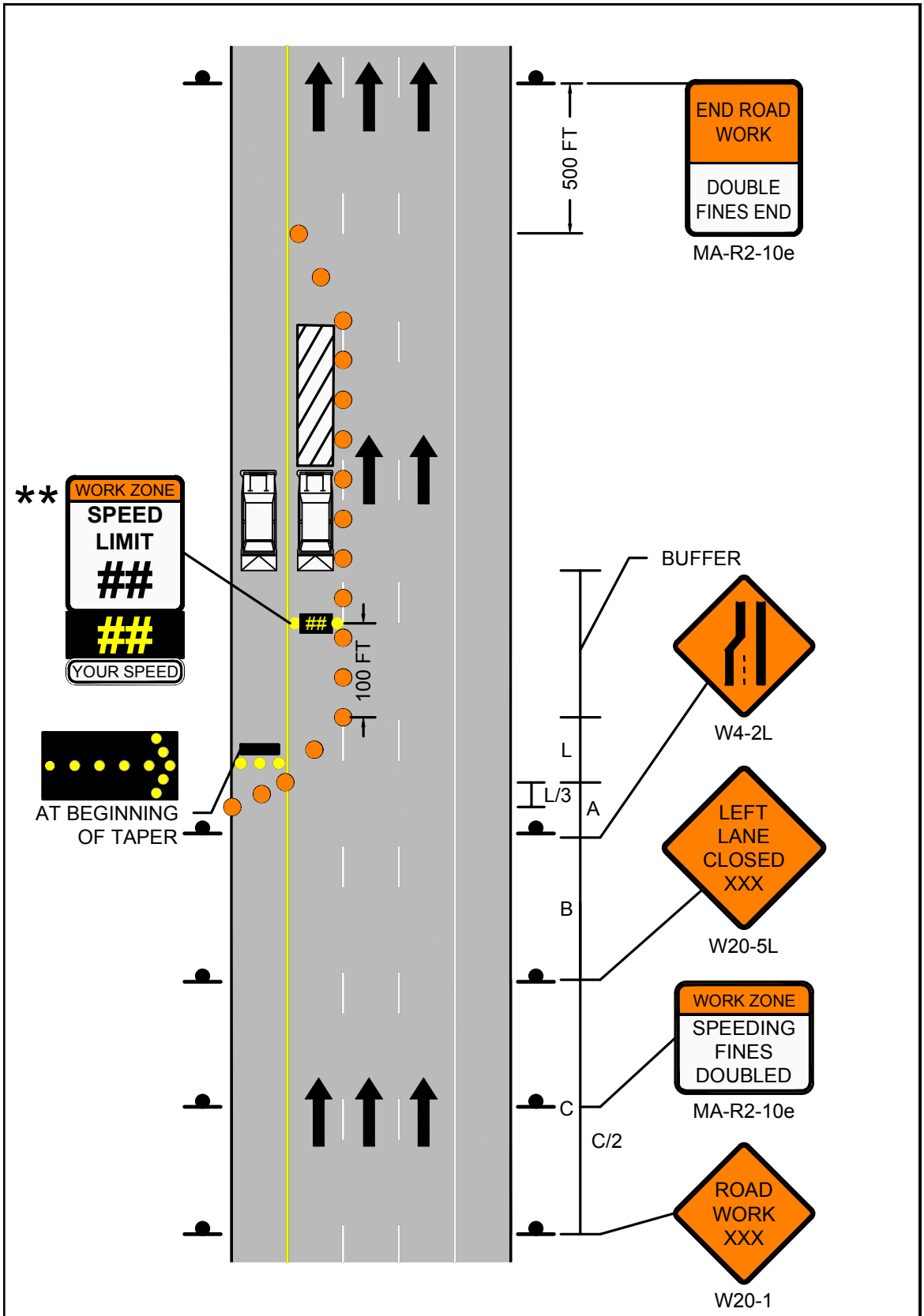
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 35	Work Zone Safety Standard Details and Drawings	FIGURE 14 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY LEFT LANE CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 36	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE OR RIGHT/CENTER LANES CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)					
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	TANGENT LENGTH BETWEEN TAPERS T (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	640	305	20	110
45-55	220	660	1320	495	40	100
60-65	260	780	1560	645	40	115

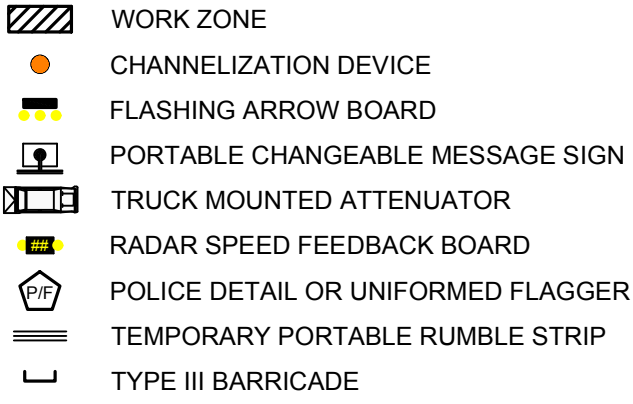
* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.
3. *** THIS SET OF SIGNS SHALL BE LOCATED AT T/2.

LEGEND



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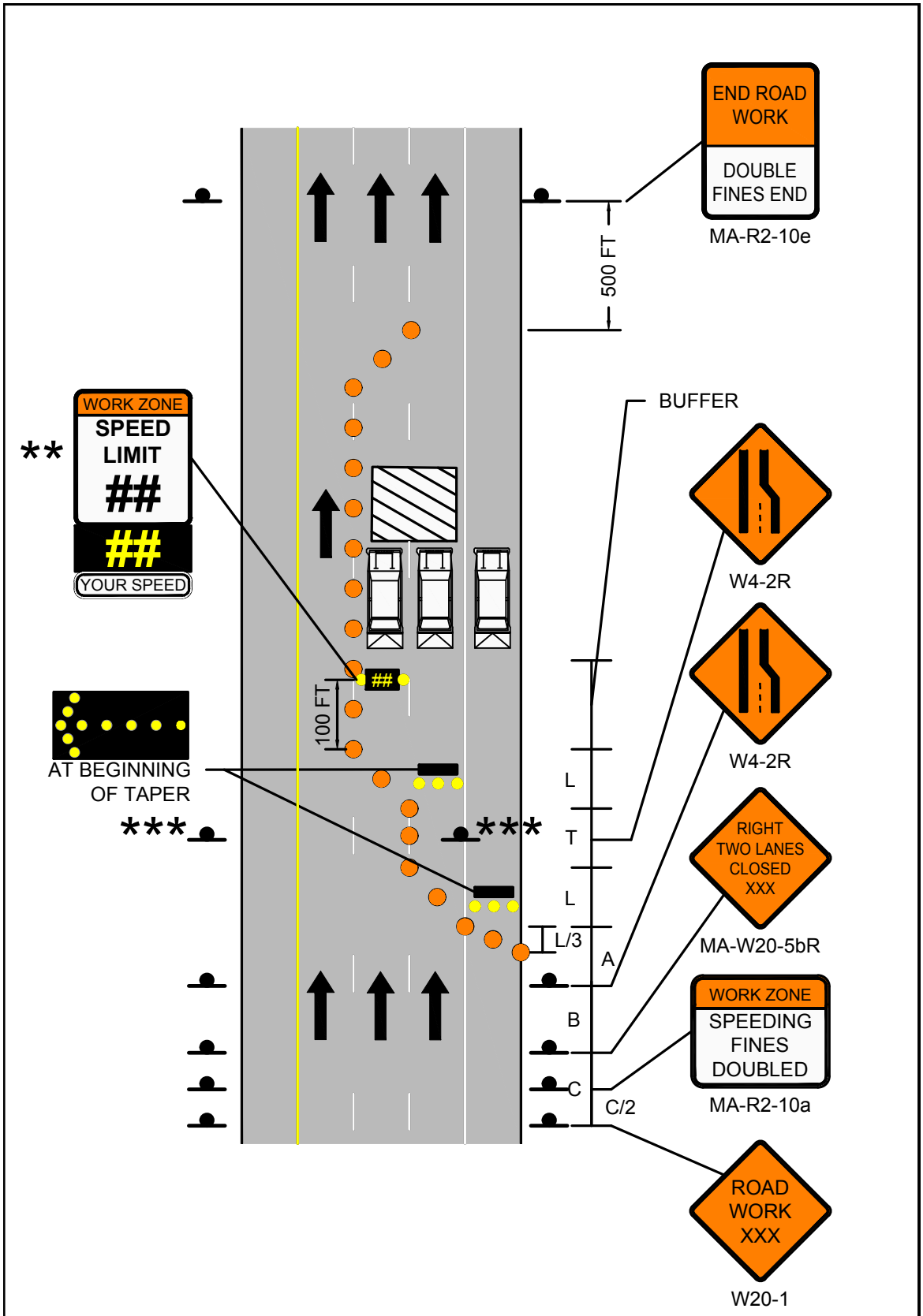


massDOT Massachusetts Department of Transportation Highway Division PAGE 37	Work Zone Safety Standard Details and Drawings	FIGURE 15 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE OR RIGHT/CENTER LANES CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 38	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE OR LEFT/CENTER LANES CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)					
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	TANGENT LENGTH BETWEEN TAPERS T (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	640	305	20	110
45-55	220	660	1320	495	40	100
60-65	260	780	1560	645	40	115

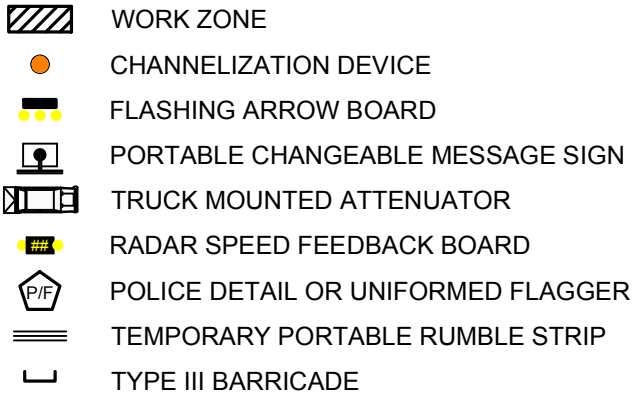
* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.
3. *** THIS SET OF SIGNS SHALL BE LOCATED AT T/2.

LEGEND



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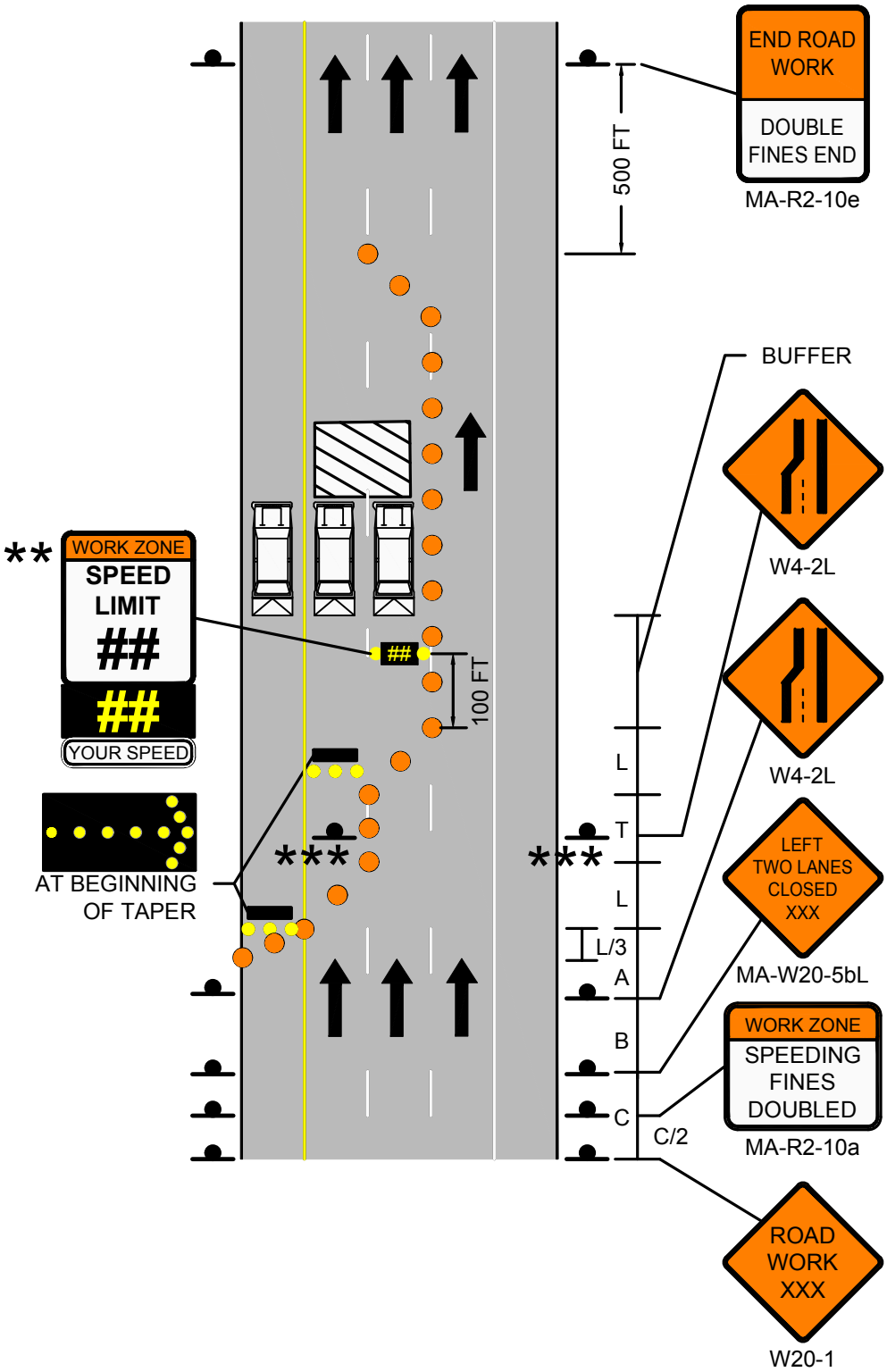


massDOT Massachusetts Department of Transportation Highway Division PAGE 39	Work Zone Safety Standard Details and Drawings	FIGURE 16 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE OR LEFT/CENTER LANES CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 40	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT SIDE OF OFF RAMP CLOSED

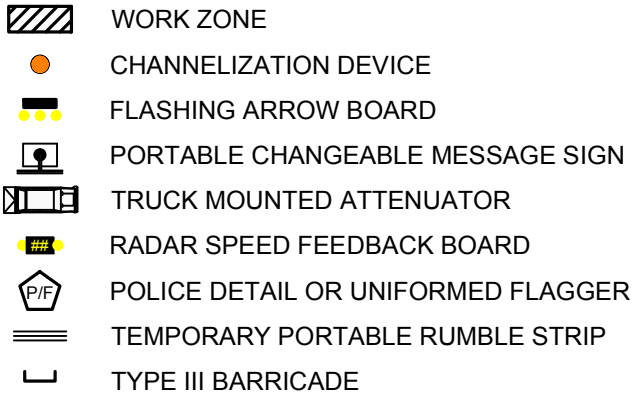
POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE SHIFT LENGTH (L/2) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	160	305	20	45
45-55	500 / 1000 / 1000	330	495	40	35

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND



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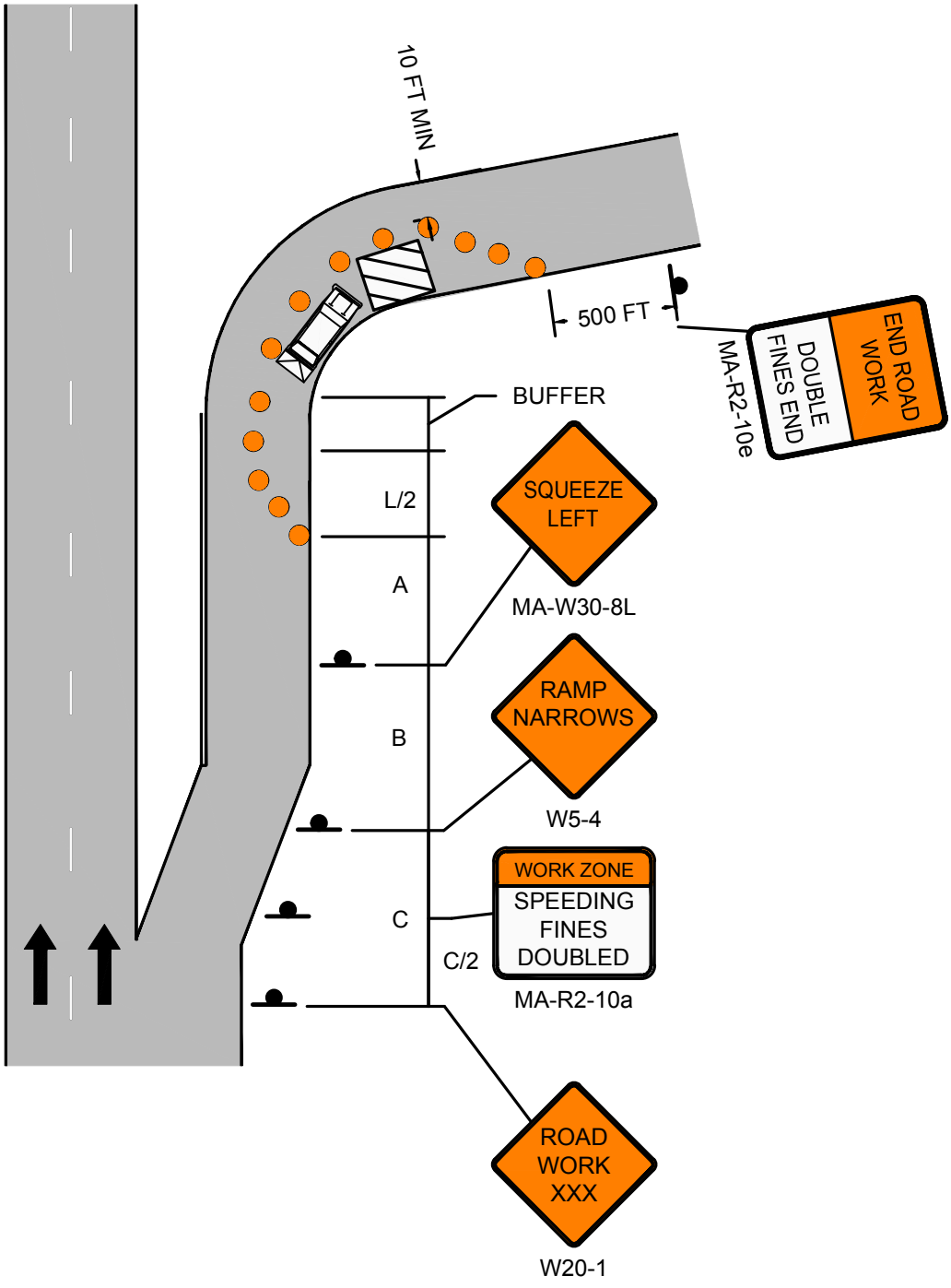


massDOT Massachusetts Department of Transportation Highway Division PAGE 41	Work Zone Safety Standard Details and Drawings	FIGURE 17 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT SIDE OF OFF RAMP CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 42	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY LEFT SIDE OF OFF RAMP CLOSED

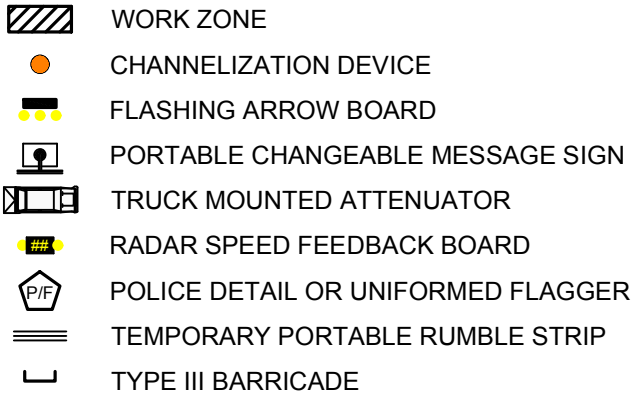
POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE SHIFT LENGTH (L/2) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	160	305	20	45
45-55	500 / 1000 / 1000	330	495	40	35

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND



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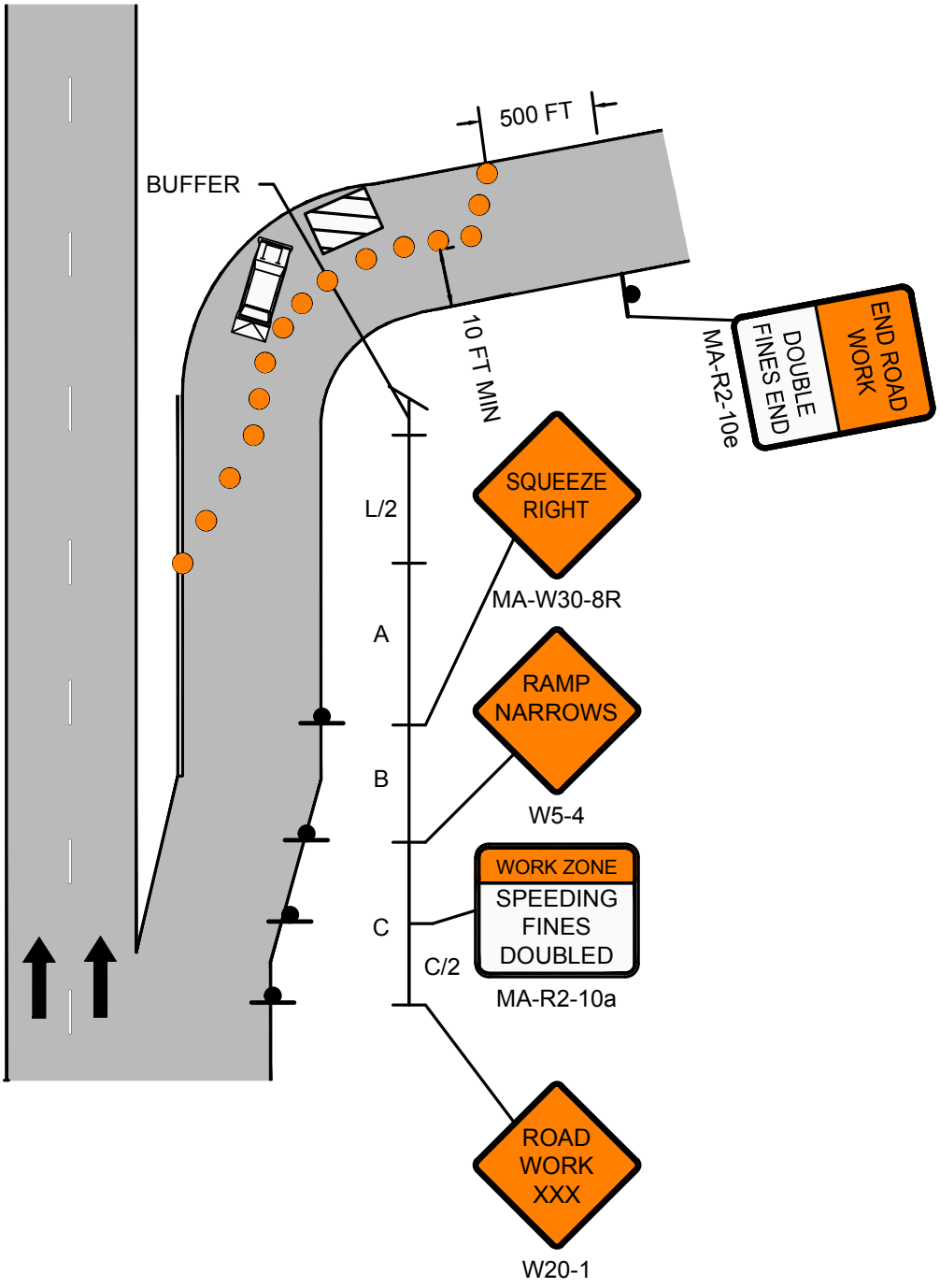


massDOT Massachusetts Department of Transportation Highway Division	Work Zone Safety Standard Details and Drawings	FIGURE 18 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY LEFT SIDE OF OFF RAMP CLOSED PAGE 43

massDOT Massachusetts Department of Transportation Highway Division PAGE 44	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY ROADWORK BEYOND ON RAMP

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)				
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	305	20	175
45-55	220	660	495	40	135
60-65	260	780	645	40	155

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

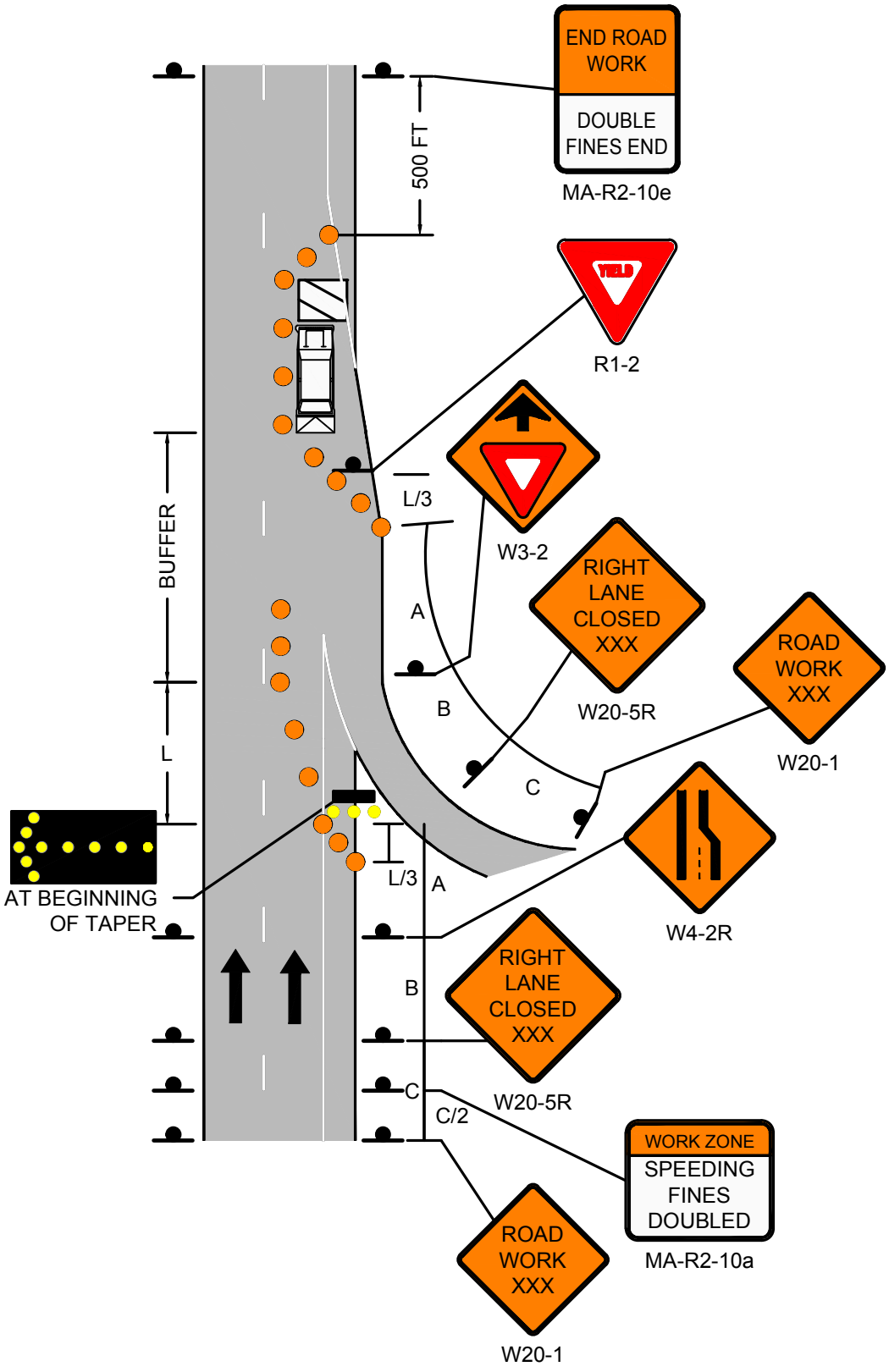
NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND

- WORK ZONE
- CHANNELIZATION DEVICE
- FLASHING ARROW BOARD
- PORTABLE CHANGEABLE MESSAGE SIGN
- TRUCK MOUNTED ATTENUATOR
- RADAR SPEED FEEDBACK BOARD
- POLICE DETAIL OR UNIFORMED FLAGGER
- TEMPORARY PORTABLE RUMBLE STRIP
- TYPE III BARRICADE

NOT TO SCALE



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Work Zone Safety Standard Details and Drawings

FIGURE 19
STATIONARY OPERATIONS
MULTILANE DIVIDED ROADWAY
ROADWORK BEYOND ON RAMP

massDOT Massachusetts Department of Transportation Highway Division PAGE 46	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY ROADWORK BEYOND OFF RAMP

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)					
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	TRAVEL LANE SHIFT LENGTH (L/2) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	160	305	20	70
45-55	220	660	330	495	40	55
60-65	260	780	390	645	40	65

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

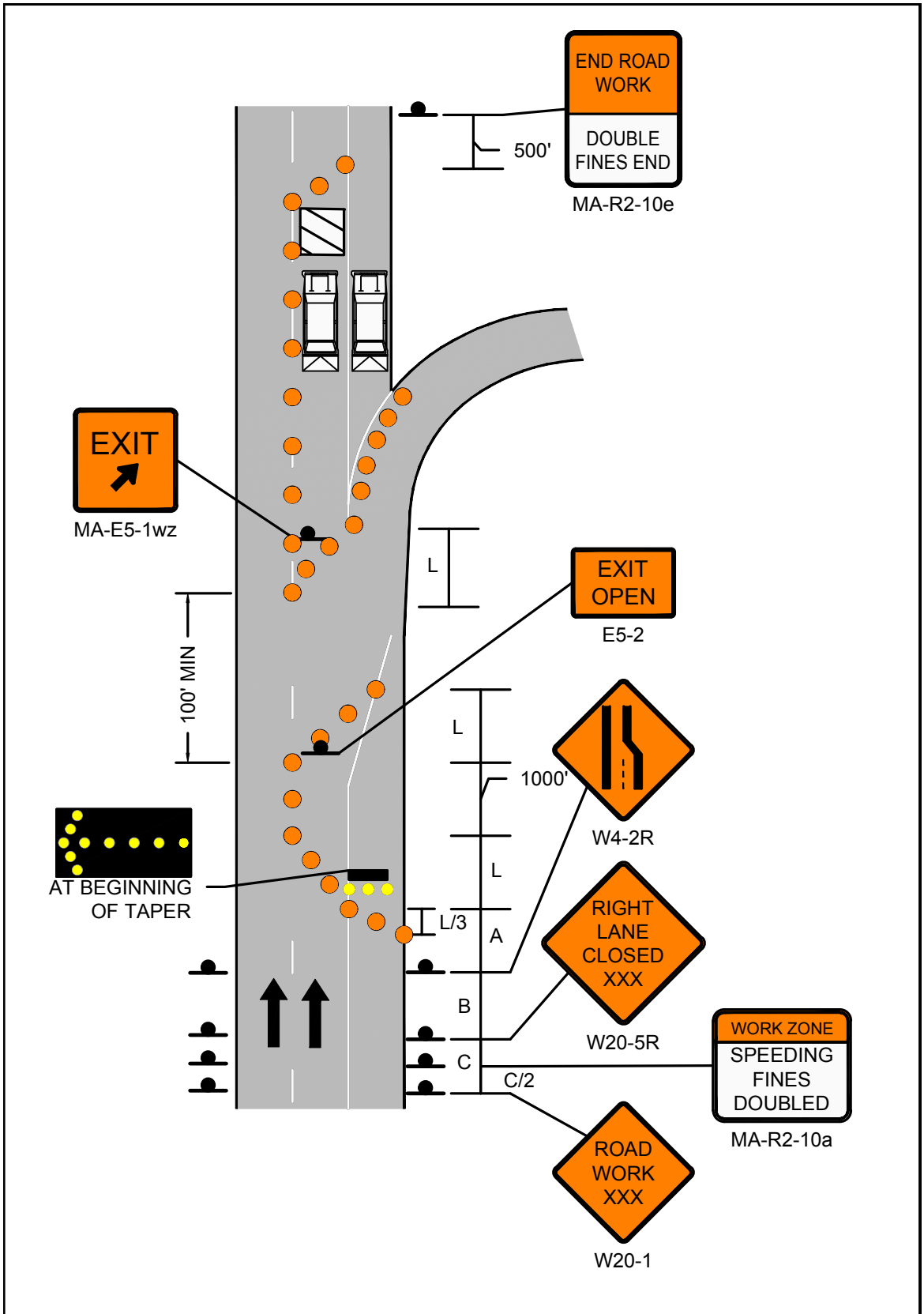
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



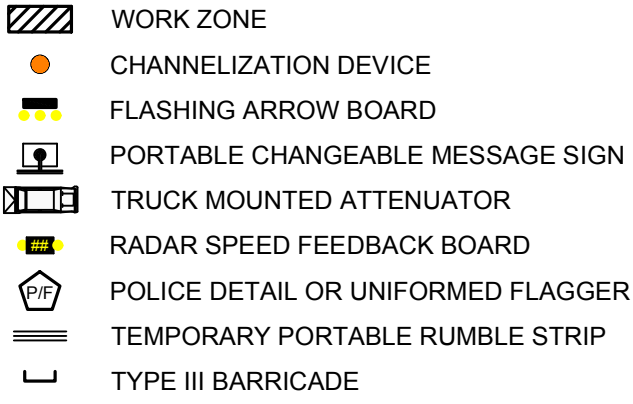
massDOT Massachusetts Department of Transportation Highway Division PAGE 47	Work Zone Safety Standard Details and Drawings	FIGURE 20 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY ROADWORK BEYOND OFF RAMP

massDOT Massachusetts Department of Transportation Highway Division PAGE 48	Work Zone Safety Standard Details and Drawings	MULTILANE DIVIDED ROADWAY TYPICAL RAMP CLOSURE

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		SHOULDER TAPER LENGTH (L/3) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES
25-40	500 / 500 / 500	110	305	20	45
45-55	500 / 1000 / 1000	220	495	40	30
60-65	1000 / 1600 / 2600	260	645	40	35

NOTES
1. MA-R2-10a LOCATED AT C/2.
2. * NOT REQUIRED IF RIGHT LANE IS CLOSED IN ADVANCE OF EXIT.
3. ** OPTIONAL AT ENGINEER'S DISCRETION.

LEGEND



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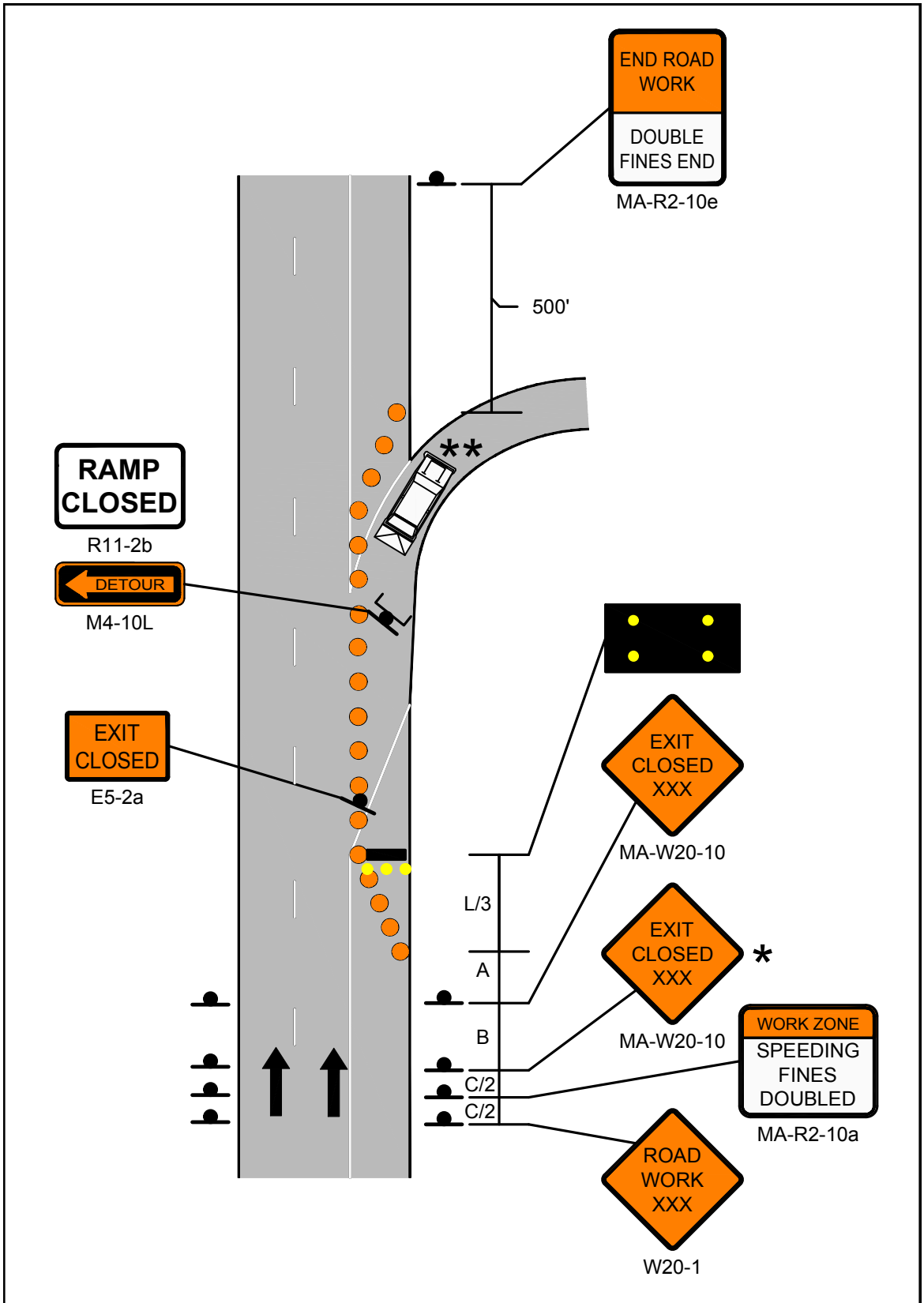


massDOT Massachusetts Department of Transportation Highway Division PAGE 49	Work Zone Safety Standard Details and Drawings	FIGURE 21 MULTILANE DIVIDED ROADWAY TYPICAL RAMP CLOSURE

massDOT Massachusetts Department of Transportation Highway Division PAGE 50	Work Zone Safety Standard Details and Drawings	MULTILANE DIVIDED ROADWAY TYPICAL CLOVERLEAF RAMP CLOSURE

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		SHOULDER TAPER LENGTH (L/3) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES
25-40	500 / 500 / 500	110	305	20	45
45-55	500 / 1000 / 1000	220	495	40	30
60-65	1000 / 1600 / 2600	260	645	40	35

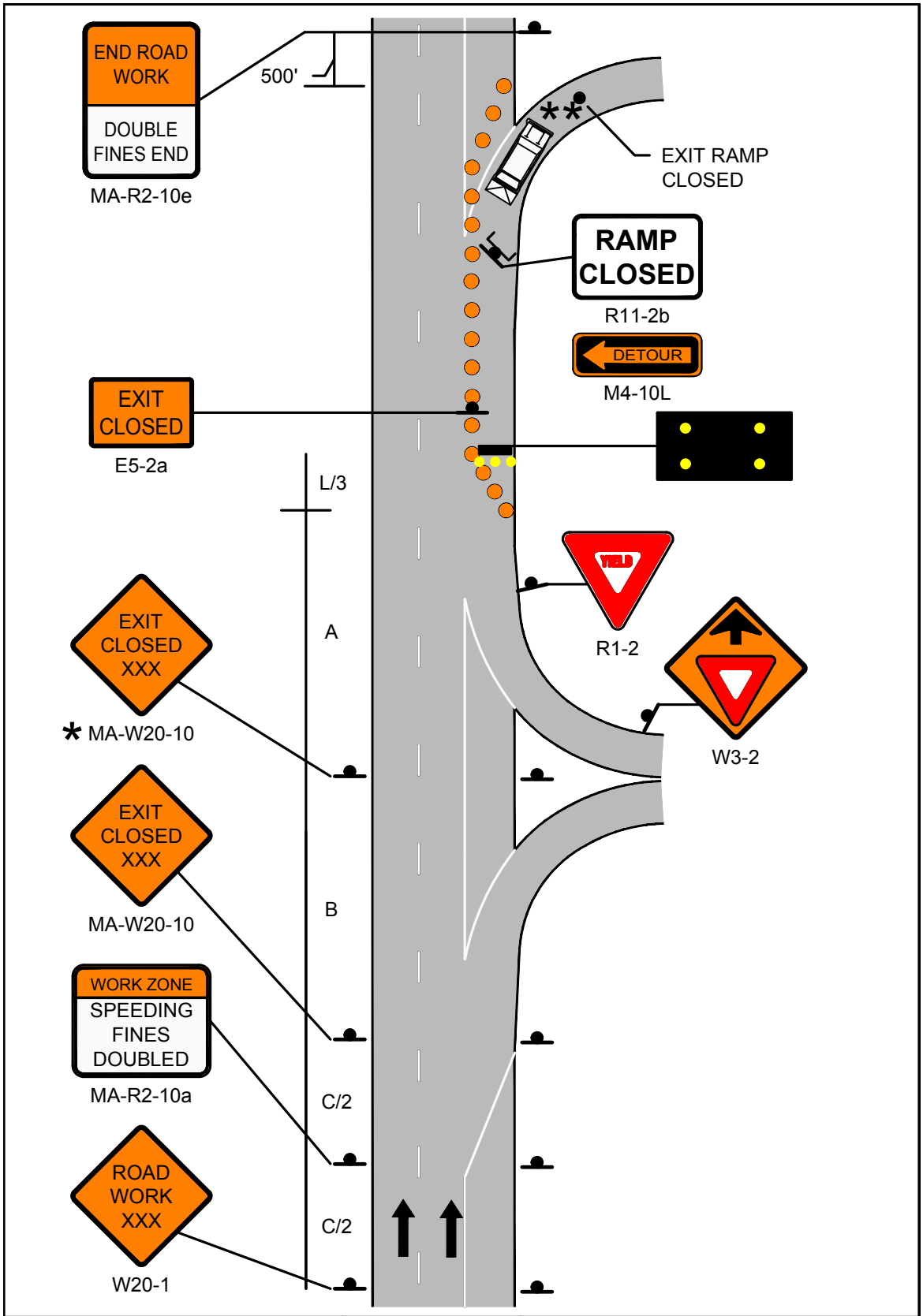
NOTES

1. MA-R2-10a LOCATED AT C/2.
2. * NOT REQUIRED IF RIGHT LANE IS CLOSED IN ADVANCE OF EXIT.
3. ** OPTIONAL AT ENGINEER'S DISCRETION.

LEGEND

- WORK ZONE
- CHANNELIZATION DEVICE
- FLASHING ARROW BOARD
- PORTABLE CHANGEABLE MESSAGE SIGN
- TRUCK MOUNTED ATTENUATOR
- RADAR SPEED FEEDBACK BOARD
- POLICE DETAIL OR UNIFORMED FLAGGER
- TEMPORARY PORTABLE RUMBLE STRIP
- TYPE III BARRICADE

NOT TO SCALE



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Work Zone Safety Standard Details and Drawings

FIGURE 22
MULTILANE DIVIDED ROADWAY
TYPICAL CLOVERLEAF RAMP CLOSURE

massDOT Massachusetts Department of Transportation Highway Division PAGE 52	Work Zone Safety Standard Details and Drawings	MULTILANE DIVIDED ROADWAY TYPICAL RAMP CLOSURE ADVANCE SIGNING

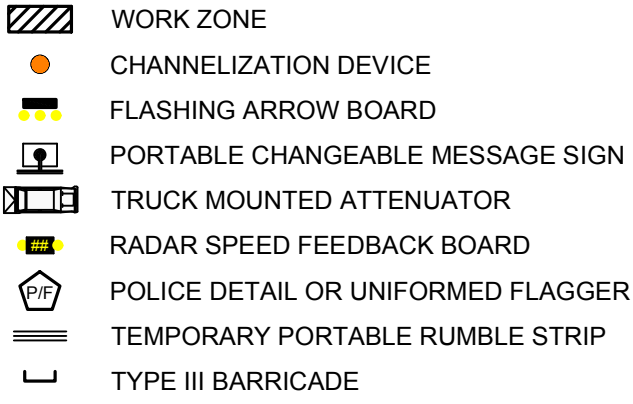
NOTES

1. IF THE CLOSED RAMP IS LOCATED DOWNSTREAM FROM THE PROPOSED DETOUR ROUTE/RAMP, A PCMS SHALL BE POSITIONED AT A SUFFICIENT DISTANCE IN ADVANCE OF THE DETOUR ROUTE/RAMP AND SHOULD STATE WHICH RAMP IS CLOSED AND WHICH SHALL BE USED FOR THE DETOUR.

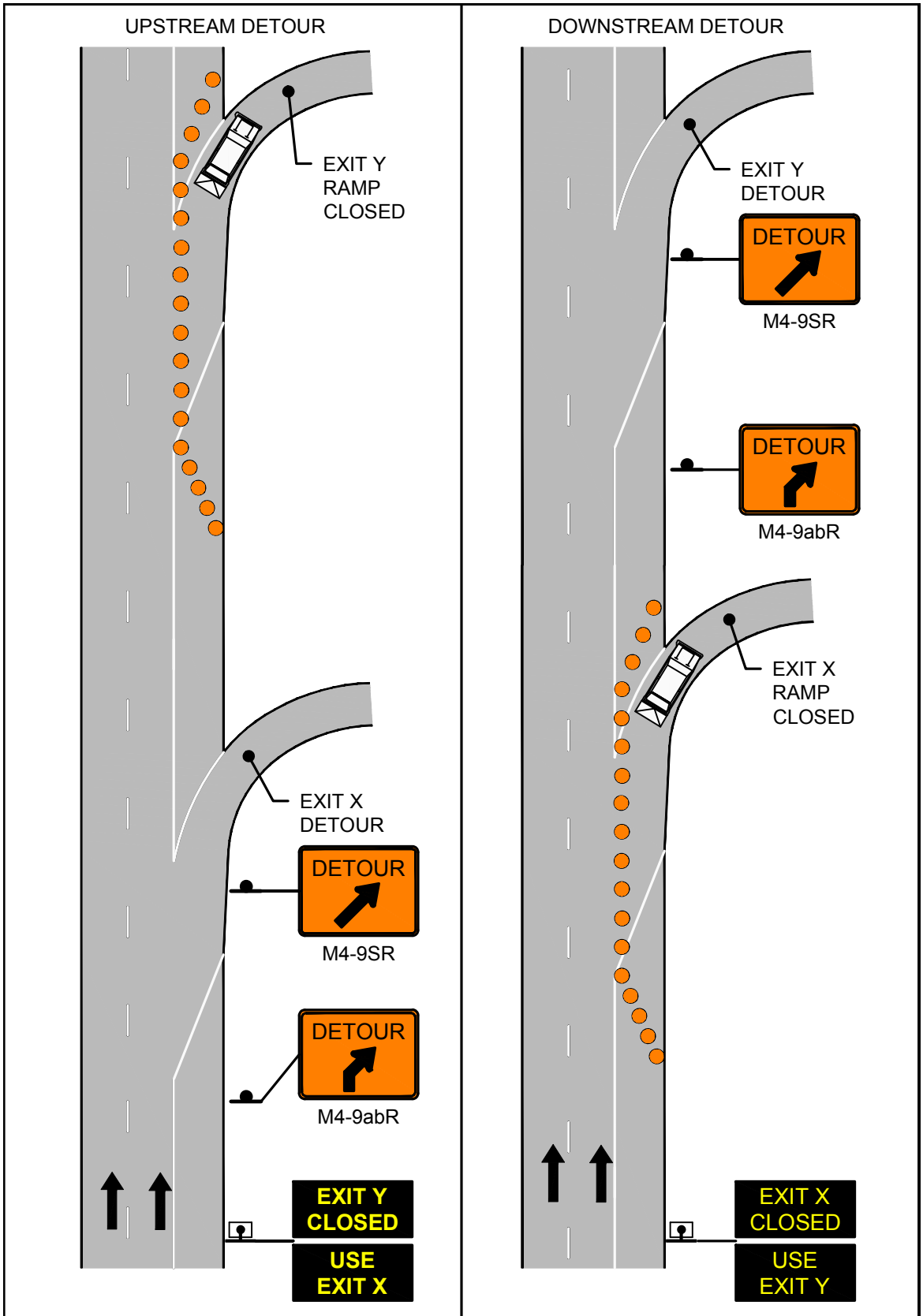
2. IF THE CLOSED RAMP IS LOCATED UPSTREAM FROM THE PROPOSED DETOUR ROUTE/RAMP, A PCMS SHALL BE POSITIONED PRIOR TO THE CLOSED RAMP AND SHOULD STATE WHICH RAMP IS CLOSED AND WHICH SHALL BE USED FOR THE DETOUR.

3. A SUFFICIENT NUMBER OF DETOUR SIGNS (M4-9 SERIES) SHOULD BE DEPLOYED TO PROPERLY DIRECT DETOURED TRAFFIC. SIGN SPACING SHALL BE AT THE DIRECTION OF THE ENGINEER.

LEGEND



NOT TO SCALE



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Work Zone Safety
Standard Details
and Drawings

FIGURE 23
MULTILANE DIVIDED ROADWAY
TYPICAL RAMP CLOSURE
ADVANCE SIGNING

massDOT Massachusetts Department of Transportation Highway Division PAGE 54	Work Zone Safety Standard Details and Drawings	FIGURE 24-1 MULTILANE DIVIDED ROADWAY PLACEMENT OF TEMPORARY PORTABLE RUMBLE STRIPS SHEET 1 OF 2

POSTED REGULATORY OR WORK ZONE SPEED	SEPARATION BETWEEN RUMBLE STRIPS
Above 55-mph	20-feet
36-mph to 55-mph	15-feet
35-mph and under	10-feet

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	TANGENT LENGTH BETWEEN TAPERS (T) (FT)
25-40	500 / 500 / 500	640
45-55	500 / 1000 / 1000	1320
60-65	1000 / 1600 / 2600	1560

NOTES

1. THE INTENTION OF THESE DETAILS IS ONLY TO DEPICT THE PLACEMENT OF TEMPORARY PORTABLE RUMBLE STRIPS (TPRS) IN RELATIONSHIP TO THE TAPER AND THE BUFFER OF A SINGLE- OR MULTI-LANE CLOSURE. THE DEPICTION OF THE NUMBER AND SPACING OF ALL OTHER TRAFFIC CONTROL DEVICES IS NOT TO SCALE. REFER TO OTHER DETAILS FOR LANE CLOSURES FOR THE PLACEMENT AND NUMBER OF ALL OTHER TRAFFIC CONTROL DEVICES.
2. THESE DETAILS ONLY DEPICT RIGHT LANE CLOSURES. LEFT LANE CLOSURES SHOULD UTILIZE A MIRROR IMAGE OF THESE SETUPS, STARTING WITH CLOSURE OF THE LEFTMOST LANE.
3. * THIS TPRS ARRAY IS OPTIONAL AT THE ENGINEER'S DISCRETION. IF USED, IT SHOULD BE PLACED ADJACENT TO THE BUFFER.
4. DETAILS SHOW THE MINIMUM NUMBER OF TPRS REQUIRED. ADDITIONAL MAY BE USED IF CONDITIONS WARRANT.

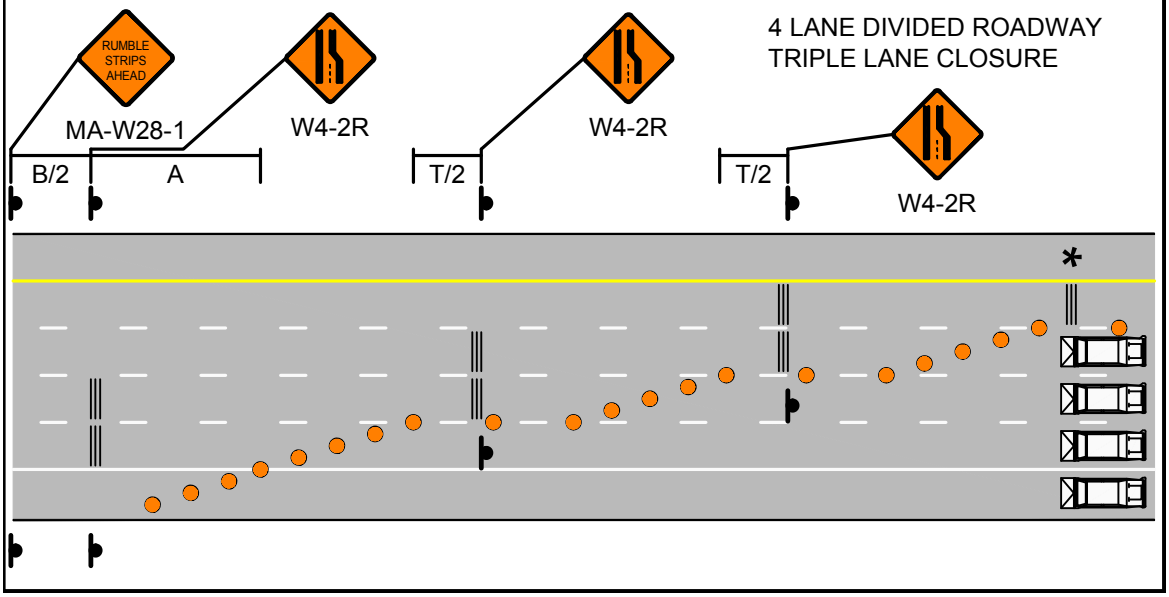
LEGEND

CHANNELIZATION DEVICE

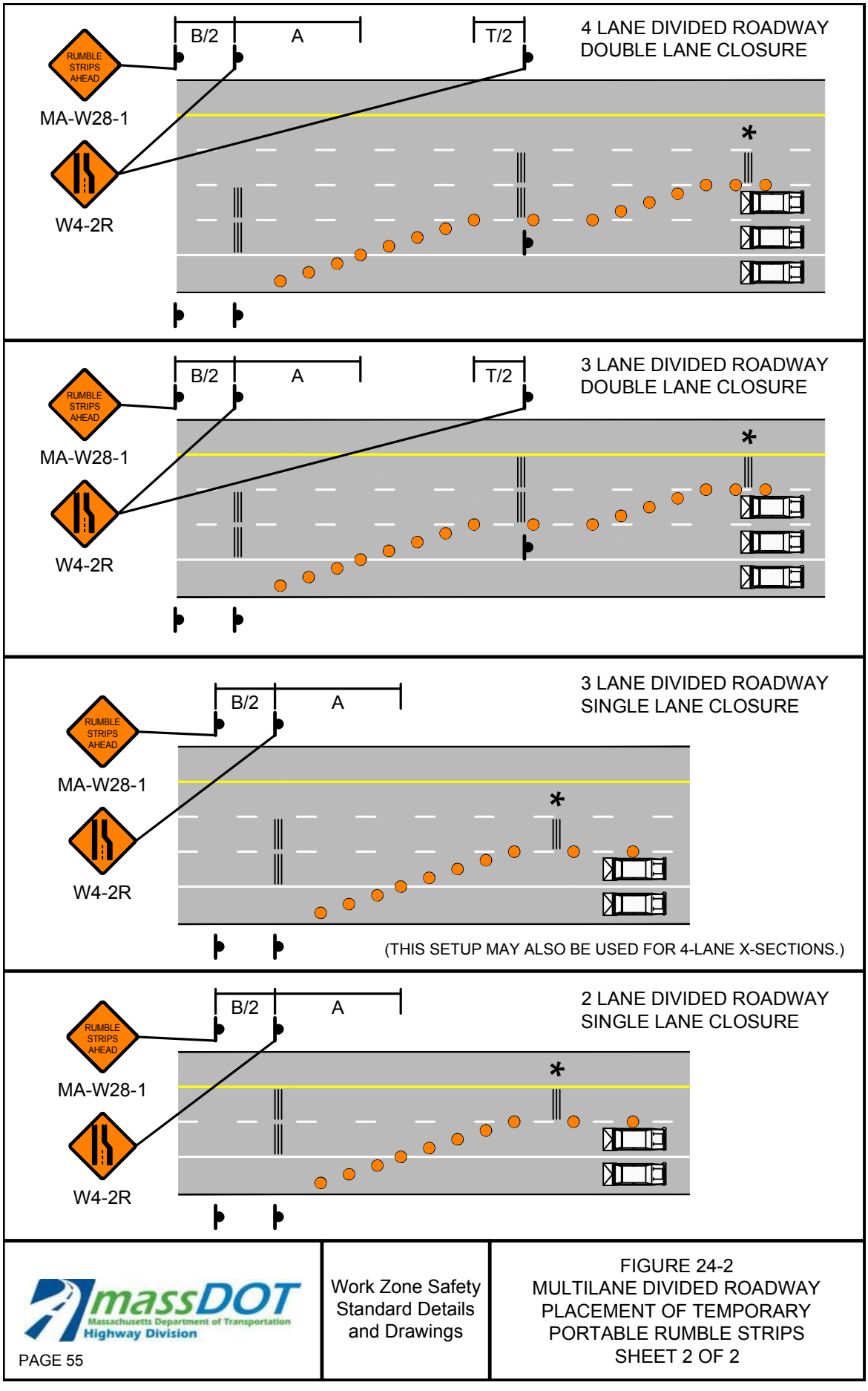
TRUCK MOUNTED ATTENUATOR

TEMPORARY PORTABLE RUMBLE STRIP

NOT TO SCALE



4 LANE DIVIDED ROADWAY
TRIPLE LANE CLOSURE



massDOT Massachusetts Department of Transportation Highway Division

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Work Zone Safety Standard Details and Drawings

FIGURE 24-2
MULTILANE DIVIDED ROADWAY
PLACEMENT OF TEMPORARY
PORTABLE RUMBLE STRIPS
SHEET 2 OF 2

Notes for Mobile Operations

- Unless otherwise stated, these notes shall apply to all Mobile Operation setups.
- Additional, setup-specific notes may be found on individual sheets.

1. The Supervisor shall travel the designated roadway prior to scheduling the work to ensure that sufficient and appropriate traffic control devices will be available. Special consideration shall be exercised to ensure that appropriate traffic controls be placed in areas that will have limited visibility of the work areas or any associated traffic queues.

2. Vehicles used for these operations shall be made highly visible with appropriate equipment such as flashing lights, rotating beacons, flags, signs, flashing arrow boards, and/or portable changeable message signs. Any signs mounted to these vehicles shall not obscure the visibility of other devices.

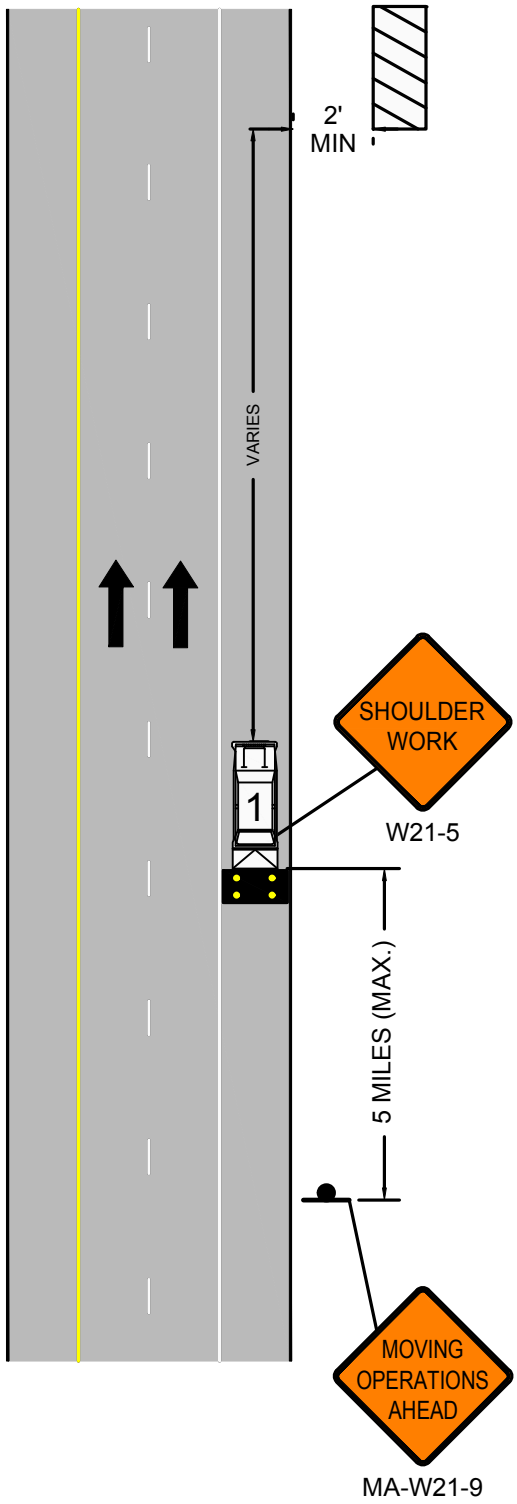
3. All vehicles shown may not be required based upon roadway conditions. However, when needed and practical, additional shadow vehicles and equipment to warn and protect motorists and workers should be used. Based upon roadway conditions, the addition of a police detail with cruiser may be used for additional protection or warning for the traveling public.

4. The distance between the work and shadow vehicle(s) may vary according to the terrain and other factors. Shadow vehicles are used to warn traffic of the operations ahead. Whenever adequate sight distance exists, the shadow vehicle(s) should maintain the minimum appropriate distance and maintain the same speed to prevent non-work related vehicles from entering the work convoy. If this formation cannot be maintained then additional traffic control devices should be deployed in advance of any vertical or horizontal curves that may restrict the sight distance of an oncoming vehicle to either the work vehicle or associated traffic queue.

5. All shadow vehicles shall be equipped with a truck or trailer mounted attenuator (TMA) and a flashing arrow board.

6. Signs should be covered or turned from view when work is not in progress.

7. Portable changeable message signs may be used in lieu of MA-W21-9 signs and any signs mounted directly to a shadow vehicle.



LEGEND

WORK ZONE

SHADOW VEHICLE

FLASHING ARROW BOARD
(WITH STATUS)

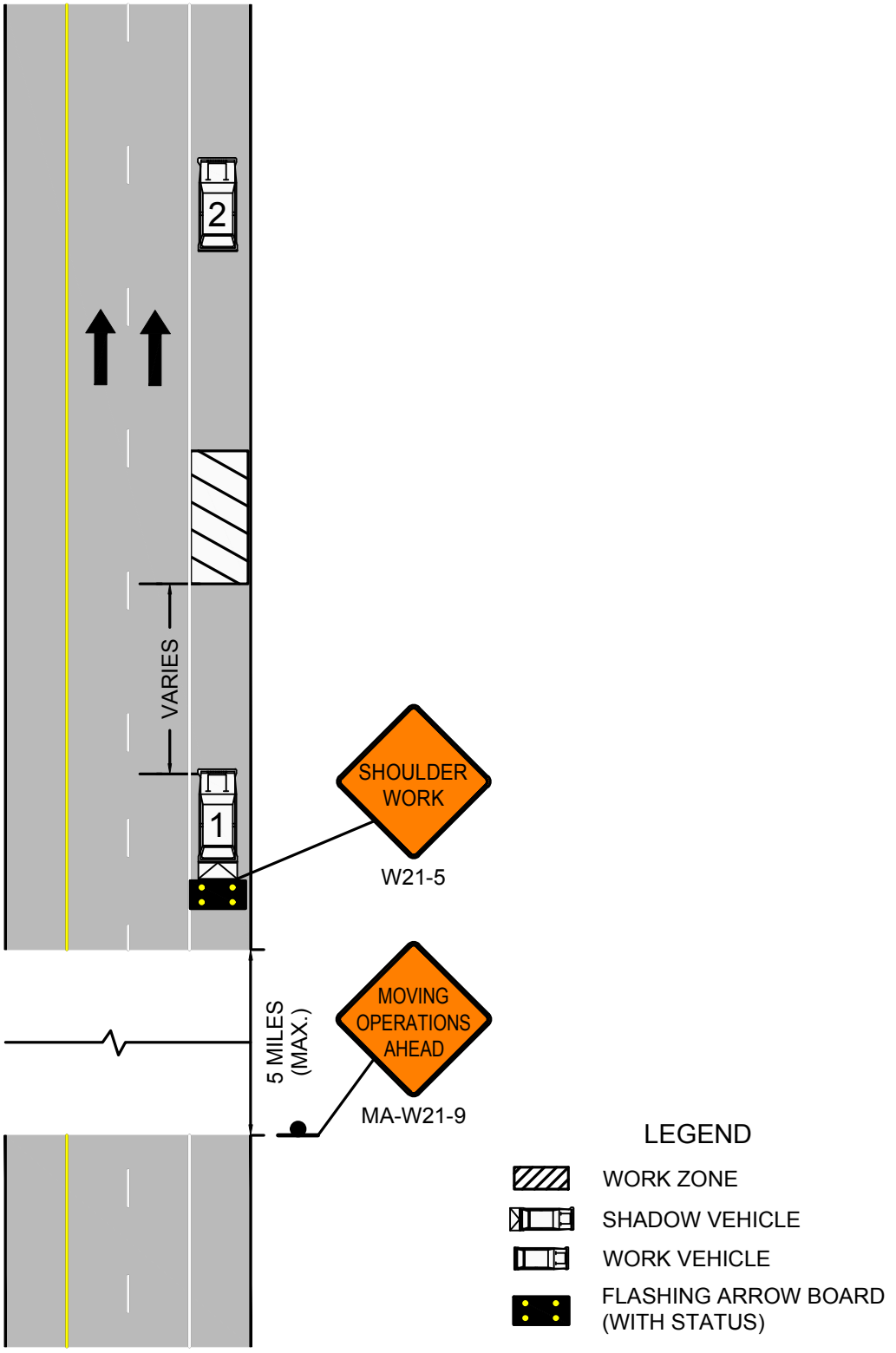
NOT TO SCALE

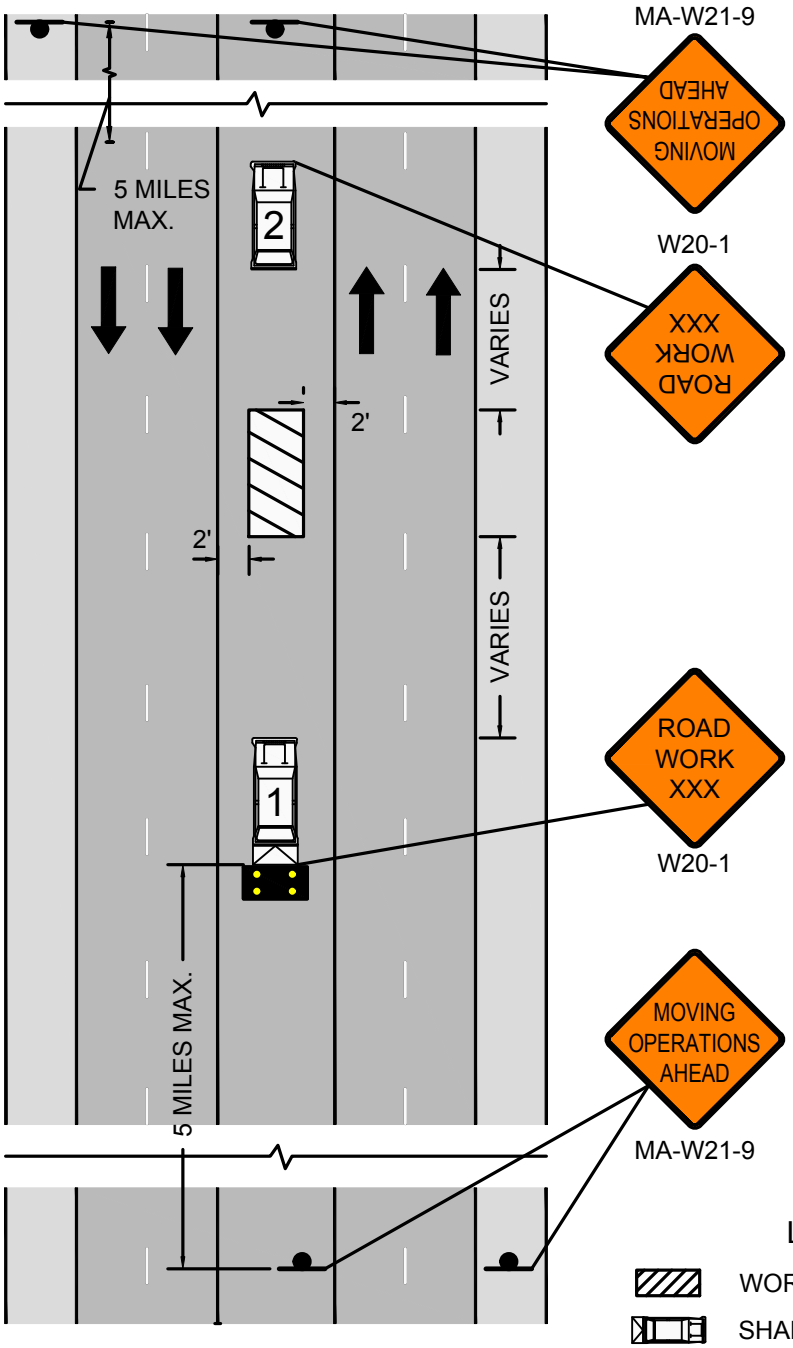
NOTES

1. IF THE WORK AREA IS SUFFICIENTLY AWAY FROM THE EDGE OF ROADWAY (20' MINIMUM) THEN SIGNS AND VEHICLES MAY NOT BE REQUIRED.

massDOT Massachusetts Department of Transportation Highway Division PAGE 57	Work Zone Safety Standard Details and Drawings	FIGURE 25 MOBILE OPERATIONS ANY ROADWAY BEYOND RIGHT SHOULDER

massDOT Massachusetts Department of Transportation Highway Division PAGE 58	Work Zone Safety Standard Details and Drawings	FIGURE 26 MOBILE OPERATIONS ANY ROADWAY SHOULDER





LEGEND

- WORK ZONE
- SHADOW VEHICLE
- WORK VEHICLE
- FLASHING ARROW BOARD (WITH STATUS)

NOT TO SCALE

NOTES

1. IF THE 2' OFFSET CANNOT BE MAINTAINED, A SHORT-TERM STATIONARY SETUP SHOULD BE USED.

massDOT Massachusetts Department of Transportation Highway Division PAGE 59	Work Zone Safety Standard Details and Drawings	FIGURE 27 MOBILE OPERATIONS DIVIDED ROADWAY MEDIAN WORK

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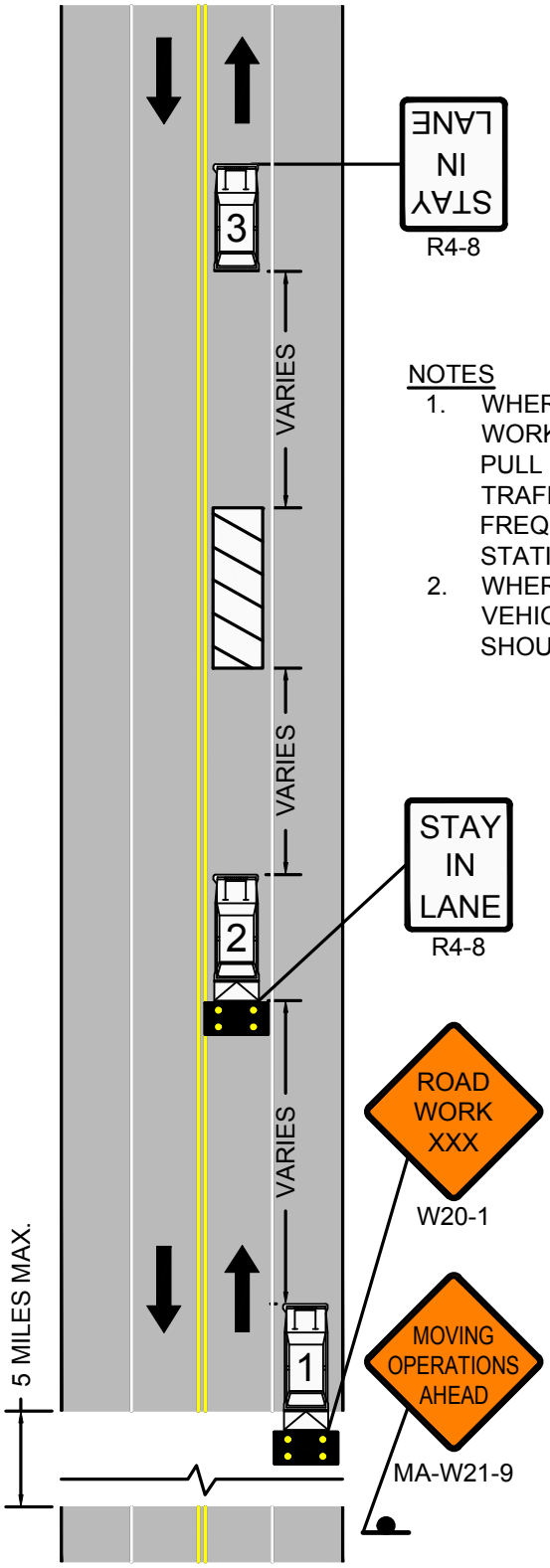
Work Zone Safety Standard Details and Drawings

FIGURE 28
MOBILE OPERATIONS
UNDIVIDED TWO LANE ROADWAY
HALF OF ROADWAY CLOSED



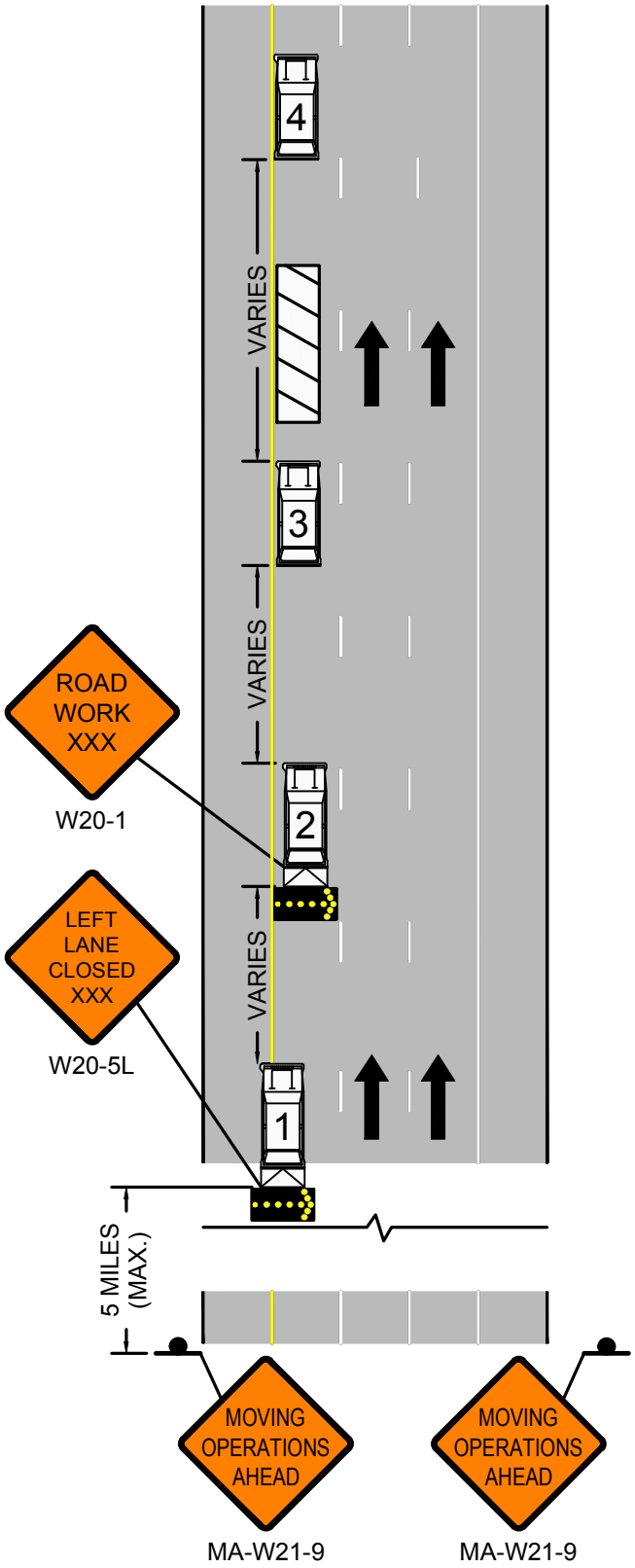
NOTES

1. WHERE PRACTICAL AND WHEN NEEDED, THE WORK AND SHADOW VEHICLE(S) SHOULD PULL OVER PERIODICALLY TO ALLOW TRAFFIC TO PASS. IF THIS CANNOT BE DONE FREQUENTLY, THEN AN ALTERNATE STATIONARY SETUP SHALL BE DEPLOYED.
2. WHERE A WIDE SHOULDER EXISTS, SHADOW VEHICLE #1 SHOULD DRIVE ON THE SHOULDER.

LEGEND

- WORK ZONE
- SHADOW VEHICLE
- WORK VEHICLE
- FLASHING ARROW BOARD (WITH STATUS)

NOT TO SCALE



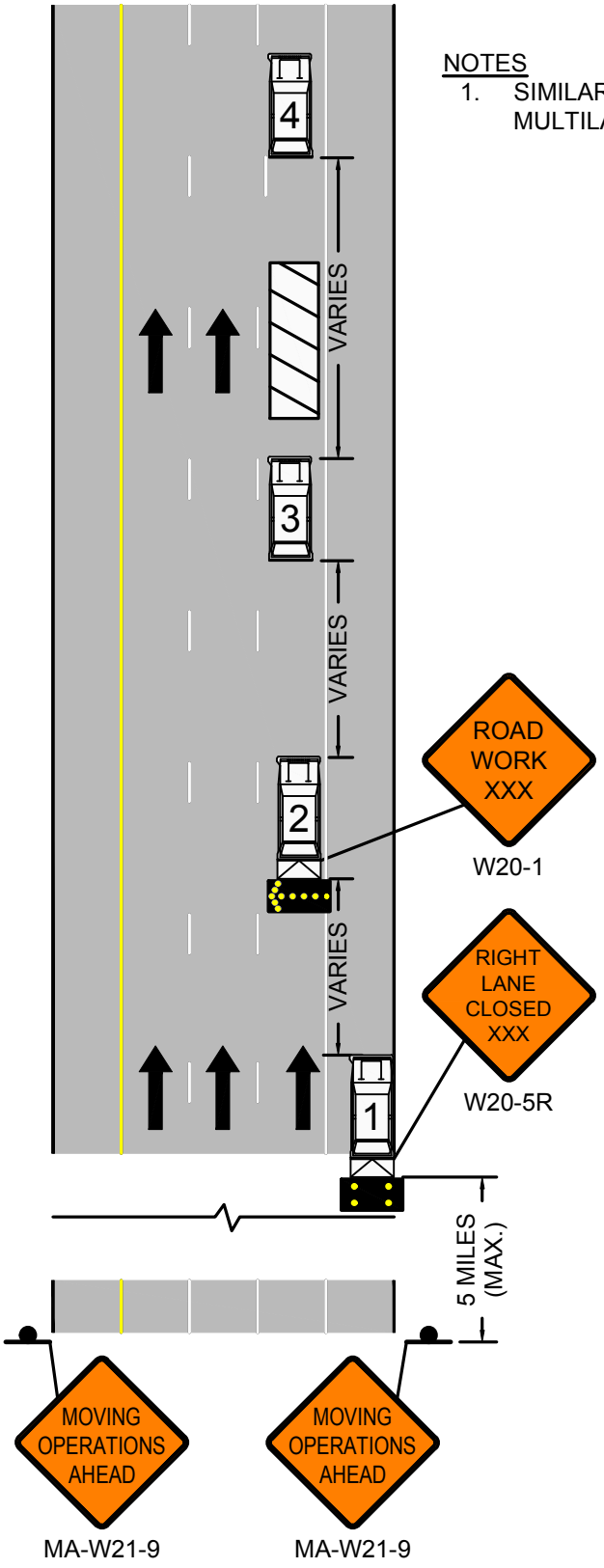
LEGEND

- WORK ZONE
- SHADOW VEHICLE
- WORK VEHICLE
- FLASHING ARROW BOARD (WITH STATUS)

NOT TO SCALE

massDOT Massachusetts Department of Transportation Highway Division PAGE 61	Work Zone Safety Standard Details and Drawings	FIGURE 29 MOBILE OPERATIONS MULTILANE DIVIDED ROADWAY LEFT LANE

massDOT Massachusetts Department of Transportation Highway Division PAGE 62	Work Zone Safety Standard Details and Drawings	FIGURE 30 MOBILE OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT LANE



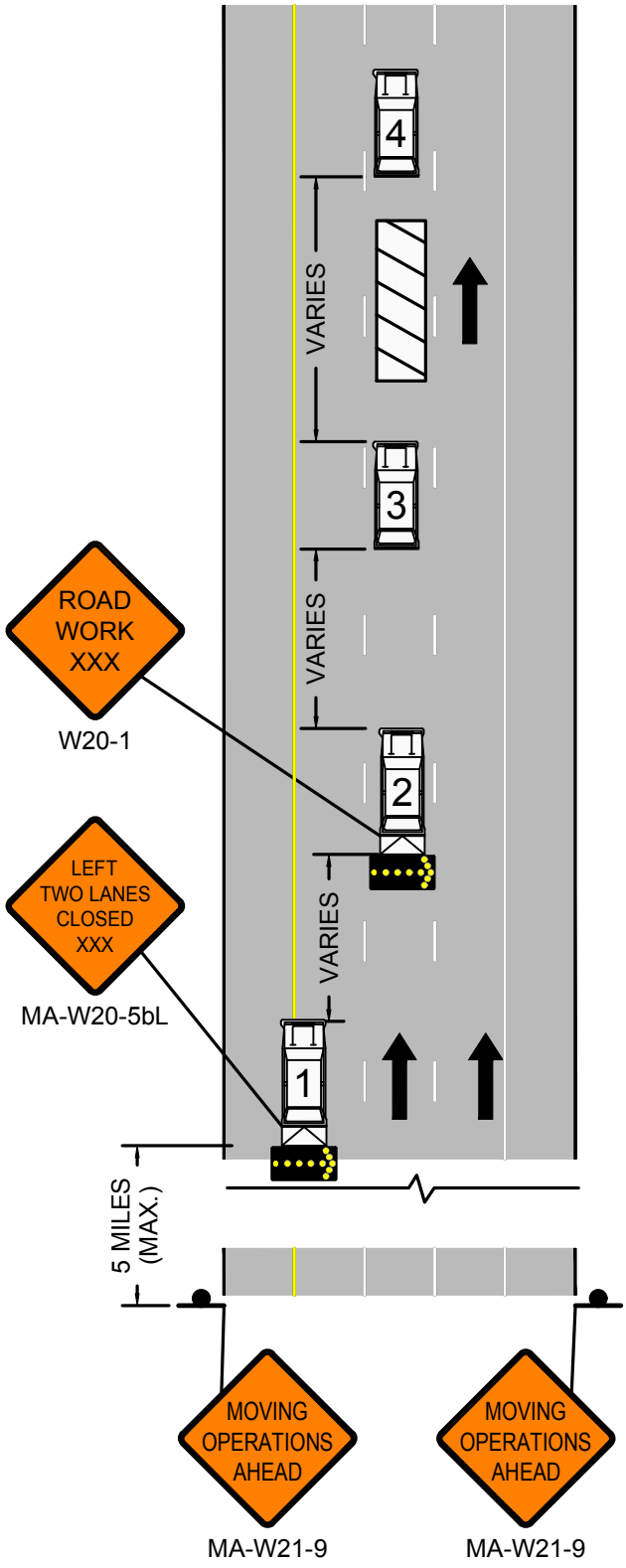
NOTES

1. SIMILAR SETUP MAY BE USED FOR A MULTILANE UNDIVIDED HIGHWAY.

LEGEND

- WORK ZONE
- SHADOW VEHICLE
- WORK VEHICLE
- FLASHING ARROW BOARD (WITH STATUS)

NOT TO SCALE



LEGEND

WORK ZONE

SHADOW VEHICLE

WORK VEHICLE

FLASHING ARROW BOARD (WITH STATUS)

NOT TO SCALE

massDOT Massachusetts Department of Transportation Highway Division

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Work Zone Safety Standard Details and Drawings

FIGURE 31
MOBILE OPERATIONS
MULTILANE DIVIDED ROADWAY
CENTER LANE

massDOT Massachusetts Department of Transportation Highway Division

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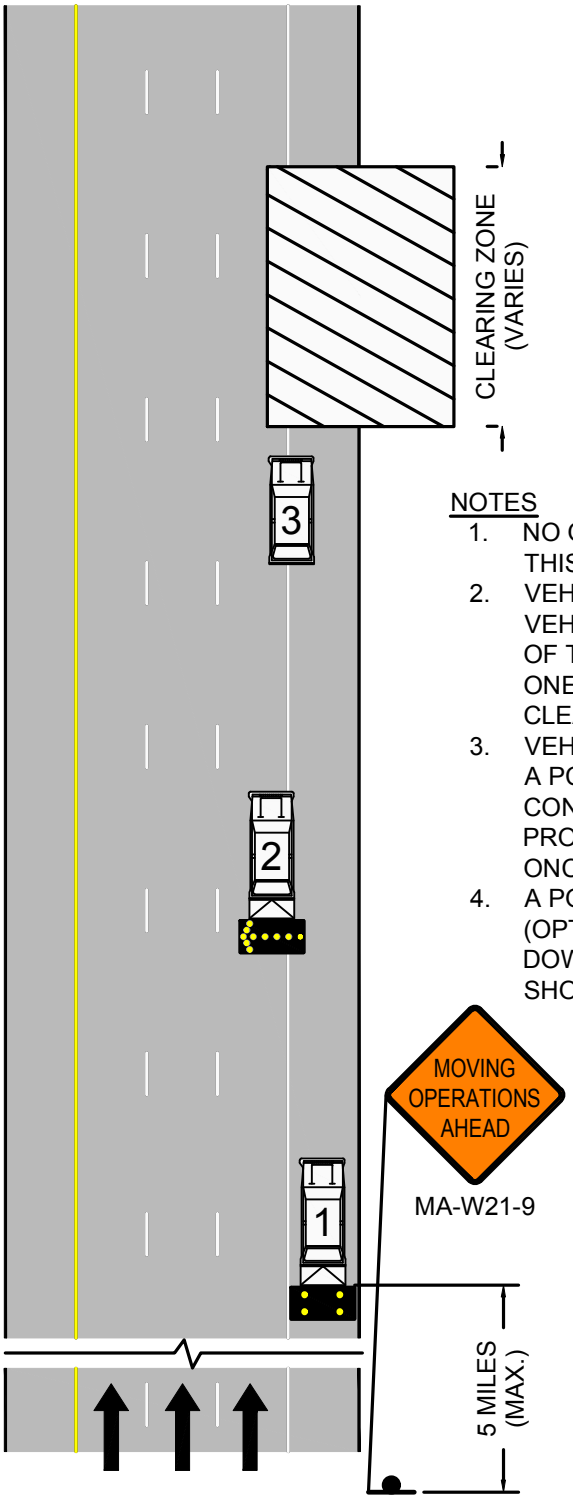
Work Zone Safety Standard Details and Drawings

FIGURE 32
MOBILE OPERATIONS
POST-STORM CLEANUP OPERATION



NOTES

1. NO OTHER NOTES ARE APPLICABLE TO THIS DETAIL.
2. VEHICLE #3 IS A SNOW/DEBRIS REMOVAL VEHICLE AND SHALL ALWAYS BE AWARE OF THE SURROUNDINGS. MORE THAN ONE VEHICLE MAY BE USED IN THE CLEARING ZONE.
3. VEHICLE #1 SHOULD BE EQUIPPED WITH A PCMS, A TMA, AND STAY IN VISUAL CONTACT WITH VEHICLE #3 WHILE PROVIDING AMPLE WARNING TO ONCOMING TRAFFIC.
4. A POLICE DETAIL WITH BLUE LIGHTS (OPTIONAL) SHALL REMAIN DOWNSTREAM OF VEHICLE #1 IN THE SHOULDER.

LEGEND

- WORK ZONE
- SHADOW VEHICLE
- WORK VEHICLE
- FLASHING ARROW BOARD (WITH STATUS)

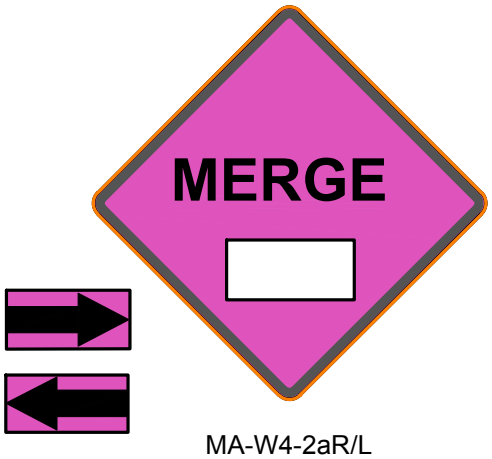
NOT TO SCALE

Notes for Traffic Emergency or Incident Operations

- The goal is to increase awareness of during traffic emergencies or incidents.
- These signs are to be used to differentiate from the traditional construction work zone and an emergency or incident.
- Upon arrival MassDOT First Responders shall assess the magnitude of the scene to determine if the incident is likely to last an hour or more in duration which would trigger the requirement to use these signs.
- Place the "Emergency Ahead" sign on the same side of the road as the incident, if possible, for up to an hour. Emergency response signs should be put up for all incidents and emergencies as soon as possible.
- Place the emergency sign 500 to 1000 feet before the first channelization devices.
- As an incident evolves this sign would be used as a secondary sign with all other emergency controls put in place.
- Only use "MERGE" signs where applicable (Not on 2 lane roads).
- Use MERGE signs on Multi-lane Roads to move traffic away from the incident and keep them in a safe lane.
- Place the MERGE sign about 500 feet before the closure.
- If additional signs are available, they should be placed accordingly as a sign informing people coming in the other direction or on the opposite side of the roadway.
- Use 12 emergency cones spaced 40 to 80 feet apart to form a taper and protect the scene.
- Sequential flashing lights/flares may be used in lieu of or to supplement cones.
- During a major incident that will last for a long duration, the EMERGENCY AHEAD sign should be moved back before an intersecting road or ramp to alert travelers and give them an option of using an alternate route. (Be sure all other devices are in place before moving this sign).

Standard Emergency Signs (36"x36" or 48"x48")

MA-W20-9



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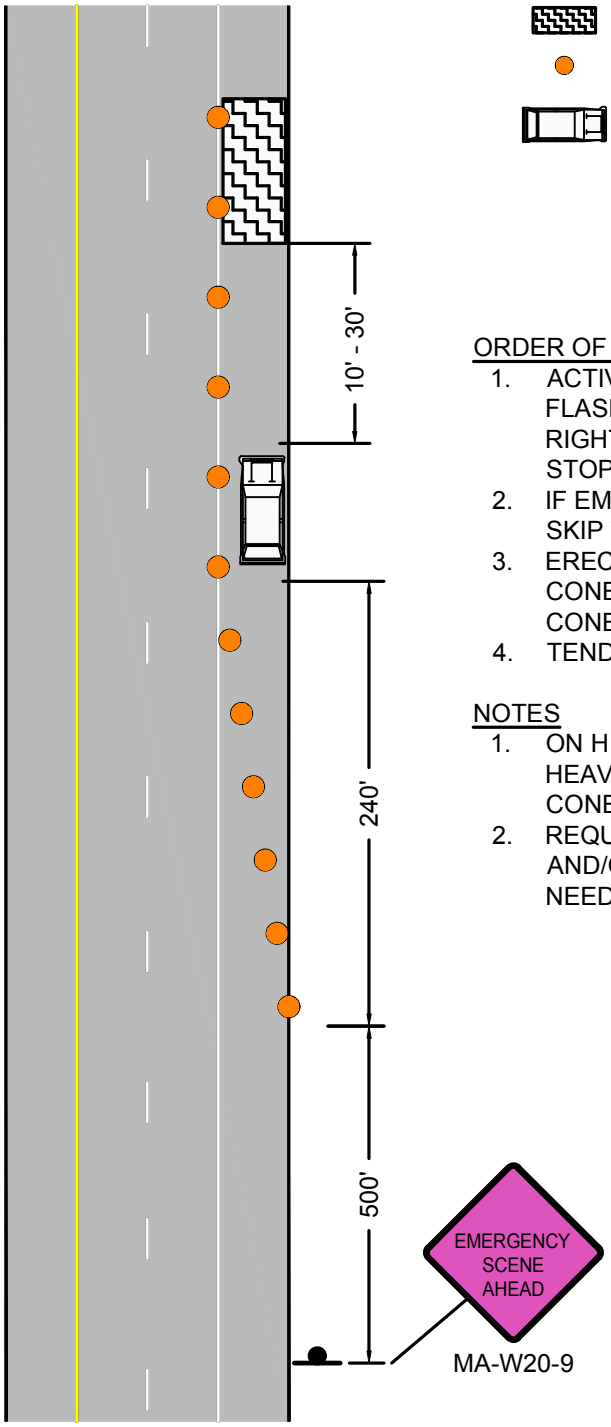
massDOT Massachusetts Department of Transportation Highway Division PAGE 66	Work Zone Safety Standard Details and Drawings	FIGURE 33 EMERGENCY RESPONSE ANY ROADWAY SHOULDER ENCROACHMENT



LEGEND

EMERGENCY AREA

CHANNELIZATION DEVICE

EMERGENCY RESPONSE VEHICLE

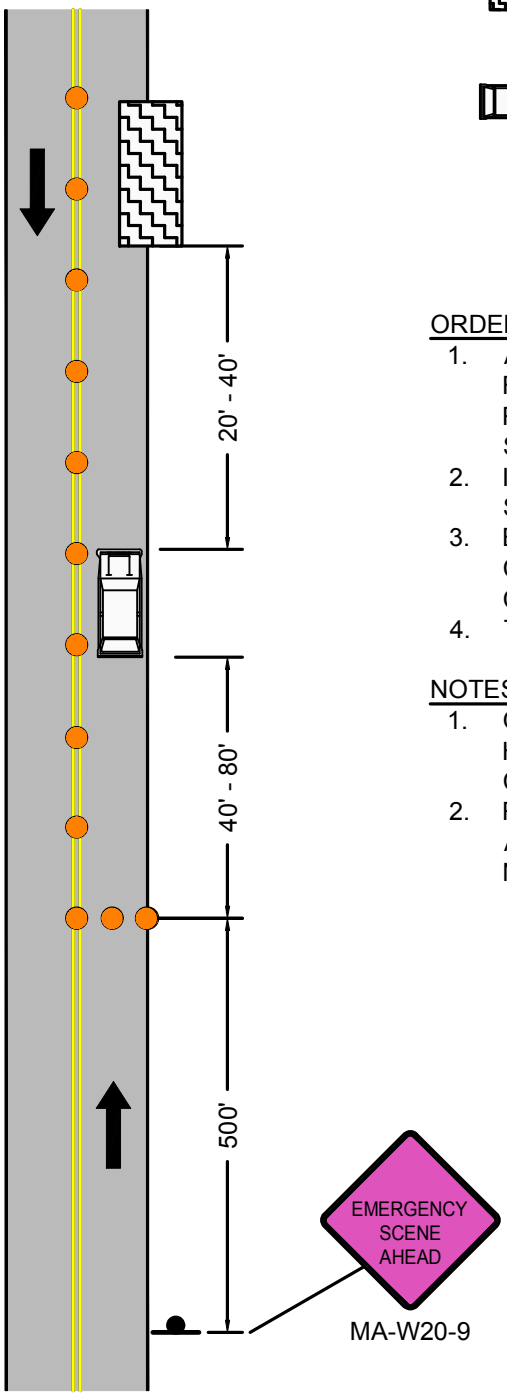
NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE RIGHT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.



LEGEND

EMERGENCY AREA

CHANNELIZATION DEVICE

EMERGENCY RESPONSE VEHICLE

NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

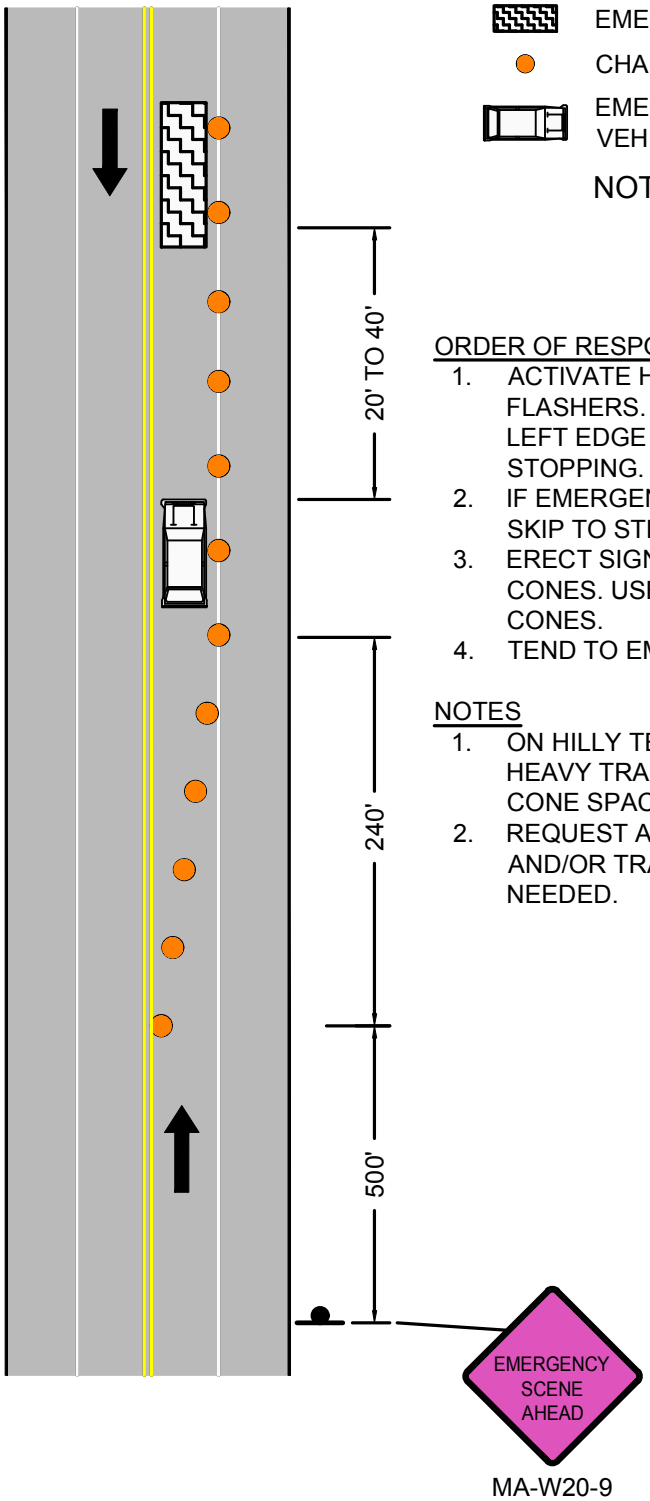
1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE RIGHT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.

massDOT Massachusetts Department of Transportation Highway Division PAGE 67	Work Zone Safety Standard Details and Drawings	FIGURE 34 EMERGENCY RESPONSE TWO LANE ROADWAY NO SHOULDER TRAVEL LANE ENCROACHMENT

massDOT Massachusetts Department of Transportation Highway Division PAGE 68	Work Zone Safety Standard Details and Drawings	FIGURE 35 EMERGENCY RESPONSE TWO LANE ROADWAY TRAVERSABLE SHOULDER SINGLE LANE ENCROACHMENT



LEGEND

- EMERGENCY AREA
- CHANNELIZATION DEVICE
- EMERGENCY RESPONSE VEHICLE

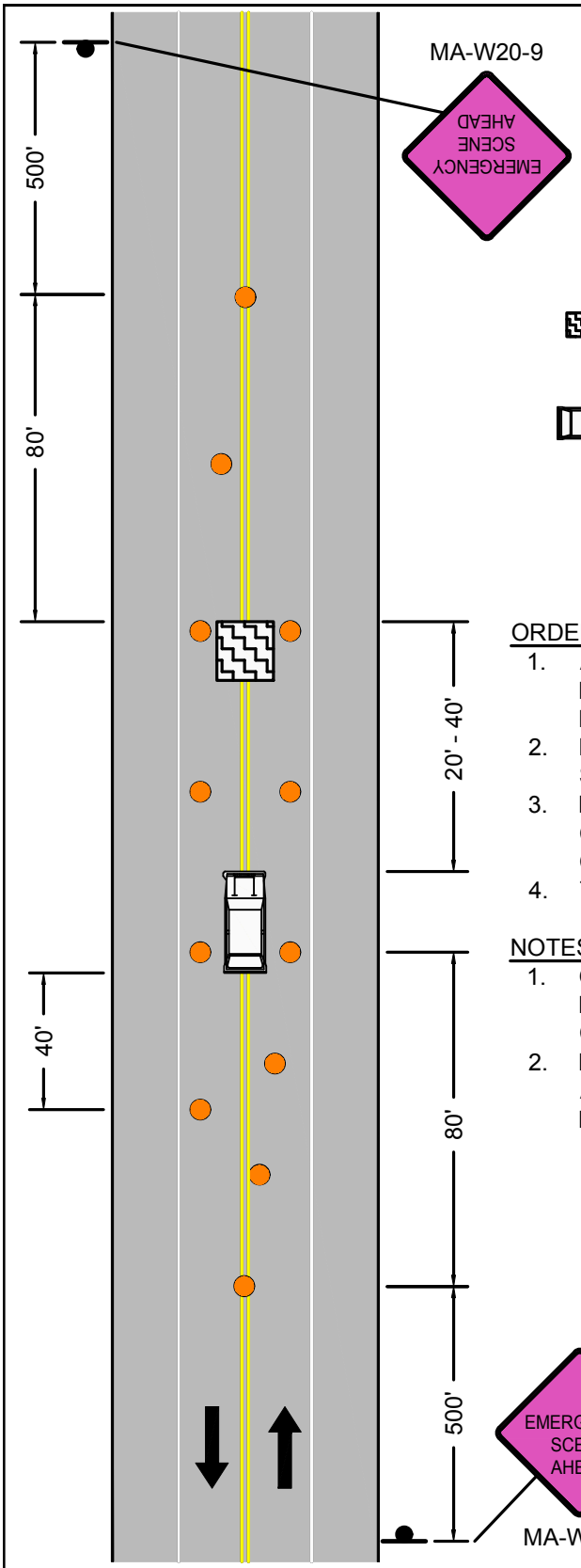
NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE LEFT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.



LEGEND

- EMERGENCY AREA
- CHANNELIZATION DEVICE
- EMERGENCY RESPONSE VEHICLE

NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

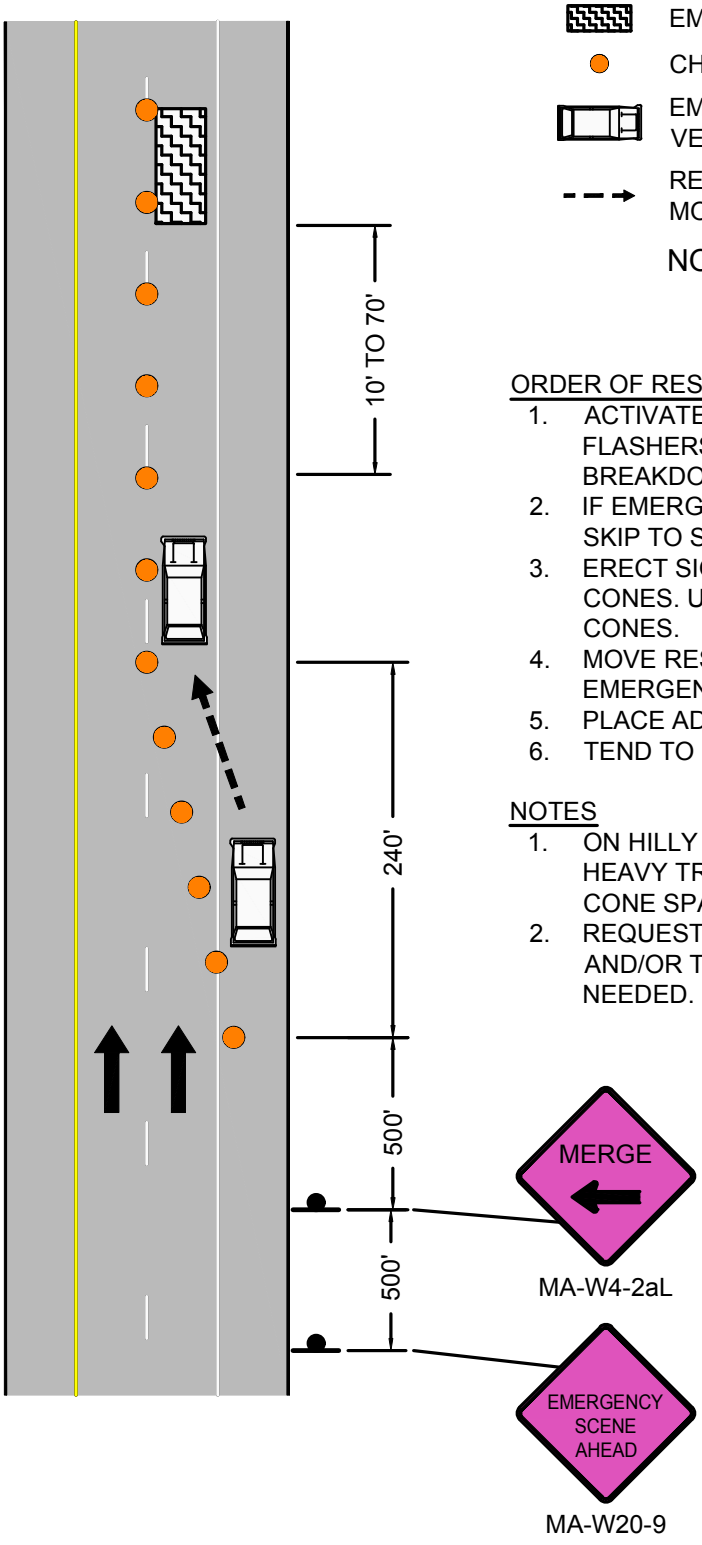
1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. STOP VEHICLE ON CENTER LINE.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.

massDOT Massachusetts Department of Transportation Highway Division PAGE 69	Work Zone Safety Standard Details and Drawings	FIGURE 36 EMERGENCY RESPONSE TWO LANE ROADWAY TRAVERSABLE SHOULDER CENTER OF ROADWAY

massDOT Massachusetts Department of Transportation Highway Division PAGE 70	Work Zone Safety Standard Details and Drawings	FIGURE 37 EMERGENCY RESPONSE MULTILANE DIVIDED ROADWAY RIGHT LANE



LEGEND

- EMERGENCY AREA
- CHANNELIZATION DEVICE
- EMERGENCY RESPONSE VEHICLE
- RESPONSE VEHICLE MOVEMENT

NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. STOP VEHICLE IN BREAKDOWN LANE.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 6 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. MOVE RESPONSE VEHICLE BEHIND EMERGENCY.
5. PLACE ADDITIONAL CONES.
6. TEND TO EMERGENCY.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.

LEGEND

EMERGENCY AREA

CHANNELIZATION DEVICE

EMERGENCY RESPONSE VEHICLE

RESPONSE VEHICLE MOVEMENT

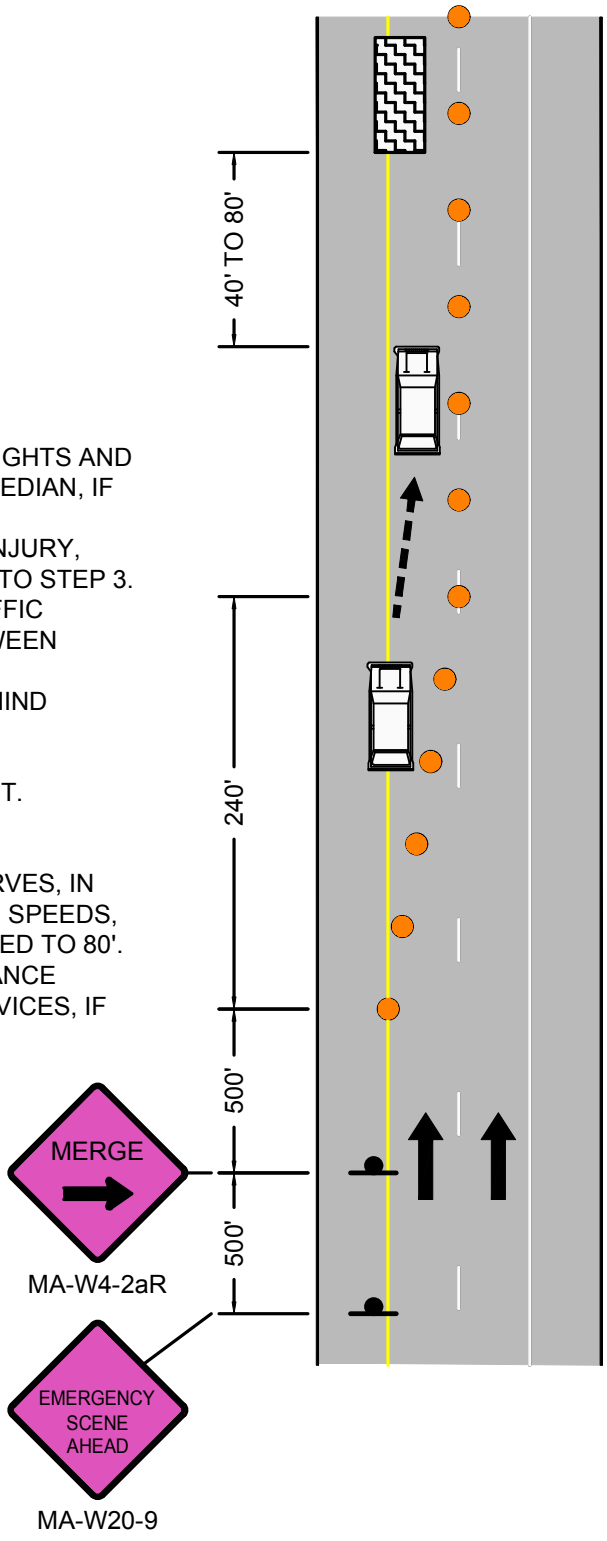
NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. STOP VEHICLE IN MEDIAN, IF PRESENT.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 6 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. MOVE RESPONSE VEHICLE BEHIND EMERGENCY.
5. PLACE ADDITIONAL CONES.
6. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.



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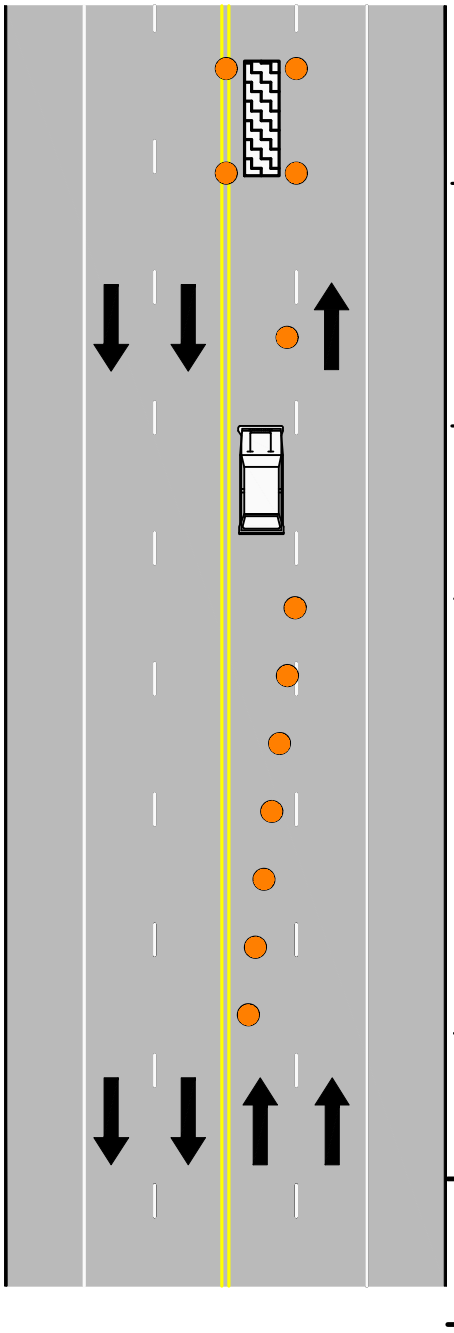
Work Zone Safety Standard Details and Drawings

FIGURE 38
EMERGENCY RESPONSE
MULTILANE DIVIDED ROADWAY
LEFT LANE

massDOT Massachusetts Department of Transportation Highway Division PAGE 72	Work Zone Safety Standard Details and Drawings	FIGURE 39 EMERGENCY RESPONSE MULTILANE UNDIVIDED ROADWAY LEFT LANE



LEGEND

- EMERGENCY AREA
- CHANNELIZATION DEVICE
- EMERGENCY RESPONSE VEHICLE

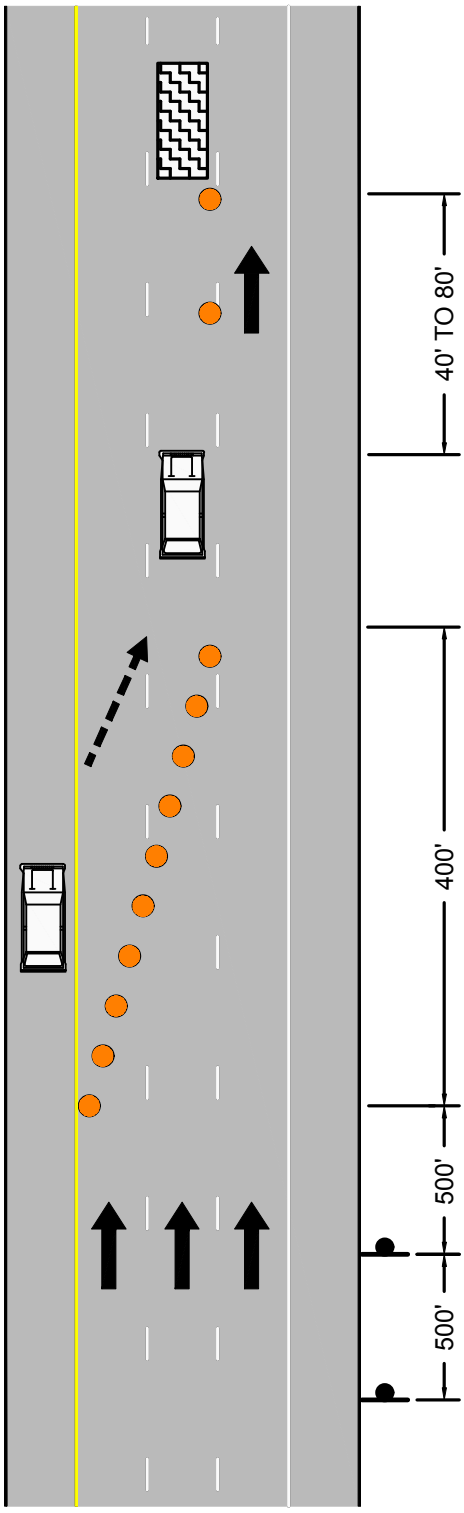
NOT TO SCALE

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE RIGHT EDGE OF BREAKDOWN LANE OR SHOULDER OR, IF NOT PRESENT, RIGHT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.



LEGEND

- EMERGENCY AREA
- CHANNELIZATION DEVICE
- EMERGENCY RESPONSE VEHICLE
- RESPONSE VEHICLE MOVEMENT

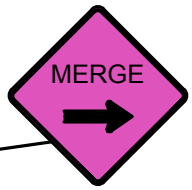
NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. STOP VEHICLE IN MEDIAN, IF PRESENT.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 6 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. MOVE RESPONSE VEHICLE BEHIND EMERGENCY.
5. PLACE ADDITIONAL CONES.
6. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.



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MA-W20-9

massDOT Massachusetts Department of Transportation Highway Division PAGE 73	Work Zone Safety Standard Details and Drawings	FIGURE 40 EMERGENCY RESPONSE MULTILANE DIVIDED ROADWAY MIDDLE LANE APPROACH FROM LEFT

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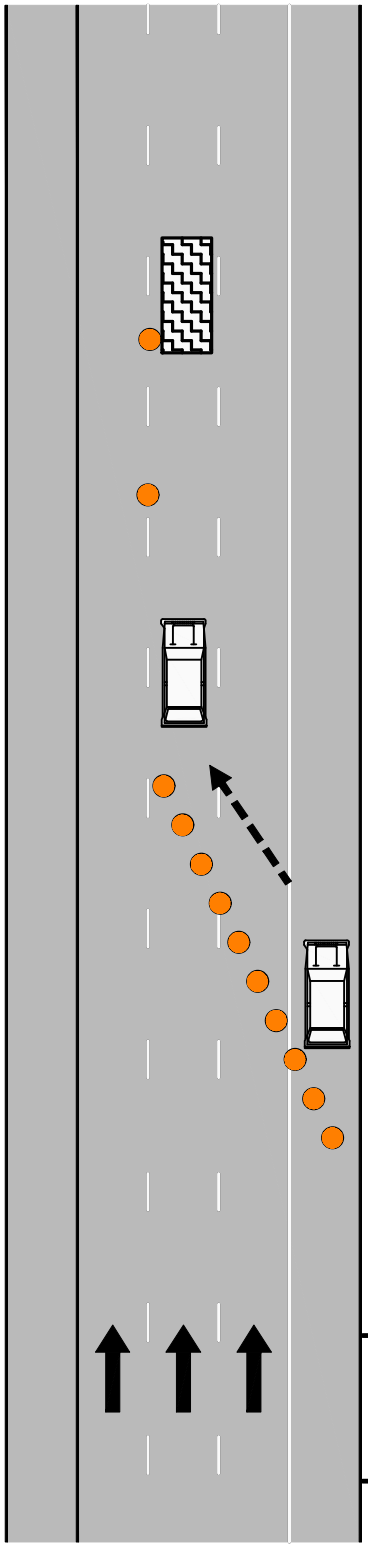
Work Zone Safety Standard Details and Drawings

FIGURE 41
EMERGENCY RESPONSE
MULTILANE DIVIDED ROADWAY
MIDDLE LANE
APPROACH FROM RIGHT



LEGEND

- EMERGENCY AREA
- CHANNELIZATION DEVICE
- EMERGENCY RESPONSE VEHICLE
- RESPONSE VEHICLE MOVEMENT

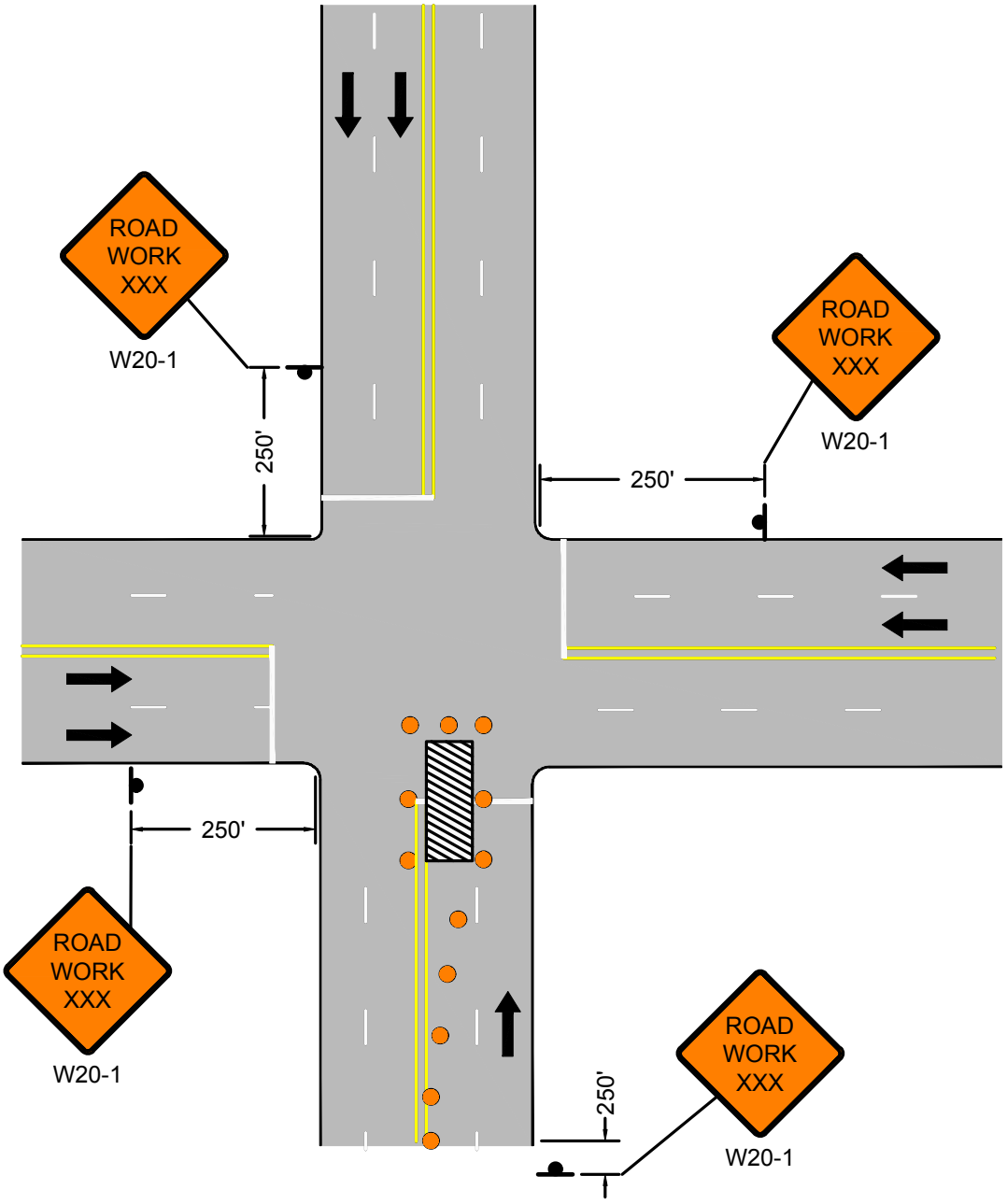
NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. STOP VEHICLE IN BREAKDOWN LANE.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 6 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. MOVE RESPONSE VEHICLE BEHIND EMERGENCY.
5. PLACE ADDITIONAL CONES.
6. TEND TO EMERGENCY.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.



LEGEND

WORK ZONE

CHANNELIZATION DEVICE

NOT TO SCALE

NOTES

1. DURATION OF WORK = 20 MINUTES OR LESS.
2. EQUIPMENT: 12 CONES + 4 PORTABLE SIGNS.
3. CONE SPACING IS 20 FEET.
4. SINGLE WORK VEHICLE PARKED/STOPPED.
5. POLICE DETAIL REQUIRED.

massDOT Massachusetts Department of Transportation Highway Division

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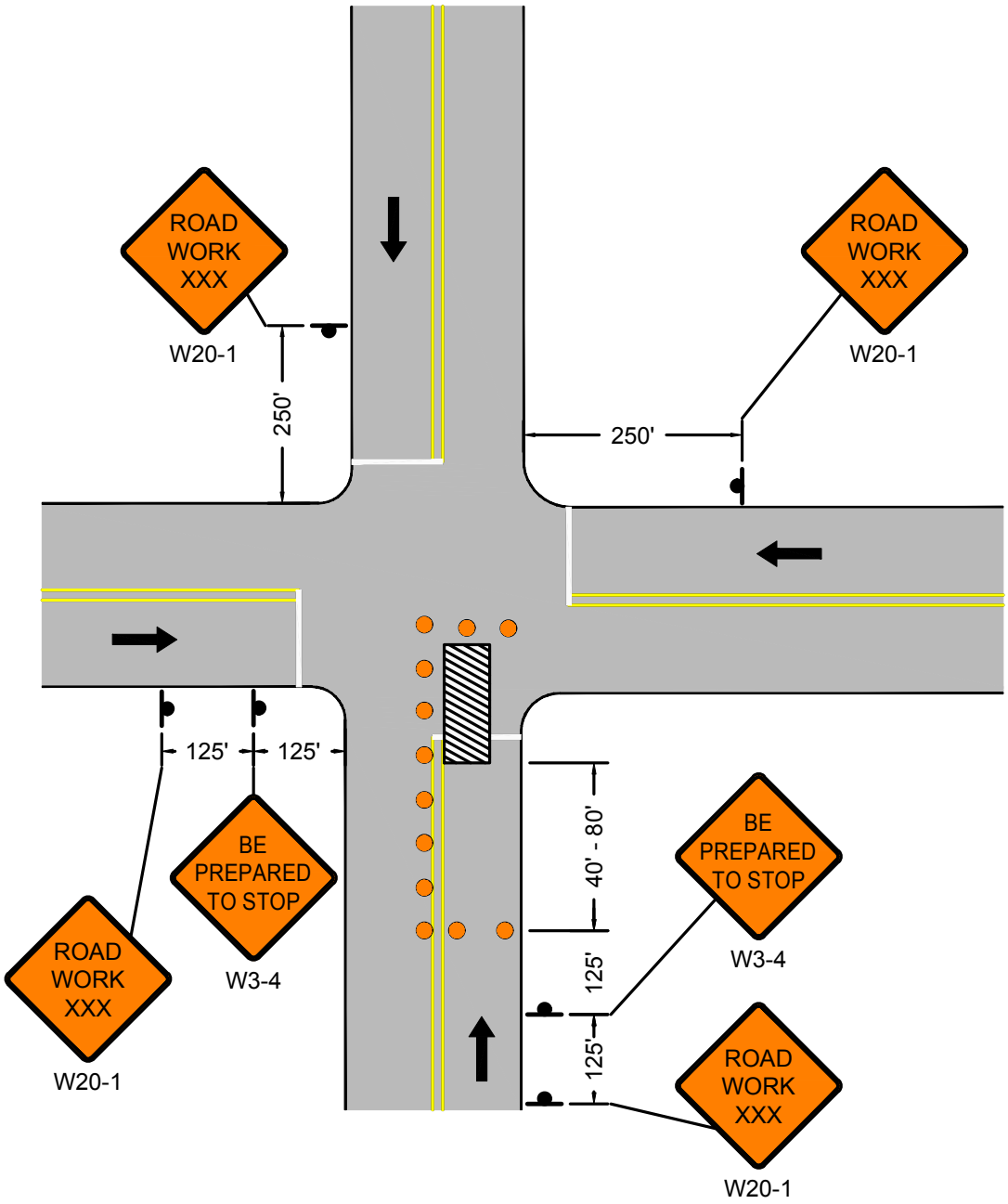
Work Zone Safety Standard Details and Drawings

FIGURE 42
TRAFFIC SIGNAL REPAIR WORK
MULTILANE UNDIVIDED ROADWAY
LEFTMOST OR LEFT TURNING LANE

massDOT Massachusetts Department of Transportation Highway Division PAGE 76	Work Zone Safety Standard Details and Drawings	FIGURE 43 TRAFFIC SIGNAL REPAIR WORK TWO LANE UNDIVIDED ROADWAY ONE LEG OF INTERSECTION



LEGEND

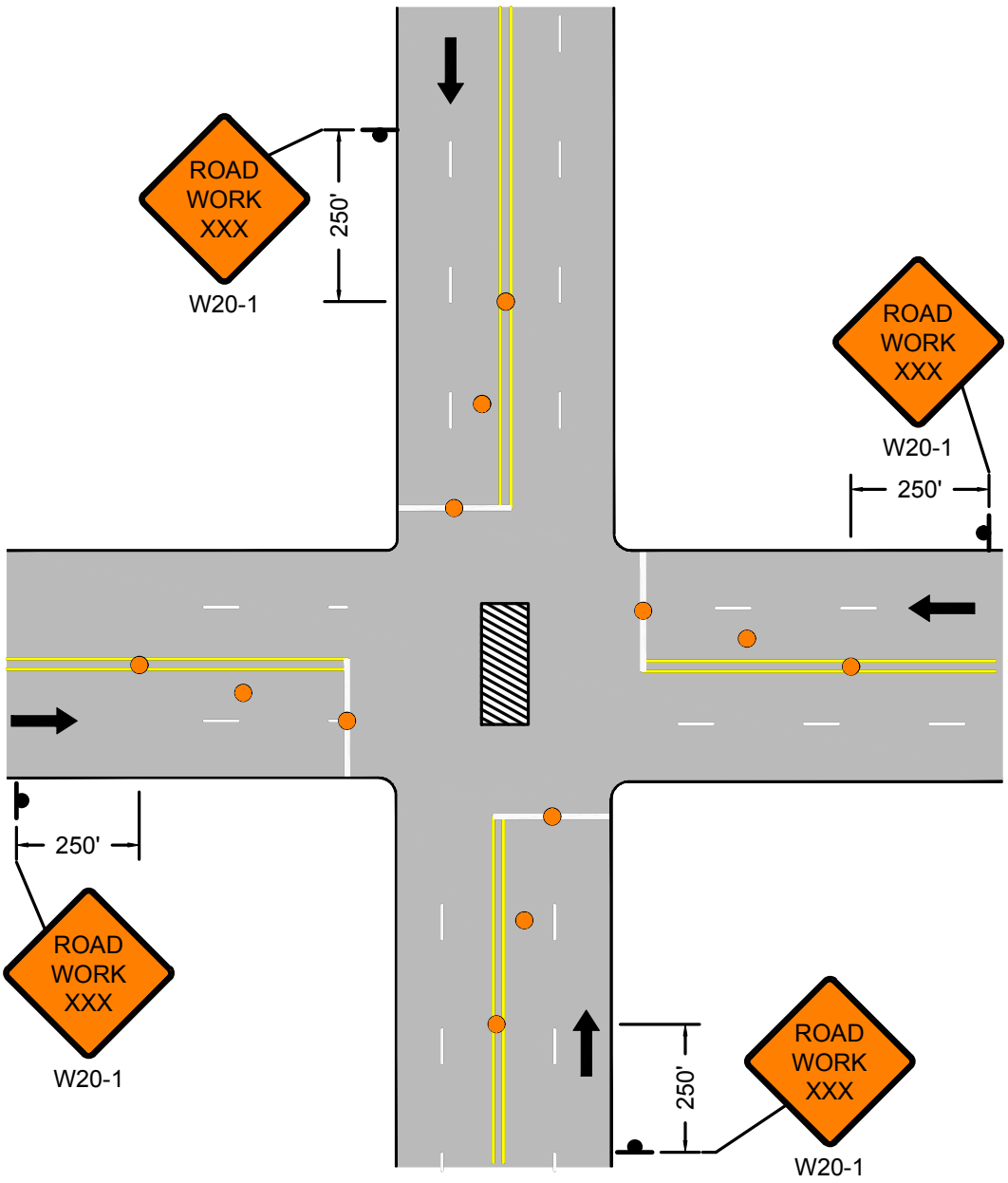
WORK ZONE

CHANNELIZATION DEVICE

NOT TO SCALE

NOTES

1. DURATION OF WORK = 20 MINUTES OR LESS.
2. EQUIPMENT: 12 CONES + 6 PORTABLE SIGNS.
3. CONE SPACING IS 20 FEET.
4. SINGLE WORK VEHICLE PARKED/STOPPED.
5. POLICE DETAIL REQUIRED.



LEGEND

WORK ZONE

CHANNELIZATION DEVICE

NOT TO SCALE

NOTES

1. DURATION OF WORK = 20 MINUTES OR LESS.
2. EQUIPMENT: 12 CONES + 4 PORTABLE SIGNS.
3. CONE SPACING IS 20 FEET.
4. SINGLE WORK VEHICLE PARKED/STOPPED.
5. POLICE DETAIL REQUIRED.

massDOT Massachusetts Department of Transportation Highway Division

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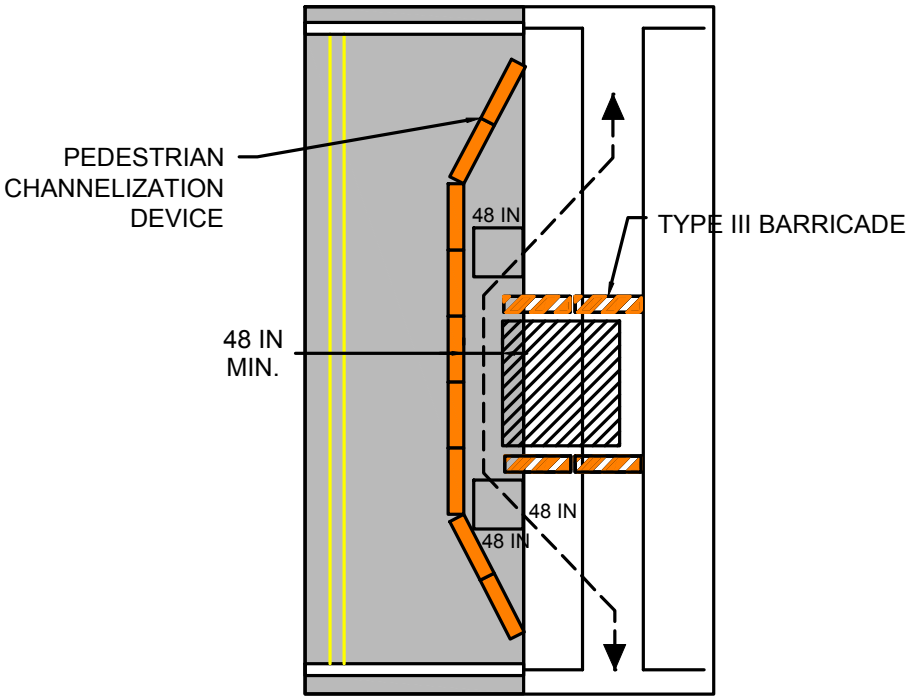
Work Zone Safety Standard Details and Drawings

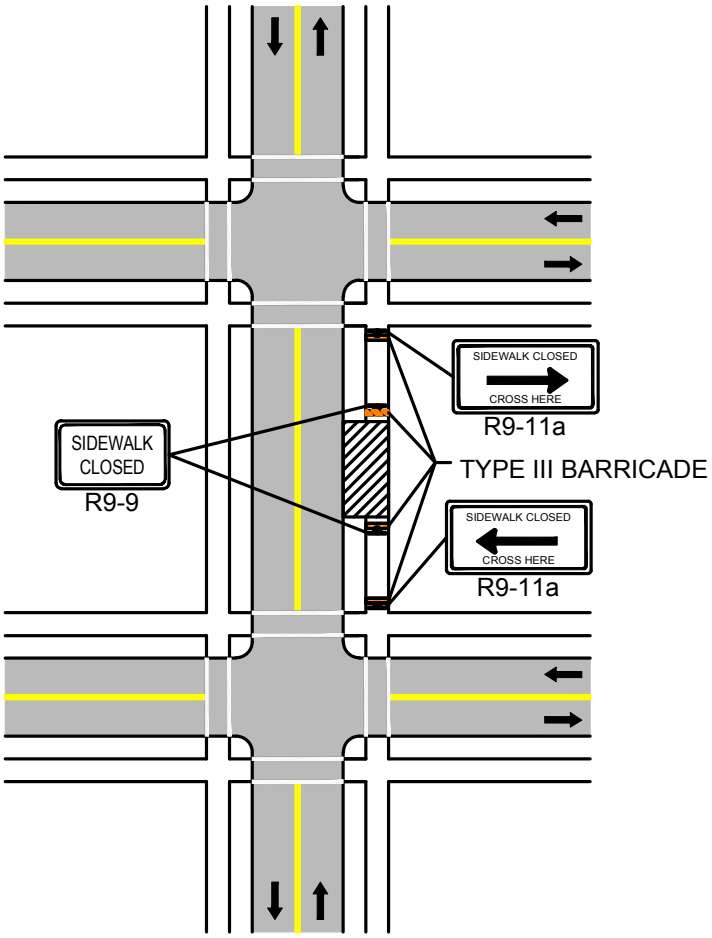
FIGURE 44
TRAFFIC SIGNAL REPAIR WORK
MULTILANE UNDIVIDED ROADWAY
CENTER OF INTERSECTION

massDOT Massachusetts Department of Transportation Highway Division PAGE 78	Work Zone Safety Standard Details and Drawings	FIGURE 45 PEDESTRIAN BYPASS



NOTES:

1. WHEN EXISTING PEDESTRIAN FACILITIES ARE DISRUPTED, CLOSED, OR RELOCATED IN A TTC ZONE, TEMPORARY FACILITIES SHALL BE PROVIDED AND THEY SHALL BE DETECTABLE AND INCLUDE ACCESSIBILITY FEATURES CONSISTENT WITH THE FEATURES PRESENT IN THE EXISTING PEDESTRIAN FACILITY.
2. A PEDESTRIAN CHANNELIZATION DEVICE THAT IS DETECTABLE BY A PERSON WITH A VISUAL DISABILITY TRAVELING WITH THE AID OF A LONG CANE SHALL BE PLACED ALONG THE FULL LENGTH OF THE TEMPORARY PEDESTRIAN ROUTE.
3. WHEN USED, TEMPORARY RAMPS SHALL COMPLY WITH AMERICANS WITH DISABILITIES ACT.
4. THE ALTERNATE PATHWAY SHOULD HAVE A SMOOTH CONTINUOUS HARD SURFACE FOR THE ENTIRE LENGTH OF THE TEMPORARY PEDESTRIAN FACILITY.
5. THE TEMPORARY SIDEWALK SHOULD BE A MINIMUM OF 4 FEET WIDE. IF THE SIDEWALK EXCEEDS 200 FEET THEN A 5 FOOT BY 5 FOOT PASSING ZONE SHALL BE PROVIDED NEAR THE MID-POINT OF THE CLOSURE.
6. THE PROTECTIVE REQUIREMENTS OF A TTC WORK ZONE MAY HAVE AN IMPACT IN DETERMINING THE NEED FOR TEMPORARY TRAFFIC BARRIERS AND THEIR USE IN PROVIDING PEDESTRIAN DELINEATION SHOULD BE BASED ON ENGINEERING JUDGMENT.
7. ON-DEMAND PEDESTRIAN ASSISTANCE PERSONNEL TO ASSIST WITH NAVIGATION AROUND THE CLOSURE/WORK AREA MAY BE CONSIDERED AS AN OPTION IN PLACE OF PROVIDING ADA/AAB DEVICES FOR WORK FOR CLOSURES LASTING 4 HOURS OR LESS.
8. CONTROLS ONLY FOR PEDESTRIAN TRAFFIC ARE SHOWN; VEHICULAR TRAFFIC SHOULD BE HANDLED AS SHOWN ELSEWHERE. THESE DETAILS ARE USED IN CONJUNCTION WITH THE PROPOSED LANE CLOSURE DETAILS AND DURING CONSTRUCTION STAGING, AS DETERMINED BY THE ENGINEER.



NOTES:

1. CLOSURE OF A SIDEWALK FACILITY SHALL CONSTITUTE THE PROVISION FOR MANAGING PEDESTRIAN TRAFFIC AND ACCOMMODATING ALL USERS. IF THE EXISTING PEDESTRIAN ACCESS ROUTE(S) CAN BE TEMPORARILY RELOCATED ALONG THE EXISTING SIDEWALK , AND SAID FACILITY PROVIDES A MINIMUM WIDTH OF 48-INCHES OF SOLID, SMOOTH UNOBSTRUCTED SURFACE, THEN NO DETOURING OF THE ROUTE SHALL BE REQUIRED. DELINEATION OF THE WORK AREA IS STILL REQUIRED.

2. IF IT IS NECESSARY TO DIVERT PEDESTRIAN TRAFFIC TO AN ALTERNATE ROUTE ACROSS THE ROADWAY FROM THE EXISTING FACILITY, THE FIGURE ABOVE SHALL BE FOLLOWED TO PROVIDE ADEQUATE DIRECTION TO PEDESTRIANS. ALTERNATE ROUTE SHALL PROVIDE THE SAME LEVEL OF ACCOMMODATION AS THE FACILITY THAT IS BEING DETOURED AND RETAIN ADA COMPLIANCE IN ITS ENTIRETY.

3. FOR EMERGENCY OR SHORT-DURATION SIDEWALK CLOSURES OF 4-HOURS OR LESS, IT IS OPTIONAL TO HAVE ON-DEMAND PEDESTRIAN ASSISTANCE PERSONNEL AVAILABLE AT ALL TIMES DURING THE CLOSURE TO ASSIST THOSE MOBILITY CHALLENGED PERSONS WHO REQUIRE ADDITIONAL ASSISTANCE TO SAFELY NAVIGATE AROUND THE WORK AREA IN LIEU OF A FULL DETOUR.

massDOT Massachusetts Department of Transportation Highway Division PAGE 80	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS BIKE LANE CLOSURE

POSTED SPEED LIMIT (MPH)	SPACING FOR BIKE ADVANCE WARNING SIGNS (FT) (A,B))	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRANSITION LENGTH (L/3)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	150 / 150	100	305	20	45
45-55	150 / 150	220	495	40	35
60-65	150 / 150	260	645	40	40

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

NOTES

1. DETAIL SHALL BE USED IN CONJUNCTION WITH THE PROPOSED LANE CLOSURE DETAILS. SIGNING SHOWN ONLY FOR BIKE TRAFFIC. FOLLOW ALL OTHER RELEVANT DETAILS FOR TTC DEVICES FOR VEHICULAR TRAFFIC.
2. ** SIGN SHALL BE USED ONLY IF THERE IS A MARKED BIKE LANE.
3. *** SIGN SHALL BE USED ONLY IF THERE IS NO MARKED BIKE LANE.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

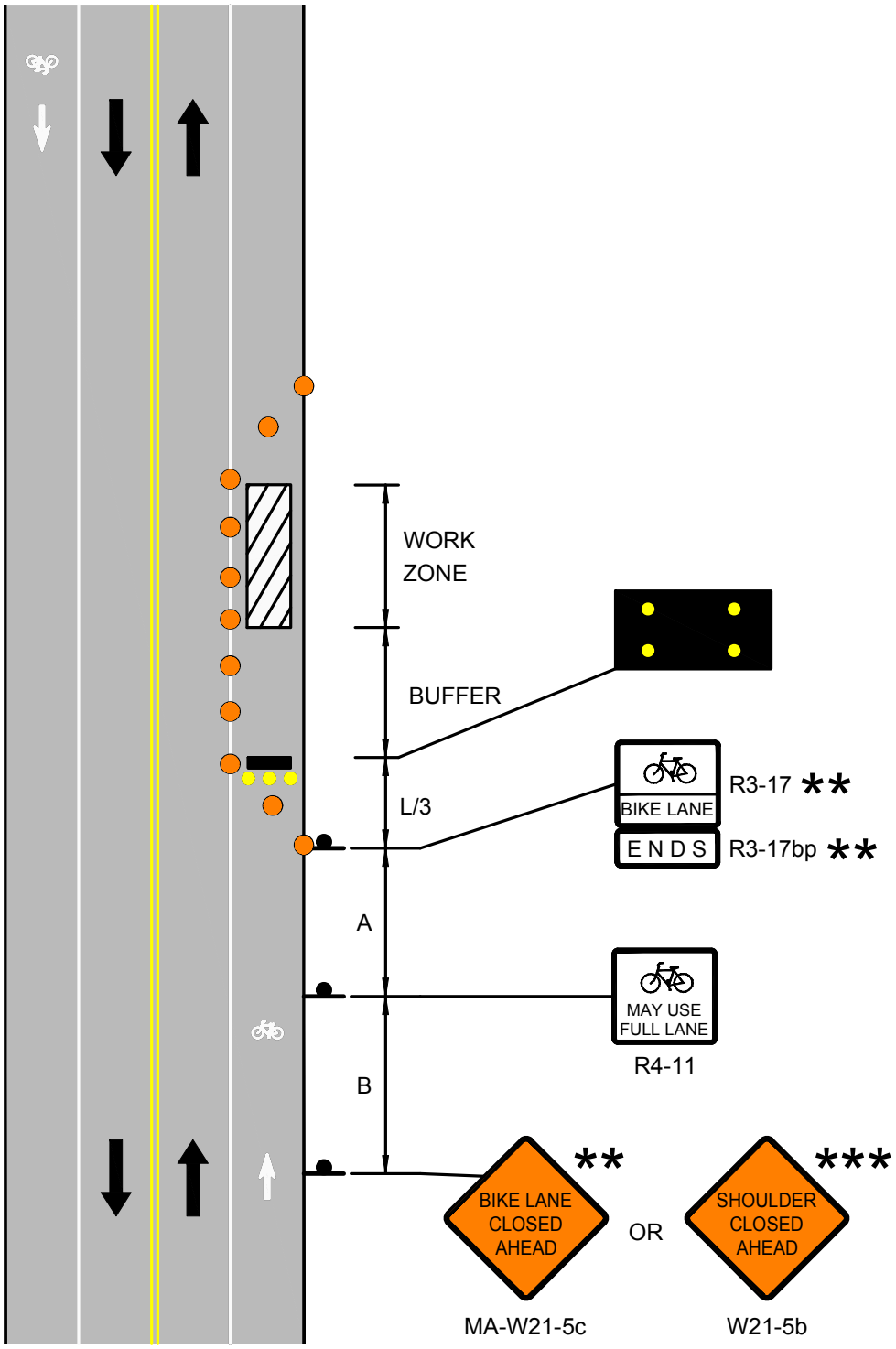
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 81	Work Zone Safety Standard Details and Drawings	FIGURE 48 STATIONARY OPERATIONS BIKE LANE CLOSURE

Rev. June, 2017

DOCUMENT A00820

Massachusetts Department of Transportation
Conditions of Custody

REQUEST FOR RELEASE OF MASSDOT AUTOCAD FILES FORM
(Only to be used following award of contract)

City/Town: CONWAY Project File Number: 609082

Contract Number: 127511

Project Description: Bridge Replacement, C-20-004, North Poland Road over Poland Brook

All AutoCAD files are provided solely as a courtesy to facilitate public access to information. MassDOT attempts to provide current and accurate information but cannot guarantee so. MassDOT provides such documents, files or other data "as is" without any warranty of any kind, either expressed or implied, including but not limited to, accuracy, reliability, omissions, completeness and currentness. The Commonwealth of Massachusetts and its Consultants shall not be liable for any claim for damages, including lost profits or other consequential, exemplary, incidental, indirect or special damages, relating in any way to the documents, files or other data accessible from this file, including, but not limited to, claims arising out of or related to electronic access or transmission of data or viruses. Because data stored on electronic media can deteriorate undetected or be modified without our knowledge, MassDOT cannot be held liable for its completeness or correctness. MassDOT makes no representation as to the compatibility of these files beyond the version of the stated CAD software.

By signing this form, I agree that it shall be my responsibility to reconcile this electronic data with the conformed contract documents, and that only the conformed contract documents shall be regarded as legal documents for this Project. I understand that this authorization does not give me the right to distribute the files. I agree to the terms above and wish to receive the AutoCAD files.

This signed form shall be emailed to the Highway Design Engineer at the MassDOT -Highway Division at the following email address:

DOTHighwayDesign@dot.state.ma.us
Attn: AutoCAD Files

Name of person requesting AutoCAD files: _____

Affiliation/Company: _____

Address: _____

_____

Telephone number: _____

Email address: _____

Signature/Date: _____

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DOCUMENT A00829

Combined Water Quality Certification (WQC) Application

And

Army Corps of Engineers Permit Application
Pre-Construction Notification (PCN)

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Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Jamey Tesler, Secretary & CEO
Jonathan L. Gulliver, Highway Administrator

massDOT
Massachusetts Department of Transportation
Highway Division

March 19, 2024

Heidi Davis
MassDEP Wetlands Program
100 Cambridge Street, Suite 900
Boston, MA 02114

Subject: Water Quality Certification Application
North Poland Road Bridge Replacement Project
Conway, Massachusetts
MassDOT Project #609082

Dear Ms. Davis:

The Massachusetts Department of Transportation – Highway Division (MassDOT) is submitting this combined Water Quality Certification / Pre-Construction Notification application for the proposed Bridge Replacement at North Poland Road over Poland Brook in Conway, Massachusetts (the Project).

The North Poland Road Bridge Replacement Project is necessary to address the undersized and unsafe bridge crossing along the North Poland Road corridor in western Conway. The existing bridge was closed to traffic in November 2022, and in February 2023, the superstructure was removed and a temporary bridge superstructure was installed to allow the bridge to remain in service until the bridge replacement project was completed. The replacement bridge structure will be widened to provide one travel lane in each direction along North Poland Road. Updated safety features including guardrails, have also been incorporated into the design.

The Project will require demolition of the existing bridge piers within Poland Brook, as well as grading and paving of the North Poland Road approaches to accommodate the replacement structure. A deep-sump catch basin and three leaching catch basins will be installed along North Poland Road to accept and infiltrate stormwater runoff. Finally, work also includes placement of scour protection around the abutments, which will be overlain by two feet of simulated streambed material.

As a result of the proposed work, approximately 687 square feet (sf) of temporary and 185 sf of permanent Land Under Water and 84 linear feet (lf) of temporary impact to Bank will occur, and 34 cubic yards (cy) of material will be dredged from below the Ordinary High Water. Due to the removal of the existing bridge piers, approximately 45 sf of streambed will be restored. Impacts will be mitigated through dewatering to allow work to occur in dry conditions, the use of sedimentation and erosion controls to prevent impacts downgradient from the proposed work, and restoring the streambed with simulated streambed material that is compatible with the existing streambed.

A pre-filing meeting with MassDEP and U.S. Army Corps of Engineers took place on March 12, 2024.

MassDOT hereby certifies that all information contained herein is true, accurate, and complete to the best of my knowledge and belief. MassDOT hereby requests that the certifying authority review and take action on this CWA 401 certification request within the applicable reasonable period of time. If you have any questions regarding this application, please do not hesitate to contact me at 857-262-0757 or Courtney.l.walker@dot.state.ma.us.

Ten Park Plaza, Suite 4160, Boston, MA 02116
Tel: 857-368-4636, TTY: 857-368-0655
www.mass.gov/massdot

Sincerely,

Courtney Walker

Courtney Walker
Wetlands and Water Resources Coordinator
MassDOT - Highway Division, Environmental Services

Cc: Heidi Davis, MassDEP
Ryan Hale, MassDEP
Tyler Lewis, MassDEP
Courtney Sulerud, MassDOT Project Manager
Chris Jones, BETA Group, Inc.
Laura Krause, BETA Group, Inc.
Conway Conservation Commission

Enclosures: WQC Application, plans

Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Jamey Tesler, Secretary & CEO
Jonathan L. Gulliver, Highway Administrator

MassDOT
Massachusetts Department of Transportation
Highway Division

March 19, 2024

Dan Vasconcelos
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742

Subject: Pre-Construction Notification Application
North Poland Road Bridge Replacement Project
Conway, Massachusetts
MassDOT Project #609082

Dear Mr. Vasconcelos:

The Massachusetts Department of Transportation – Highway Division (MassDOT) is submitting this combined Pre-Construction Notification / Water Quality Certificate application for the proposed Bridge Replacement at North Poland Road over Poland Brook in Conway, Massachusetts (the Project). This Project requires authorization under Massachusetts General Permit 23: Linear Transportation Projects and Stream Crossings.

The North Poland Road Bridge Replacement Project is necessary to address the undersized and unsafe bridge crossing along the North Poland Road corridor in western Conway. The existing bridge was closed to traffic in November 2022, and in February 2023, the superstructure was removed and a temporary bridge superstructure was installed to allow the bridge to remain in service until the bridge replacement project was completed. The replacement bridge structure will be widened to provide one travel lane in each direction along North Poland Road. Updated safety features including guardrails, have also been incorporated into the design.

The Project will require demolition of the existing bridge piers within Poland Brook, as well as grading and paving of the North Poland Road approaches to accommodate the replacement structure. A deep-sump catch basin and three leaching catch basins will be installed along North Poland Road to accept and infiltrate stormwater runoff. Finally, work also includes placement of scour protection around the abutments, which will be overlain by two feet of simulated streambed material.

As a result of the proposed work, approximately 687 square feet (sf) of temporary and 185 sf of permanent impact to Waters of the United States and 84 linear feet (lf) of temporary impact to Bank will occur, and 34 cubic yards (cy) of material will be excavated from below the Ordinary High Water. Due to the removal of the existing bridge piers, approximately 45 sf of streambed will be restored. Impacts will be mitigated through dewatering to allow work to occur in dry conditions, the use of sedimentation and erosion controls to prevent impacts downgradient from the proposed work, and restoring the streambed with simulated streambed material that is compatible with the existing streambed.

A pre-filing meeting with U.S. Army Corps of Engineers and MassDEP took place on March 12, 2024.

MassDOT hereby certifies that all information contained herein is true, accurate, and complete to the best of my knowledge and belief. If you have any questions regarding this application, please do not hesitate to contact me at 857-262-0757 or Courtney.l.walker@dot.state.ma.us.

Ten Park Plaza, Suite 4160, Boston, MA 02116
Tel: 857-368-4636, TTY: 857-368-0655
www.mass.gov/massdot

Sincerely,

Courtney Walker

Courtney Walker
Wetlands and Water Resources Coordinator
MassDOT - Highway Division, Environmental Services

Cc: Heidi Davis, MassDEP
Ryan Hale, MassDEP
Tyler Lewis, MassDEP
Courtney Sulerud, MassDOT Project Manager
Chris Jones, BETA Group, Inc.
Laura Krause, BETA Group, Inc.
Conway Conservation Commission

Enclosures: PCN Application, plans

Conway, MA

North Poland Road Bridge Replacement

MassDOT Project Number 609082

March 2024

PRE-CONSTRUCTION NOTIFICATION/ WATER QUALITY CERTIFICATION

89 Shrewsbury Street
Suite 300
Worcester, MA 01604
508.756.1600
www.BETA-Inc.com

North Poland Road Bridge Replacement

Conway, MA

PRE-CONSTRUCTION NOTIFICATION/ WATER QUALITY CERTIFICATION

Prepared by: BETA GROUP, INC.
Prepared for: MassDOT – Highway Department

March 2024

TABLE OF CONTENTS

LIST OF APPENDICES

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands and Waterways

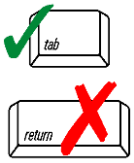
BRP WW 10 Major Project Certification
BRP WW 11 Minor Project Certification

401 water Quality Certification for Fill and excavation Projects in waters and Wetlands

Transmittal Number #

A. Applicant Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Which permit category are you applying for?

☐ BRP WW 10 ☒ BRP WW 11

2. Applicant/Owner:

Massachusetts Department of Transportation – Highway Division
Name

10 Park Plaza, Room 7360
Address

Boston	MA	02116
City/Town	State	Zip Code

Courtney Walker
Contact Person

	857-262-0757
Telephone (home)	(work)

3. Authorized Agent

BETA Group, Inc.
Name

89 Shrewsbury Street, Suite 300
Address

Worcester	MA	01604
City/Town	State	Zip Code

Laura Krause
Contact Person

	774-258-1230
Telephone (home)	(work)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands and Waterways

BRP WW 10 Major Project Certification
BRP WW 11 Minor Project Certification

401 water Quality Certification for Fill and excavation Projects in waters and Wetlands

Transmittal Number #

B. Project Information

1. Project Location:

North Poland Road over Poland Brook
Address

Conway	MA	01341
City/Town	State	Zip Code

Poland Brook
Nearest or Adjacent Waterbody

2. Project Name (if any):

Conway – Bridge Replacement, C-20-004, North Poland Road over Poland Brook

3. a. Describe project purpose:

The purpose of the Project is to replace the previously removed bridge No. C-20-004 along North Poland Road in Conway. The pre-existing bridge was a single lane, three span, bridge along a frequently travelled roadway that connects western Conway with Ashfield Road. The existing bridge was closed to traffic in November 2022. In February 2023 the superstructure was removed and a temporary bridge superstructure was installed to allow the bridge to remain in service until the permanent bridge replacement project was completed. The proposed replacement is necessary to replace the removed superstructure and provide traffic and safety improvements along North Poland Road. The new single span structure will result in removal of piers from Poland Brook, restoring a portion of the stream and improving water flow through the Site.

b. Is the project

☒ water-dependent ☐ non water-dependent

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands and Waterways

BRP WW 10 Major Project Certification
BRP WW 11 Minor Project Certification

401 water Quality Certification for Fill and excavation Projects in waters and Wetlands

Transmittal Number #

B. Project Information (cont.)

4. a. provide a brief description of the proposed project (See Application Instructions and include a copy of the Notice of intent, if any.):

The North Poland Road Bridge Replacement Project proposes to construct a replacement bridge superstructure over Poland Brook in western Conway, Massachusetts. The replacement bridge abutments will be installed upgradient from the existing structures. The replacement bridge decking will be wider to accommodate two lanes of traffic and modernized guardrails, and will require minor grading and widening of the adjacent sections of North Poland Road to accommodate the size of the new structure. Three leaching catch basins are also proposed along North Poland Road to receive and infiltrate stormwater runoff. Riprap scour protection will be installed along the abutments, which will be overlain by two feet of simulated streambed material.

b. Notice of Intent File number (if any): N/A

5. Identify the loss in square feet of each type of resource area (see Application Instructions for additional information.):

a. Bordering vegetated wetland: 0 square feet

b. Isolated vegetated wetland: 0 square feet

c. Land under water: 687 (Temporary) 185 (Permanent) square feet

d. Total cumulative loss of a. + b. + c.: 687 (Temporary) 185 (Permanent) square feet

e. Salt marsh: 0 square feet

6. a. Will the proposed project occur in any wetlands or waters designated as “Outstanding Resource Waters”?

☐ Yes ☒ No

If yes has public notice been published in the Environmental Monitor?

☒ Yes ☐ No TBD Date of Publication

b. Is this project a subdivision or any part of a subdivision? ☐ Yes ☒ No

c. Is the project categorically subject to MEPA? ☐ Yes ☒ No

If yes, has final action been taken? ☐ Yes ☒ No

If yes, please include copy of MEPA certificate.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands and Waterways

BRP WW 10 Major Project Certification
BRP WW 11 Minor Project Certification

401 water Quality Certification for Fill and excavation Projects in waters and Wetlands

Transmittal Number #

B. Project information (cont.)

7. Alternatives Analysis:

   As related to the project purpose, attach a detailed description of alternatives to the proposed project that were considered and why none are available that avoid adverse impacts to wetlands and waters.

   If no alternatives are available, describe how the activity will minimize or mitigate the adverse impacts to wetlands and waters.

   See application instructions for information required. Attach required documentation.

C. Additional Information

1. Is any of your proposed work exempt from the Massachusetts Wetlands Protection Act or taking place in a federal non-state wetland?

   ☒ Yes ☐ No

   If yes, see Application Instructions for additional information needed.

2. Public notice to a newspaper of general circulation within the area of the proposed activity must be published within 10 days of the date of this application. Is proof of public notice submitted?

   ☒ Yes ☐ No

   (See Application Instructions for additional information)

D. Certification

Application is hereby made for water quality certification.

"I certify that I am familiar with the work proposed and that to the best of my knowledge and belief the information contained in this application is true, complete, and accurate"

Courtney Walker
Applicant's Signature

Courtney Walker
Print name

Laura Krause
Agent's Signature

Laura Krause
Print Name

3/19/2024
Date

U.S. Army Corps of Engineers (USACE), New England District (NAE)

PRE-CONSTRUCTION NOTIFICATION (PCN)

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332.

Principal Purpose The information provided will be used in evaluating activities under Pre-Construction Notification procedures within New England.

Routine Uses Disclosure This information may be shared with other federal, state, and local government agencies during the application review process. Submission of requested information is voluntary. However, if information is not provided the PCN application cannot be fully evaluated nor can USACE render a permit decision.

Instructions The applicant must complete ALL required sections of this document before their submission to USACE. The PCN submission to USACE shall include one set of drawings which show the location and character of the proposed activity, statements that address each required field below, and documentation that supports each field (e.g., emails, letters, description/narrative, phone calls, surveys, reports, etc.). Electronic submissions to the following address are strongly preferred: cenae-r-ma@usace.army.mil. The email subject line shall contain the following: General Permit #, PCN, City/Town, and date submitted. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY USACE)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME
First - Courtney Middle - Last - Walker
Company - MassDOT - Highway Division
E-mail Address - courtney.l.walker@dot.state.ma.us

6. APPLICANT'S ADDRESS:
Address- 10 Park Plaza, Room 7360
City - Boston State - MA Zip - 02116 Country - USA

7. APPLICANT'S PHONE NOs. with AREA CODE
a. Residence b. Business c. Fax d. Mobile
857-262-0757

8. AUTHORIZED AGENT'S NAME AND TITLE (*agent is not required*)
First - Laura Middle - Last - Krause
Company - BETA Group, Inc
E-mail Address - lkrause@beta-inc.com

9. AGENT'S ADDRESS:
Address- 89 Shrewsbury Street, Suite 300
City - Worcester State - MA Zip - 0160 Country - USA

10. AGENT'S PHONE NOs. with AREA CODE
a. Residence b. Business c. Fax d. Mobile
774-258-

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Laura Krause to act on my behalf as my agent in the processing of this general permit PCN application and to furnish, upon request, supplemental information in support of this general permit PCN application.

Courtney Walker — SIGNATURE OF APPLICANT
3/19/2024 — DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME or TITLE (*see instructions*)
Conway – Bridge Replacement, C-20-004, North Poland Road over Poland Brook

13. NAME OF WATERBODY, IF KNOWN (*if applicable*)
Poland Brook

14. PROPOSED ACTIVITY STREET ADDRESS (*if applicable*)
North Poland Road
City: Conway State: MA Zip: 01341

15. LOCATION OF PROPOSED ACTIVITY (*see instructions*)
Latitude: 42.51181 °N Longitude: -72.74345 °W

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (*see instructions*)

State Tax Parcel ID: Municipality: Conway

Section: Township: Range:

17. DIRECTIONS TO THE SITE.

Take Route 2 west for 52 miles to Orange, MA. Continue on Route 2/ 2A for 20 miles. Take the Route 91 south exit and continue on Route 91 south for 9 miles. Take exit 36 toward Conway, MA. Continue on Route 116 for 9 miles, North Poland Road will be on the left. After turning onto North Poland Road, the Site is located 0.1 miles south, at the second bridge.

18. IDENTIFY THE SPECIFIC GENERAL PERMIT(S) YOU PROPOSE TO USE:

GP 23: Linear Transportation Projects and Stream Crossings

19. DESCRIPTION OF PROPOSED GENERAL PERMIT ACTIVITY (*see instructions*)

The Project proposes to demolish the previous North Poland Road bridge and associated piers within Poland Brook, and construct a new bridge superstructure. Removal of the existing piers will occur within Poland Brook under dry conditions. The replacement structure will be constructed upgradient, spanning Poland Brook. Additional Project elements include grading and repaving of North Poland Road in the location of the bridge and installation of three leaching catch basins.

20. DESCRIPTION OF PROPOSED MITIGATION MEASURES (*see instructions*)

Work within Poland Brook will be conducted in dry conditions, within a dewatered area. Sedimentation and erosion controls will be installed downgradient of proposed work areas to prevent impacts to waters of the US. In addition, the Project includes removal of piers from below the OHW mark. Placement of riprap scour protection will be mitigated through placement of two feet of simulated streambed material on top of the scour protection.

21. PURPOSE OF GENERAL PERMIT ACTIVITY (*Describe the reason or purpose of the project, see instructions*)

The proposed Project is necessary to replace the demolished North Poland Road bridge over Poland Brook, which was undersized and lacked modern safety features. The previous bridge was removed in February 2023, and a temporary bridge structure was installed. This Project is necessary to construct a permanent stream crossing that is able to accommodate traffic demands along North Poland Road.

22. Quantity of Wetlands, Streams, or Other Types of Waters Directly Affected by Proposed General Permit Activity (*see instructions*)

Area (square feet)	Length (linear feet)	Volume (cubic yards)	Duration	Purpose
687 sf			Temporary	Waters of the U.S. - Dewatering/ Abutment Demo
185 sf		34 cy	Permanent	Waters of the US - Dredging to install scour protection
	84 lf		Temporary	Bank - Sediment controls/ construction access
45 sf			Restoration	Waters of the U.S. - Removal of existing bridge piers

Each PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site.

23. List any other GP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project on any related activity (*see instructions*)

Water Quality Certification

24. If the proposed activity will result in the loss of aquatic resources that exceed those identified in the New England District Compensatory Mitigation Thresholds, explain how the compensatory mitigation requirement will be satisfied. (*see instructions*)

No loss of aquatic resources

25. Is Any Portion of the General Permit Activity Already Complete? [ ] Yes [X] No If Yes, describe the completed work:

26. List the name(s) of any species listed as endangered or threatened under the Endangered Species Act that might be affected by the proposed GP activity or utilize the designated critical habitat that might be affected by the proposed GP activity. (*see instructions*)

Northern Long-Eared Bat (Myotis septentrionalis), Monarch Butterfly (Danaus plexippus)

27. List any historic properties that have the potential to be affected by the proposed GP activity or include a vicinity map indicating the location of the historic property or properties. Attach relevant project information, along with any responses received from project notifications to this submittal. (*see instructions*)

Burnett House and Farm (CNW.52) - 42 North Poland Road

28. For a proposed GP activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, identify the Wild and Scenic River or the "study river":

n/a

29. If the proposed GP activity also requires permission from the USACE pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, have you submitted a written request for section 408 permission from the USACE district having jurisdiction over that project? [ ] Yes [X] No

If "yes", please provide the date your request was submitted to the USACE District:

30. Does the activity require a 401 Water Quality Certification (WQC)? If so, specify the type of 401 WQC that is required (general or individual). In cases where an individual 401 WQC is required, provide the date the 401 WQC certification request was submitted to the certifying authority and their contact information.

Yes, General.

31. If the terms of the GP(s) you want to use require additional information to be included in the PCN (i.e. sampling and analysis plan), please include that information in this space or provide it on an additional sheet of paper marked Block 30. (*see instructions*)

32. I certify that the information in this pre-construction notification is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Courtney Walker	3/19/2024	Laura Krause	3/19/2024
SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

The Pre-Construction Notification must be signed by the person who desires to undertake the proposed activity (applicant) and, if the statement in block 11 has been filled out and signed, the authorized agent.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

APPENDIX A

- **Project Narrative**

1.0 INTRODUCTION

On behalf of the Massachusetts Department of Transportation (MassDOT) – Highway Department, BETA Group, Inc. (BETA) is submitting a combined Pre-Construction Notification (PCN)/ Water Quality Certification (WQC) for the proposed replacement of the North Poland Road Bridge over Poland Brook in western Conway, Massachusetts (the Project). This Project is proposed to improve traffic conditions and safety along the North Poland Road corridor.

The Project will consist of several activities including:

- Removal of the existing temporary bridge crossing
- Demolition and removal of the existing bridge piers
- Installation of scour protection within the Streambed of Poland Brook and overlaying with two feet of simulated Streambed material
- Installation of new bridge abutments upgradient of the existing abutments
- Installation of a new bridge deck
- Grading and widening roadway approach to match new dimensions
- Installation of a deep-sump catch basin and three leaching catch basins along North Poland Road

This Project proposes temporary and permanent alteration of Waters of the United States / Land Under Water, and Bank to Poland Brook. These impacts are associated with dewatering necessary for the removal of the existing bridge piers and placement of rip rap scour protection downgradient of the proposed abutments to occur under dry conditions. Mitigation for these impacts include placement of erosion and sedimentation controls, dewatering to conduct work in dry conditions, placement of two feet of simulated streambed material over the proposed scour protection, and streambed restoration associated with removal of the existing bridge piers to a depth of two feet below the mud line.

As a bridge Project funded through the 2014 Massachusetts Transportation Bond Bill, this work is exempt from the Massachusetts Wetlands Protection Act. Due to the WPA exemption, and the proposed fill within Land Under Water, the Project requires a 401 Water Quality Certification. In addition, a Pre-Construction Notification (PCN) is required for authorization under the Massachusetts General Permit 23: Linear Transportation Projects. Due to the nature and location of the Project, it will also require the following reviews and permits:

- Section 106 Historic Review, as the Project is partially federally funded.
- Section 7 Project Review, as the Project will occur within the range of the Northern Long-Eared Bat (NLEB - *Myotis septentrionalis*), therefore it is subject to review under Section 7 of the Endangered Species Act (ESA).
- National Environmental Policy Act (NEPA) review through preparation of a programmatic Categorical Exclusion.
- Massachusetts Endangered Species Act (MESA) Review, due to the presence of Longnose sucker (*Catostomus catostomus*) and Wood Turtle (*Glyptemys insculpta*) habitat.

2.0 EXISTING CONDITIONS

2.1 PROJECT LOCUS

The Site is located along North Poland Road approximately 500 feet south from its intersection with Ashfield Road, where it crosses over Poland Brook (Figure 1 – Site Locus). Poland Brook flows north/ northeast through the Site toward the South River within the Connecticut River Basin. Land use in the vicinity of the Site consists of undeveloped forest and wetlands to the south and east, and agricultural land to the north and west. Given the rural setting, there is significant distance between each residence along the roadway, with only three driveways within a relative proximity of the bridge. North Poland Road connects with Ashfield Road (Route 116) to the north, providing access to commercial and retail uses, primarily to the east, within the town center.

North Poland Road is functionally classified as a Major Collector, extending approximately 2 miles in its entirety from the intersection with Ashfield Road at its northern terminus to the intersection with Main Poland Road at its southern terminus. The Bridge that carries North Poland Road over the Poland Brook is approximately 1000 feet south of the intersection of North Poland Road and Ashfield Road.

North Poland Road generally follows a north-south alignment on approach to and through the bridge from Ashfield Road, but then bends to the left to feature a more east-west alignment to the west of the bridge. The previous bridge (which has been replaced with the temporary bridge) provided a roadway width of 14’-0”, with two 1’-7” reinforced concrete safety curbs with guardrails, resulting in an out-to-out bridge width of 17’-2”. North Poland Road to the north of the bridge is approximately 22-feet wide, and to the south of the bridge is approximately 19-feet wide. Both approaches accommodate travel in each direction with no pavement markings. Utility poles are located on the easterly side of North Poland Road in vicinity of the bridge, with overhead wires spanning the length of the bridge.

The roadway currently has no sidewalks, guardrails, shoulders, or drainage improvements. The bridge structure consists of a temporary single-lane bridge crossing with a span of 65 feet, the same as the previous bridge structure, supported by abutments along either side of Poland Brook which located above the Ordinary High-Water (OHW) elevation, and two bridge piers which are located within the channel of Poland Brook. Poland Brook, in the vicinity of North Poland Bridge, has a bankfull width of 35’ 10”.

2.2 JURISDICTIONAL WATERS OF THE U.S. / WATERS OF THE COMMONWEALTH

A Site inspection was conducted by BETA Wetland Scientists on November 6, 2020, and verified in February of 2024 to review the previously delineated boundaries of existing Resource Areas within and in the immediate vicinity of the Site. Waters of the U.S./ Land Under Water boundaries were identified and delineated in accordance with the methods developed by the *U.S. Army Corps of Engineers Wetland Delineation Manual; Northeast Region* (2009). Resource Areas identified on the Site include Land Under Waters of the U.S., as well as the Bank and Ordinary High-Water Mark of Poland Brook.

The Site is also located within a FEMA Flood Zone A, that does not have a FEMA-determined base flood elevation. A Hydraulic Analysis, however, was conducted by MassDOT, which estimated the 100-year Base Flood Elevation (BFE) of Poland Brook as 798.88 ft.

Vegetated Wetlands were observed to the north of the Site, beyond the scope and limits of work associated with the Project. The Resource Area Boundary Delineation Report in Appendix C describes BETA’s findings.

3.0 PROPOSED CONDITIONS

The Project will consist of several activities including:

- Installation of erosion and sedimentation controls downgradient of proposed work areas
- Installation of dewatering structures within Poland Brook around existing bridge abutments and piers to allow for work in dry conditions
- Construction of an 18-foot temporary gravel driveway north of North Poland Road to access Poland Brook, if needed
- Removal of the existing temporary bridge crossing
- Demolition and removal of the existing bridge piers to two feet below the mudline
- Installation of scour protection within the Streambed of Poland Brook and overlaying with 2 feet of simulated Streambed material
- Installation of new bridge abutments upgradient of the existing abutments
- Installation of a new bridge deck
- Grading and widening roadway approach to match new dimensions
- Installation of a deep-sump catch basin and three leaching catch basins along North Poland Road
- Stabilization of temporarily disturbed right-of-way areas with loam and seed.

As noted above, Site preparation for the Project will include installation of traffic controls, erosion control and water control installation[1], construction of a temporary access road northwest of the bridge, and minor associated clearing and grubbing at the southeast and northwest corners of the bridge. The southwest and northeast quadrants are currently vegetated with grasses, so tree clearing in these areas will not be required.

The proposed replacement bridge superstructure will have a span of 83 feet and a width of 27 feet. New concrete abutments will be constructed upgradient from the existing structures, outside of the channel of Poland Brook. Demolition, staging and construction will be conducted from the existing paved surface of North Poland Road, upgradient of the Poland Brook channel. No equipment will be staged within the channel itself.

Water controls and a dewatering system will be installed to remove the existing piers and install a portion of the scour protection in dry conditions. Additional details on anticipated dewatering and water controls are provided in Section 7.3 below. An anticipated Construction Sequence is also provided in Section 4.

Because the bridge is proposed to be widened, the roadway approaches require reconstruction, which will result in an increase in impervious surface from 15,090 sf to 17,365 sf (approximately 2,275 sf of new impervious area). A deep-sump catch basin and three leaching catch basins will be installed along the eastern side of North Poland Road, north of the bridge to capture and infiltrate the additional stormwater runoff generated from the larger bridge structure and roadway approach widening.

Potential discharges from the Project will include dewatering discharges and overland stormwater flow through the work area. Poland Brook will be protected during construction through the implementation of sediment and erosion controls, and treating dewatering effluent to minimize releases of turbid water during construction.

[1] Water controls to be installed prior to April 1 or after July 31 to avoid impact to rare species migratory pathways. See Section 7.3.

3.1 WORK WITHIN JURISDICTIONAL RESOURCE AREAS

Portions of the Project will occur within Waters of the U.S./ Waters of the Commonwealth including areas of Streambank and Streambed/Land Under Water, as summarized in Table 2.

Table 1. Summary of Impacts

Waters of the U.S./ Commonwealth	Temporary Impacts	Permanent Impacts	Restoration
Streambed / Land Under Water	687 square feet (sf)	185 sf	45 sf
Dredging	34 cubic yards (cy)	0 lf	0 lf
Streambank	84 linear feet (lf)	0 lf	0 lf

3.1.1 STREAMBANK

Temporary impacts to Streambank, totaling approximately 84 lf, are required to access the work area to demolish and remove the existing bridge piers within Poland Brook. Temporary impacts are associated with access and installation of erosion and dewatering controls to establish work areas.

3.1.2 STREAMBED / LAND UNDER WATER

Temporary impacts to Streambed/Land Under Water are required to demolish and remove the existing bridge piers that are located within Poland Brook. Approximately 687 sf of temporary alteration is proposed associated with installation of erosion and dewatering controls to establish work areas and allow work to be completed in dry conditions. In addition, riprap scour protection will be installed within the Streambed, then covered with two feet of simulated Streambed material. Scour protection has been placed in accordance with the findings of the Hydraulic Study Report, and its installation will result in 185 sf of permanent alteration and 34 cy of dredging.

Removal of the existing bridge piers will result in the restoration of 45 sf of Streambed within Poland Brook.

3.1.3 FEMA FLOOD ZONE

The Site is located within a FEMA Flood Zone A, however there is no Regulated Floodway associated with Poland Brook. Work within Zone A includes temporary and permanent impacts associated with bridge abutment replacement, placement of riprap scour protection and removal of bridge piers. Impacts include approximately 34 cy of dredging required to place the scour protection around the proposed bridge abutments.

As described above, a Hydraulic Analysis was conducted by MassDOT, which estimated the 100-year Base Flood Elevation (BFE) of Poland Brook as 798.88 ft. This analysis also found that the proposed condition, as modeled, does not result in an increase in the water surface elevation for the hydraulic and scour design flood events, safely conveys the maximum allowed design flood, and results in a slightly (within inches) lower base flood profile (Appendix K).

3.2 STREAM CROSSING STANDARDS

The Project includes the construction of one replacement stream crossing. Table 2 below describes how the Project meets the Massachusetts Stream Crossing Standards.

Table 2 – Stream Crossing Standards

Stream Information and Standards	Poland Brook Crossing
Location	Sta. 13+00
Stream Type	Perennial Stream
New or Replacement Crossing	Replacement
Standard 1 **Crossing Type**	**83' span, 27' wide Single-span bridge** The proposed span bridge is the preferred crossing type, as it spans the resource areas. The Project will maintain, and slightly improve, aquatic connectivity through removal of the existing piers to 2 feet below the mud line.
Standard 2 **Embedment > 2 feet**	The proposed bridge spans the Brook and the design include providing 2 feet of simulated streambed material over the proposed scour protection to restore habitat for aquatic wildlife following construction. The proposed project will maintain, and slightly improve aquatic species passage through removal of the existing piers. - **Meets**
Standard 3 **Crossing Span >1.2*BFW**	BFW = 35.83'* 1.2*35.83' = 43.0' Span = 83' The proposed Bridge span provides nearly double the required span for this stream, providing sufficient areas for both terrestrial and aquatic wildlife to utilize the stream crossing - **Meets**
Standard 4 **Openness Ratio >0.82 feet**	$= \frac{10' * 83'}{27'}$ = 30.74 feet The Proposed bridge meets the standards for Openness; therefore, it provides adequate conditions for aquatic and terrestrial wildlife to utilize the stream crossing. - **Meets**
Standard 5 **Substrate Type**	Simulated and native natural substrate will be used to restore the streambed following construction. A Fluvial Geomorphologist developed the proposed simulated streambed specification for this project to ensure compatible and suitable material will be placed during construction. The restored streambed will provide vital wildlife habitat for aquatic species in the vicinity of the bridge. - **Meets**
Standard 6 **Water Depth and Velocity**	As documented in the attached Hydraulic Analysis (Appendix K), the Project is anticipated to result in comparable water depths and

	velocities for the simulated flow events, with the Project resulting in flows approximately 0.5 ft/s slower and water depths 0.5 feet lower for these events - **Meets**

** Proposed BFW will match existing width of the channel at 35.83'. No changes to the channel are proposed.*

As detailed in Table 2, the replacement bridge meets the Massachusetts Stream Crossing Standards.

4.0 Construction Sequence

The bulk of the construction will be performed in conjunction with a full roadway closure at the project location, with traffic detoured. This full closure will be limited to the summer school vacation period to avoid the need to detour school busses. Construction activities will still be required to be performed outside the full closure period; however, traffic will be maintained during those activities, although there may be delays. The detour route, from just east of the bridge, will follow North Poland Rd to Ashfield Rd (Route 116), to Maple St, to Orchard St, to Manning St, to Main Poland Rd, and back to North Poland Rd. The complete detour loop is approximately 8 miles.

The definitive sequencing of work activities will be determined by the selected contractor; however, the anticipated sequencing is as follows:

1. Implement traffic controls,
2. Installation of erosion and dewatering controls as shown on Project plans,
3. Clear and grub the site, as necessary,
4. Construct the proposed access road, if required,
5. Removal of the temporary bridge crossing structure,
6. Demolish and remove the existing bridge piers to two feet below the mud line,
7. Install scour protection and stream restoration,
8. Construct the new bridge abutments upgradient of Waters of the U.S,
9. Install the replacement bridge deck structure,
10. Install the proposed drainage improvements,
11. Grade and pave the bridge approach roadway to meet new bridge dimensions, and,
12. Once Site is stabilized, remove erosion control measures and stabilize all work areas.

5.0 Wetland Impacts

No work is proposed within wetlands onsite. A total of approximately 687 sf of temporary and 185 sf of permanent impacts to Waters of the US / Land Under Water and 84 lf of temporary impacts to Streambank will occur as a result of the proposed work. All temporary impacts will be restored in place as discussed in Section 6.0 – Waters of the U.S./ Land Under Water Replication/Restoration.

6.0 Replication / Restoration

Streambed/Land Under Water restoration will be provided through the removal of the existing bridge piers within Poland Brook to two feet below the mud line. Restoration of the Streambed altered through placement of the scour protection will include placing a minimum of two feet of simulated Streambed material compatible with the native Streambed material found on the Site over the proposed scour protection.

7.0 MITIGATION

The Project has been designed to avoid and minimize impacts to Waters of the US and other environmentally sensitive areas, however, to mitigate for unavoidable impacts, mitigation associated with the Project will include invasive species control, sediment and erosion controls, dewatering, and stormwater management improvements, as described further below.

7.1 INVASIVE SPECIES CONTROL

Temporary alteration to Waters of the US/ Land Under Water will create opportunities for invasive species to colonize newly exposed soils. Minor site grading and temporary construction access will create exposed areas of disturbed soils vulnerable to colonization by invasive species. Newly disturbed soils and vegetation present openings for highly prolific invasive plant species to establish and out-compete native plant species. Adjacent existing invasive species populations provide a seed bank for future growth, adding to the invasive management challenge.

The introduction or spread of invasive or other unacceptable plant or animal species on the Site or areas adjacent to the Project caused by the work shall be avoided to the maximum extent practicable. For example, construction equipment shall be thoroughly cleaned and free of vegetation and soil before and after use. These requirements are included in the specifications included in Appendix J.

7.2 SEDIMENT CONTROL

The Project Plans provide details and descriptions of erosion and sediment control measures. Erosion and sedimentation controls will be installed and maintained by the contractor where activities are proposed within 100-feet of Poland Brook and any associated wetland resource areas. The erosion controls will provide a limit of work barrier while preventing silt and sediments from migrating into or towards the resource areas. Erosion controls will consist of compost-filled filter tubes, or an approved equal.

The erosion and sedimentation control measures will be installed in accordance with the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, March 1997.

Best management practices for erosion and sedimentation controls will be adhered to for all phases of construction to minimize potential impacts to wetland resource areas and wildlife habitat. To the extent practicable, disturbed soils will be seeded with a seed mix that provides wildlife habitat as designed by MassDOT. Please refer to the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan included in the attached Stormwater Report.

7.3 WATER CONTROL AND DEWATERING

In order to complete the demolition and removal of the existing bridge piers within Poland Brook and place a portion of the proposed scour protection, dewatering will be required to conduct work in dry conditions. While the exact means and methods for water control will be determined by the contractor, it is anticipated that water controls will consist of cofferdams. Water will be pumped from inside water control system to a treatment system in an upland area. Again, the exact means and methods of treating the dewatering effluent will be selected by the contractor, however, methods could include pumping the effluent to a filter bag placed on stone surrounded by sediment controls, to a frac-tank, or to another treatment system. Filtered/treated dewatering effluent will be visually monitored during dewatering to avoid sediment discharges, and will be sampled as required under the NPDES Construction General Permit.

Proposed water controls will be installed along either Bank of Poland Brook, maintaining a flow channel between the water control systems throughout construction. A Time of Year (TOY) restriction will be observed within Poland Brook from April 1st to July 31st to protect rare species habitat. Water controls will be installed prior to this period. Once installed, work will be allowed to continue behind the water controls (within the dewatered area) year-round.

Water control specifications (Item 991.2) have been included. A Water Control Plan designed by a Mass. Registered PE is required to be submitted prior to starting work on the bridge replacement. The Water Control Plan will include a Sedimentation and Erosion Control Plan, as well as, a Water Flow Diversion and Containment plan. Work within Waters of the U.S., including placement of fill, will only occur within dewatered areas. Final streambed restoration will be overseen by a Fluvial Geomorphologist.

8.0 Stormwater Management

The Project has been designed to meet the Massachusetts Stormwater Management Standards (310 CMR 10.05(6)(k-q) – the Standards) to the maximum extent practicable. The Project will result in the addition of impervious surface through the widening of North Poland Road to accommodate the new bridge dimensions. Existing Stormwater infrastructure on the Site is classified as “country drainage”.

To improve existing conditions, a deep-sump catch basin and three leaching catch basins are proposed along North Poland Road to capture and infiltrate the additional stormwater runoff. A Stormwater Memorandum describing the proposed stormwater improvements can be found in Appendix F.

Several alternatives were considered for treating stormwater runoff on the Site. These include:

8.1 Catch basins - Preferred

A series of catch basins along North Poland Road were proposed to attenuate additional stormwater flow created by the Project. This alternative will attenuate and treat stormwater runoff from North Poland Road and allow it to infiltrate stormwater directly into the ground through the use of one deep-sump catch basin and three (3) infiltration basins.

Several borings were conducted on the north side of the bridge (most recently in October 2020) and groundwater was observed at a depth of approximately 8.5’ below the surface. Review of nearby USGS groundwater data (Greenfield) indicates that groundwater elevations were within 1’ of typical season highs at the time of the boring. Also, NRCS soil mapping indicates the presence of Agawam fine sandy loam in the area of the proposed leaching basins and estimates groundwater to be greater than 6.5’ below the ground surface, which further supports the data obtained from the borings. The depth to the bottom of the leaching basin stone is approximately 5.5’ below the ground surface and is anticipated to be above and have adequate separation to groundwater.

This method is the most efficient use of the relatively narrow right-of-way therefore it was selected as the preferred alternative.

8.2 Installation of other Stormwater Control Measures

The installation of a stormwater infiltration basin or other stormwater control measures, such as swales, was evaluated during the design process but was not considered to be practicable due to limited right-of-way, steep slopes adjacent to the roadway, and the presence of utilities (poles and hydrant). Given the Site constraints and potential impacts to private property, this alternative was not selected.

9.0 Fisheries and Wildlife / NHESP / Vernal Pools

A portion of the Project is located within Natural Heritage and Endangered Species Program (NHESP) mapped Priority Habitat for Rare Species (PH 1741) and Estimated Habitats of Rare Wildlife (EH 1155). According to the Massachusetts Endangered Species Program, the Project is located within mapped wood turtle (*Glyptemys insculpta*) and longnose sucker (*Catostomus catostomus*) habitat. In addition, Poland Brook is a mapped Coldwater Fisheries Resource (Figure 3 – Environmental Resources). Poland Brook is also a tributary to the Deerfield River, which is mapped Essential Fish Habitat (EFH) for Atlantic Salmon. The Project will mitigate impacts to this EFH through the use of mitigation measures described in Section 7.0.

The Project has received a conditional "No Take" letter, which requires the following conditions:

1. Prior to the start of work, a Wood Turtle Protection Plan must be prepared and approved by the Division of Fisheries and Wildlife.
2. No in-water work is to occur between April 1 – July 31 of a given year.

There are no Areas of Critical Environmental Concern (ACEC), Surface Water Protection Areas (Zones A, B, C), Wellhead Protection Areas (Zone I, II or IWPA) or Outstanding Resource Waters (ORWs) present on the Site. The Site is not located with a FEMA Regulated Floodway and no NHESP Certified Vernal Pools (CVPs) or Potential Vernal Pools exist at the Site as well. As described above, however, the Site is located within a FEMA-100 year floodplain.

The Site is located within the range of the Northern Long-Eared Bat (*Myotis septentrionalis*), a species listed as endangered per the federal Endangered Species Act (ESA). As detailed in Appendix G, the Project has received a "May affect, but not likely to adversely affect" determination for this species.

10.0 Alternatives Analysis

10.1 Alternative 1 – No Build Alternative

The existing bridge carrying North Poland Road over Poland Brook has been removed and replaced with a temporary bridge structure. This means that, while the No-Build Alternative would be the least costly option, it is not feasible because the temporary bridge structure is not designed for long-term use and requires replacement with a permanent structure to allow continued vehicular travel along North Poland Road. In addition, the No-Build Alternative would mean the piers that supported the old structure would remain within the waterbody, which would obstruct natural debris movement within the waterbody and would not meet the Stream Crossing Standards.

10.2 Alternative 2 - Bridge Span

There are two feasible options for bridge spans to support the proposed structure.

10.2.1 Alternative 2A – Three-Span Layout

The first is maintaining the existing three-span layout, with support piles in the same locations as the existing structures. Due to the age and condition of the existing piles still remaining after the removal of the original bridge superstructure, retaining these structures in the proposed design is not feasible. Replacing these structures within their current footprints would result in additional impacts to the Streambed of Poland Brook and as with the "No Build Alternative" would present an obstruction to floating debris and not meet the Stream Crossing Standards as closely as alternative 2B.

10.2.2 Alternative 2B – Single Span – Preferred

It was determined that a single span bridge, with abutments constructed upgradient of the existing abutments is the preferred option. This alternative will result in the smallest impacts to Waters of the U.S/Land Under Water and will remove the existing piles that currently obstruct the waterway to restore a portion of the Poland Brook Streambed to pre-bridge conditions. The use of a single span would greatly increase the openness ratio of the crossing to meet the Stream Crossing Standards.

10.3 Alternative 3 – Bridge Structure Type

Several different types of materials were considered for the final design of the superstructure including:

- Alternative 3A - Prefabricated Bridge Units (PBU's)
- Alternative 3B - Steel Plate Girders with Full Depth Precast Concrete Deck Panels
- Alternative 3C - New England Deck Bulb Tees (NEDBT's)
- Alternative 3D - Northeast Extreme Tee Type D (NEXT D) Beams
- Alternative 3E - Staged Conventional Steel Beams

These alternatives are all proposed for a two-lane, single span layout therefore they do not impact the proposed bridge's compliance with the Stream Crossing Standards. All bridge structures times will provide the same compliance with the Stream Crossing Standards.

10.3.1 Alternative 3A - Prefabricated Bridge Units (PBU's)

PBUs are the second cheapest option, consisting of prefabricated pieces that can allow for accelerated installation. This type of beam is deeper than other alternatives. This means, if the design limits the increase in roadway profile to 1-foot, that the structure will only have 1.3 feet of freeboard over the 25-year design flood. This is below the 100-year check flood elevation, which could result in the possibility for pressure flow for the 100-year check flood, which would require the entire channel to be lined with riprap. This would create significant impacts to the Banks to Poland Brook and so was not selected as the preferred option.

10.3.2 Alternative 3B - Steel Plate Girders with Full Depth Precast Concrete Deck Panels

Steel Plate Girders are the second most expensive alternative considered. These beams require a deep profile comparable to PBUs, only allowing for 1.3-feet of freeboard over the 25-year design flood and requiring riprap stone along the channel. Due to the high cost and increased impacts to Poland Brook, this option was not selected as the preferred alternative.

10.3.3 Alternative 3C - New England Deck Bulb Tees (NEDBT's) – Preferred

The preferred alternative is the New England Deck Bulb Tee's (NEDBT's). This option is not the cheapest proposed, but the difference in cost compared to the cheapest option is essentially caused by the need for the Producer to procure forms for NEDBT beams. These beams are lighter than several of the options listed so they do not require special cranes to install and are more resistant to corrosion. The NEDBT option is also tied for the lowest depth of construction, compared to the other alternatives, allowing for 2-feet of freeboard over the 25-year design flood, while only requiring a 1-foot increase in the roadway profile at the bridge. This will allow the bridge to be placed outside of the 100-year check flood elevation with minimal additional impacts.

10.3.4 Alternative 3D - Northeast Extreme Tee Type D (NEXT D) Beams

NEXT D Beams are the cheapest and fastest alternative to replace the superstructure and have a shallow structure depth allowing for 2-feet of freeboard over the 25-year design flood elevation while only raising the roadway profile by 1 foot. This alternative was not chosen because the size of the beams creates additional concerns when transporting them, and installation will require specialized equipment that can accommodate the heavier weight. The availability of this specialized equipment cannot be guaranteed at any given time, and given the limited time window to complete the replacement, the alternative was not selected.

10.3.5 Alternative 3E - Staged Conventional Steel Beams

Conventional Steel Beams were not considered because they are considerably more expensive than any other option. This option would also require the roadway to be realigned in order for it to be constructed above the 100-year check flood elevation. Installation of these beams would require significant additional impacts to the Bank of Poland Brook, as it would require a 75-foot wingwall and riprap to accommodate the realigned superstructure. Due to these factors, this alternative was not considered for the final design.

10.4 Alternative 4 – Bridge Width

10.4.1 Alternative 4A – Single-Lane Structure

The installation of a new single-lane bridge to replace the former single-lane bridge was evaluated. Given that the roadway on both sides of the bridge is a two-lane roadway, as well as other factors including the roadway design speed and sight distances, a single-lane bridge was determined to be substandard for the location and was therefore ruled out.

This alternative would result in a smaller dewatering area associated with the new bridge abutments and therefore would reduce temporary impacts to Poland Brook, however it would not eliminate the need to remove the existing bridge support piles and the impacts associated with it. This layout would require a narrower structure, which results in a higher openness ratio and complies with the Stream Crossing Standards, however this is still possible with other alternatives as well. A single-lane bridge would also lower the cost of the Project as less materials would be required; however, it was not selected due to the design speed and sight distances at the bridge.

10.4.2 Alternative 4B - Two-Lane Structure – Preferred

The installation of a two-lane superstructure to replace the former single-lane structure was selected as the preferred alternative to address the bridge deficiencies to improve motorist access and safety along North Poland Road. While a two-lane bridge will be more costly than a single-lane structure, due to the need to replace the temporary bridge crossing, it is far less costly to install the larger structure now than replace it in the future. This alternative requires larger abutments to support the superstructure which requires a slightly larger dewatering area and increased temporary impacts to Poland Brook compared to the single-lane structure, however, these abutments will not require any additional permanent impacts, and temporary impacts can be restored following installation of the structure.

While this alternative does have a smaller openness ratio compared to Alternative 4A, both alternatives provide well over the optimum openness ratio of 2.46, and maintain a height of 6 feet. This alternative was selected, as it will also address sight distance issues at the bridge.

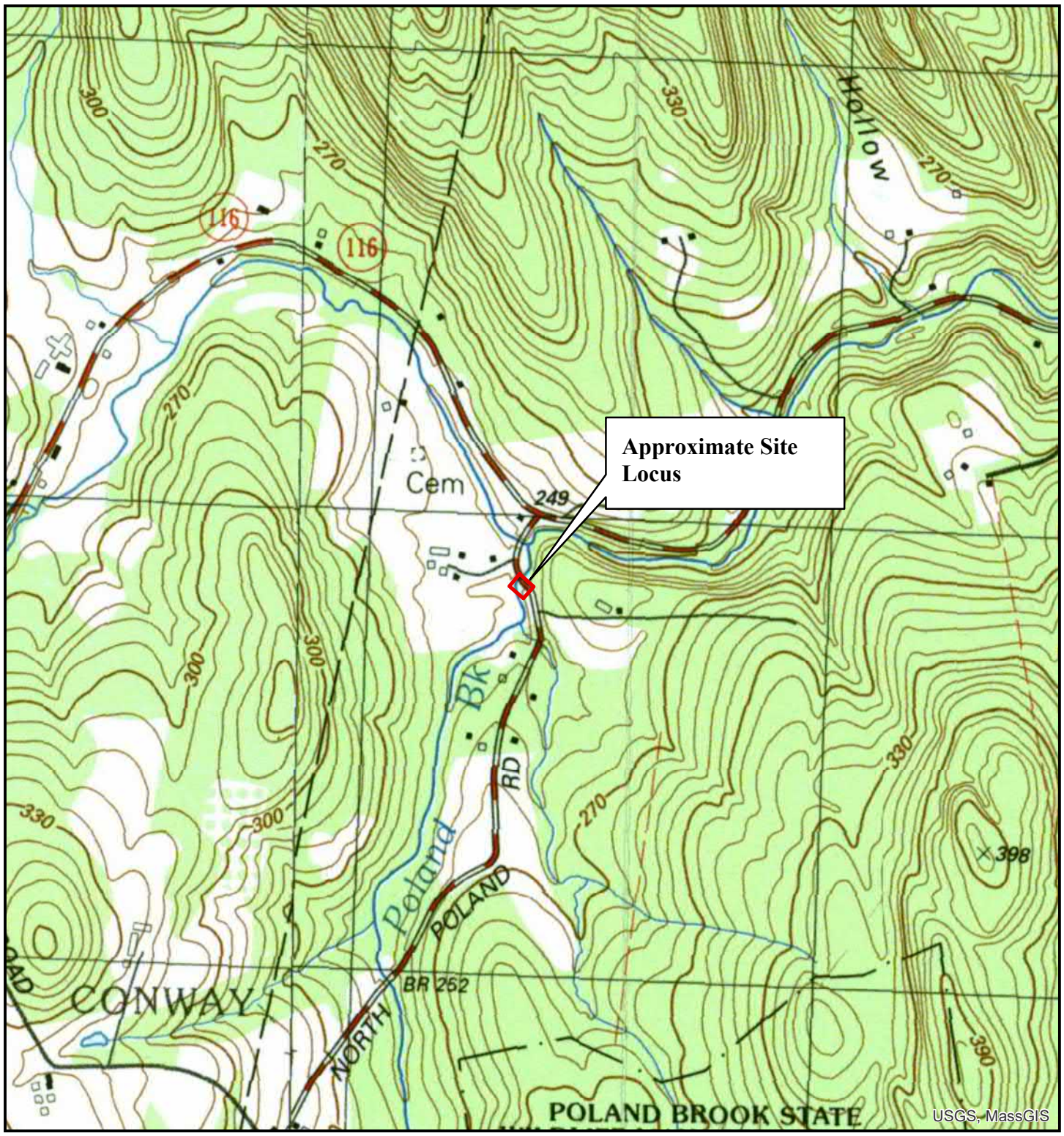
11.0 CONCLUSION

The proposed Bridge Replacement Project will replace the demolished bridge structure to restore traffic access along the North Poland Road corridor in western Conway, Massachusetts. The updated superstructure will include modern safety features and will be widened to accommodate travel in both directions. While minor temporary and permanent impacts are proposed, completion of the Project will result in the restoration of portions of the Poland Brook Streambed. All temporary impacts to Waters of the U.S./ Land Under Water will be fully mitigated through in-place restoration.

The Project has been designed to address the safety and operational deficiencies of the previous bridge structure. Impacts to Poland Brook have been avoided and mitigated to the extent practicable. The applicant respectfully requests that MassDEP and the US Army Corps of Engineers find these measures adequately protective of the interests identified in the 401 Water Quality Regulations and Massachusetts General Permit and issue, respectively, a Water Quality Certificate and Authorization under the Massachusetts General Permit approving the work shown on the accompanying plan set.

APPENDIX B

- **Figure 1 – Site Locus**
- **Figure 2 – Site Locus Aerial**
- **Figure 3 –Environmental Resources Map**
- **Figure 4 – FEMA FIRMette**



BETA
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1 inch = 1,000 feet

Figure 1
Site Locus
North Poland Road Bridge Over Poland Brook
Conway, MA

Data Source: MassGIS USGS Topographic Quadrangle Images (2001)

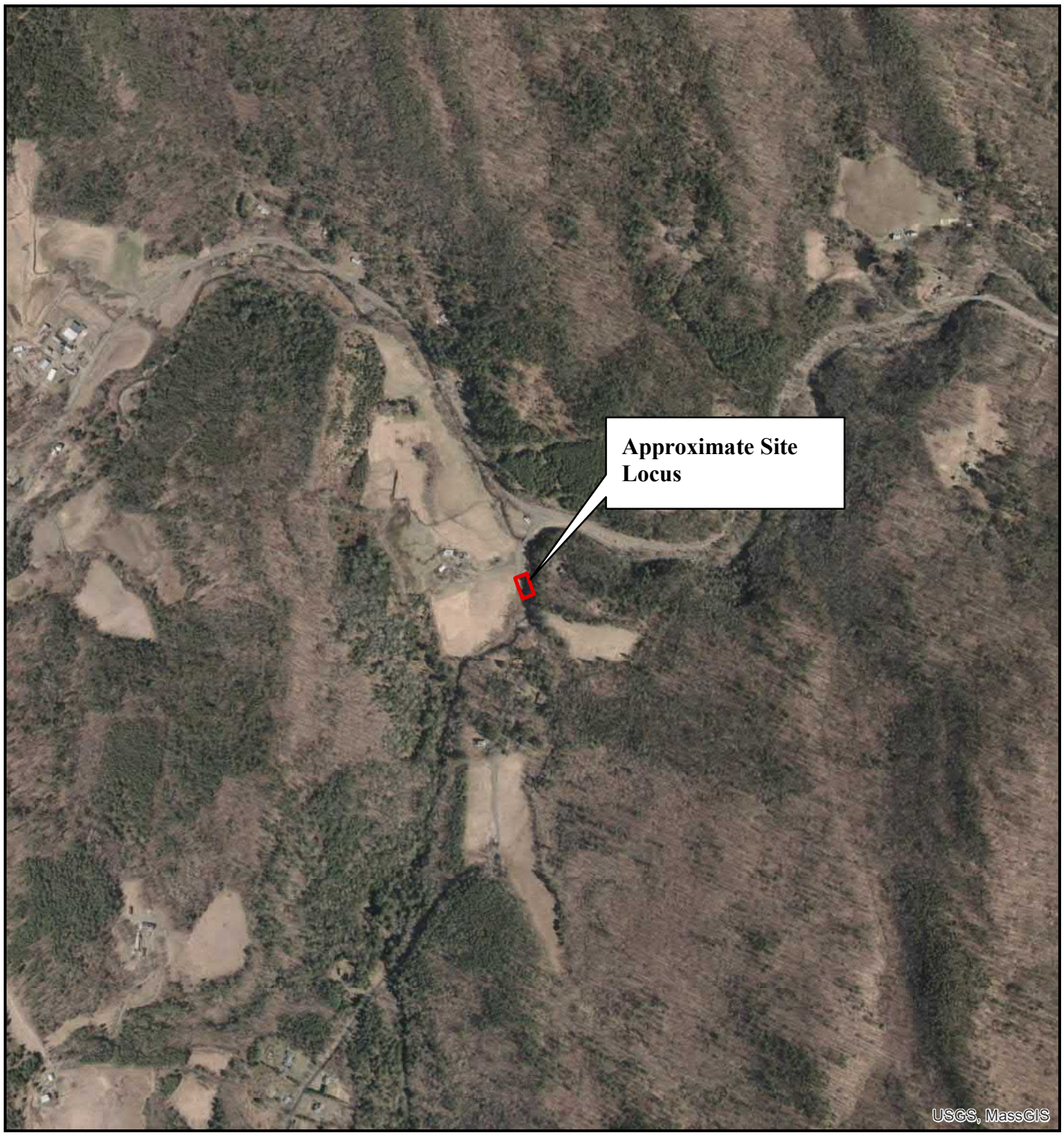

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Figure 2
Site Locus - Aerial
North Poland Road Bridge Over Poland Brook
Conway, MA

Data Source: MassGIS USGS Topographic Quadrangle Images (2001)

Figure 3
Environmental Resources Map
North Poland Road Bridge
Over Poland Brook
Conway, MA

Wetland Resources Legend

- MassDEP Hydrologic Feature
- Marsh/Bog
- Wooded marsh
- Open Water
- NFHL 100 Year Flood Zone
- Area of Critical Environmental Concern (ACEC)
- DFW Coldwater Fisheries
- Outstanding Resource Water
- Zone A
- Zone B
- Zone C
- MassDEP IWPA
- MassDEP Zone I
- MassDEP Zone II

Mapped Habitat Legend

- NHESP Potential Vernal Pool
- NHESP Certified Vernal Pool
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1 inch = 100 feet

Data Source: MassGIS USGS Color Ortho Imagery (2014), MassDEP Wetlands (1:12000) (2009), NHESP Potential Vernal Pools (2000), NHESP Certified Vernal Pools, NHESP Priority Habitats of Rare Species (2008), NHESP Estimated Habitats of Rare Species (2008), Areas of Critical Environmental Concern (2009), FEMA National Flood Hazard Layer (2014),

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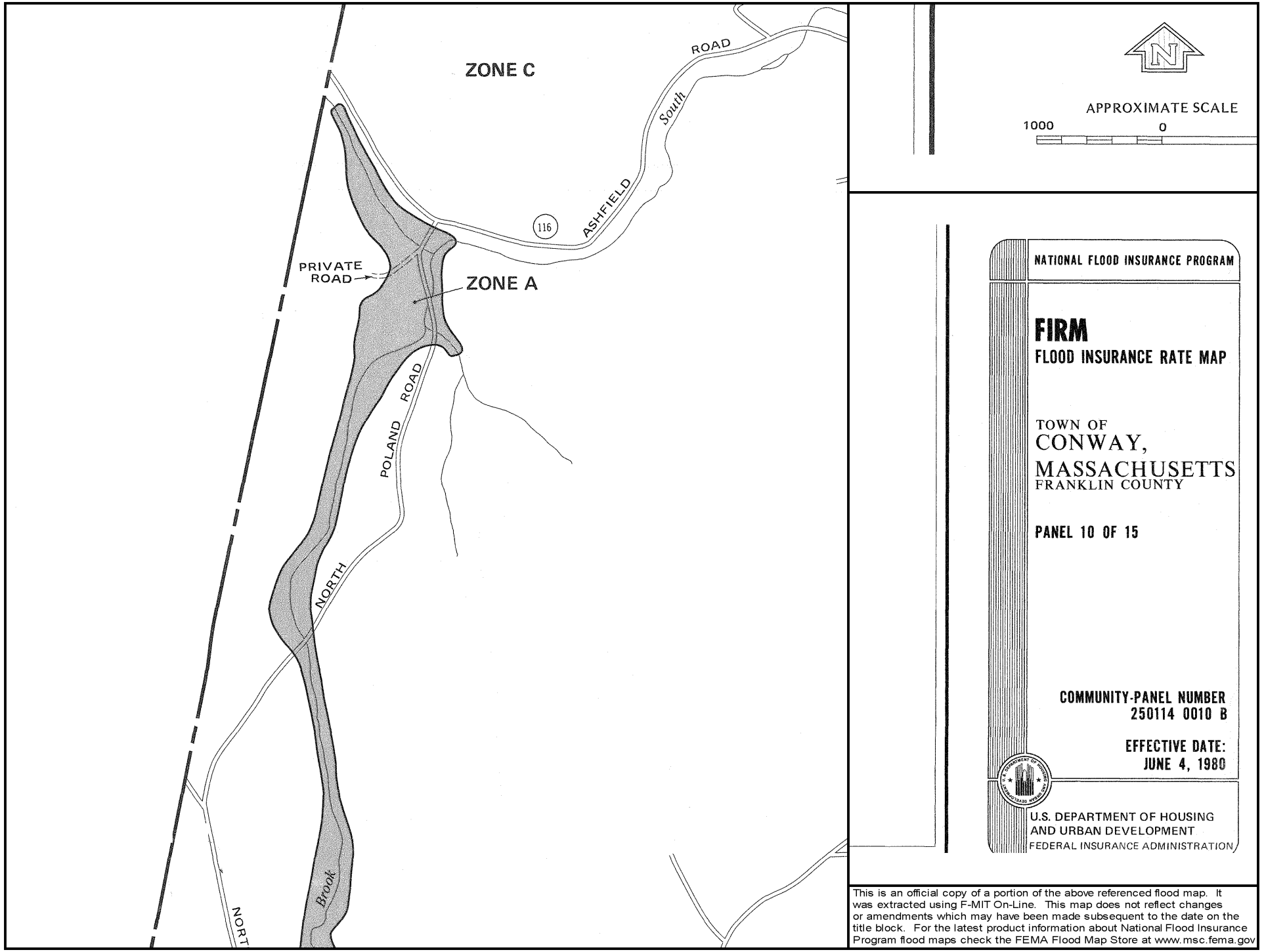
Figure 4.


ZONE C
ROAD
South
ASHFIELD
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PRIVATE
ROAD
ZONE A
POLAND ROAD
NORTH
Brook
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APPROXIMATE SCALE
1000
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NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
TOWN OF
CONWAY,
MASSACHUSETTS
FRANKLIN COUNTY
PANEL 10 OF 15
COMMUNITY-PANEL NUMBER
250114 0010 B
EFFECTIVE DATE:
JUNE 4, 1980
U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX C

- **Delineation Report**

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Resource Area Boundary Delineation
North Poland Road Over Poland Brook
Conway, Massachusetts

March 1, 2022

On November 6, 2020, BETA Group, Inc. (BETA) Wetland Scientists reviewed previously delineated jurisdictional boundaries within 100 feet of the project limits associated with replacing the North Poland Road Bridge over Poland Brook in Conway, Massachusetts (the Site). This report describes the "Waters of the United States" (federally protected wetland areas and streams) Subject to Protection under the federal Clean Water Act (33 U.S.C. §1251 et seq (1972)) and the Massachusetts Clean Waters Act (MGL Chapter 21 Section 26-53) that exist on the Site and methodology used to confirm their boundaries. Since the Project is anticipated to meet the requirements of a "Footprint Bridge", only jurisdictional areas subject to federal laws and regulations were identified/delineated. The boundaries of Waters of the United States were delineated by MassDOT prior to BETA's site visit.

Site Description

The Site consists of a single-lane bridge that runs north to south, providing passage of vehicular traffic over Poland Brook approximately 190' south of its confluence with the South River. The Site is bound to the west, east, and south by residential properties, and to the north by the Poland Road/Route 116 intersection (Figure 1 – Site Locus Plan and Figure 2 – Environmental Resources Plan). According to the USDA Natural Resources Conservation Service – Soil Survey, mapped soils on the Site and in the vicinity of the Site are classified as Agawam fine sandy loam, Occum fine sandy loam, and Canton fine sandy loam. Our field work generally confirmed the soil types at the Site. The *Custom Soil Resource Report for Franklin County, Massachusetts* is attached.

Federal jurisdictional boundaries under the Clean Water Act that were previously delineated on the Site and confirmed during this site visit include the Ordinary High-Water Mark (OHWM) associated with Poland Brook. Other federally protected areas identified on-site include the 100-Year Floodplain, Stream Bank, and Streambed. The MassGIS database was used as the initial step in identifying critical areas on or within proximity of the Site that would be examined more closely if construction activities are proposed. The table below describes selected environmentally critical categories as determined through MassGIS.

Table 1. Selected MassGIS Environmental Data Layers

Mapped Resource On or Within Proximity to Site	Yes	No
Area of Critical Environmental Concern		✓
NHESP Certified Vernal Pool		✓
NHESP Potential Vernal Pool		✓
NHESP Estimated Habitat of Rare Wildlife	✓	
NHESP Priority Habitat of Rare Species	✓	
Mapped Northern Long-eared Bat Roost Trees (within 8 miles)		✓
Mapped Northern Long-eared Bat Hibernacula (within 8 miles)		✓
Outstanding Resource Waters		✓
Surface Water Protection Areas (Zone A, B, and C)		✓
Interim Wellhead Protection Areas		✓
Zone I Wellhead Protection Areas		✓
Zone II Wellhead Protection Areas		✓

BETA GROUP, INC.
89 Shrewsbury Street, Suite 300, Worcester, MA 01604
P: 508.756.1600 | W: www.BETA-Inc.com

FEMA Flood Zones	✓	
Wild and Scenic River		✓
Coldwater Fish Resource	✓	

Source: MassGIS

Jurisdictional Areas – Federal Clean Water Act (Sections 401 and 404)
The perennial stream (Poland Brook) located within the Site is considered a "water of the United States," and is therefore subject to the federal Clean Water Act, 33 U.S.C. §1251 et seq (1972). The boundary to "waters of the United States" is the Vegetated Wetlands boundary, or, in the absence of Vegetated Wetlands, is the Ordinary High-Water Mark (OHWM) for non-tidal rivers and streams, as specified at 33 CFR §328.4. Areas Subject to Protection under Sections 401 and 404 exist on the Site and are described below.

A Site inspection was conducted by BETA's Wetland Scientists on November 6, 2020 to identify and confirm the boundaries of waters of the United States that are under federal jurisdiction at the Site and within the immediate vicinity. Jurisdictional boundary delineations were confirmed in accordance with methods developed by the US Army Corps of Engineers Wetlands Regulatory Assistance Program, *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)* dated 2012, as well as definitions set forth in the Clean Water Act Regulations, 33 CFR §328.4 (404 Regulations).

Ordinary High-Water Mark
In accordance with the definition at 33 CFR §328.3(c)(6), the OHWM is the "line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas".

The OHW elevations were determined at the Site based on shelving and staining. Due to the steep, undercut nature of the Stream Bank, these indicators were observed as consistent with the Stream Bank as delineated in the field. Based on the relation of the survey-located flags and the topographic data for the Site, an OHWM elevation of **792'±** was determined.

Stream Bank
Portions of the Stream Bank associated with both sides of Poland Brook in the vicinity of the Site were flagged in the field with blue flagging. This delineation was performed by MassDOT prior to BETA's site visit. After assessing the delineation in accordance with the above-referenced federal publications and regulations, BETA is in agreement with the delineated Stream Bank, and by extension, the OHWM.

Table 2: Stream Bank Boundary Description

Flag Series	Location	Description / Notes
WF#B1 & WF#B3 Series *WF#B1-106 to WF#B1-123 (northwest Bank);*	Poland Brook, near to the North Poland Road Bridge	Poland Brook flows in an easterly direction under the North Poland Road Bridge until it reaches its confluence with the South River. The Stream Bank generally consists of an abrupt, undercut bank that is vegetated with species including black willow (*Salix nigra*) and spiraea (*Spiraea sp.*). Pebbles with a diameter of approximately 0.75"-1.5" were observed along the Stream Bank, with armoring of larger rocks observed on the northerly side under the North Poland Road

Flag Series	Location	Description / Notes
WF#B3-100 to WF#B3-117 (southeast Bank)		Bridge. The boundary of Stream Bank flagged in the field was observed to be consistent with the OHWM. According to StreamStats, the bankfull width (BFW) for Poland Brook just downstream of the North Poland Road Bridge is **34.6'.** BETA conducted a BFW assessment in the field at six (6) different locations. These assessments were performed at flags WF#B1-114 through 116 and WF#B1-119, 120, and 123. Based on these measurements, the BFW of Poland Brook in the vicinity of the North Poland Road Bridge was determined to be **33'.**

100-Year Floodplain

According to the June 4, 1980 FEMA Flood Insurance Rate Map (FIRM) Panel 250114 0010 B, the Site is located within a FEMA Flood Hazard Zone A. This designation does not have a base flood elevation (BFE) associated with it. Further hydraulic analysis would be required to determine the extent of the Floodplain and demonstrate that any proposed work within the Floodplain would not contribute to a rise in flood elevation.

Streambed

Streambed exists between the Stream Bank boundaries below the mean annual low water level of Poland Brook. Streambed consists of 3-4" pebbles, as well as vegetation including tussock sedge (*Carex stricta*), joe pye weed (*Eutrochium purpureum*), and boneset (*Eupatorium perfoliatum*). A deposition of sandy soils caused by an eddy-like feature was noted downstream of the Site.

Jurisdictional Areas – Massachusetts Clean Waters Act (Section 401)

The limit of jurisdiction under Massachusetts Clean Waters Act (Section 401), as specified in 314 CMR 9.00, is the limit of Section 404 jurisdiction under the federal Clean Water Act. Exceedances of the jurisdictional threshold under 314 CMR 9.00 require filing for a Water Quality Certification under Section 401.

Findings and Recommendations

Areas Subject to Protection and/or Jurisdiction under the federal Clean Water Act and the Massachusetts Clean Waters Act, located on or within 100 feet of the Site have been delineated and include boundary of the OHWM and limit of the Stream Bank. In order to definitively determine the extent of Army Corps of Engineers jurisdiction and MassDEP jurisdiction, the boundary flags and OHWM elevations would need to be located and depicted on a to-scale plan of the Site.

Attachments: Figure 1 - Site Locus
Figure 2 - Environmental Resources Map
Figure 3 - FEMA FIRMette
Photographic Documentation
Custom Soil Report for Franklin County, Massachusetts
StreamStats Report

Job No: 13.04657.00

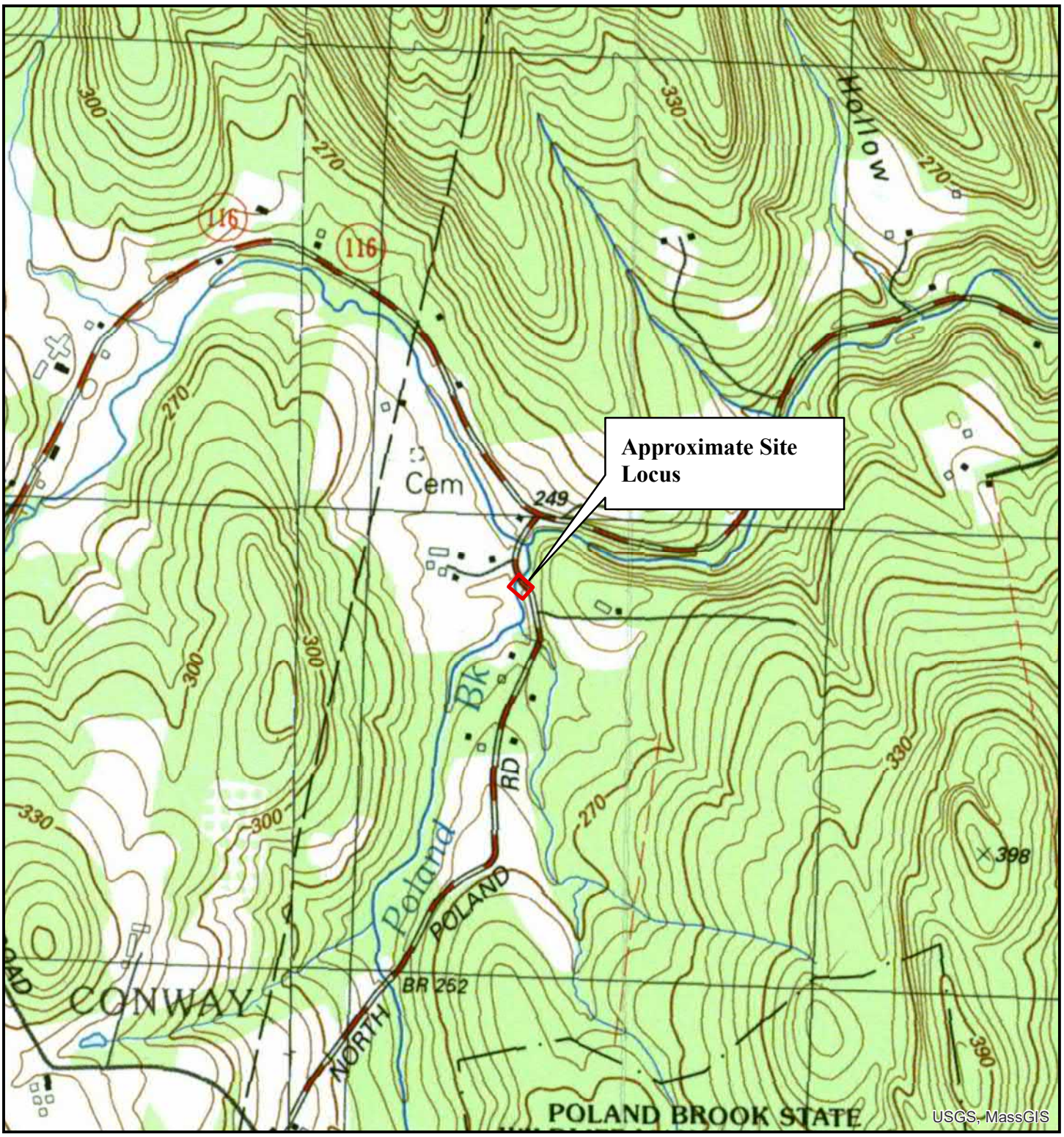

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Figure 1
Site Locus
North Poland Road Bridge Over Poland Brook
Conway, MA

Data Source: MassGIS USGS Topographic Quadrangle Images (2001)

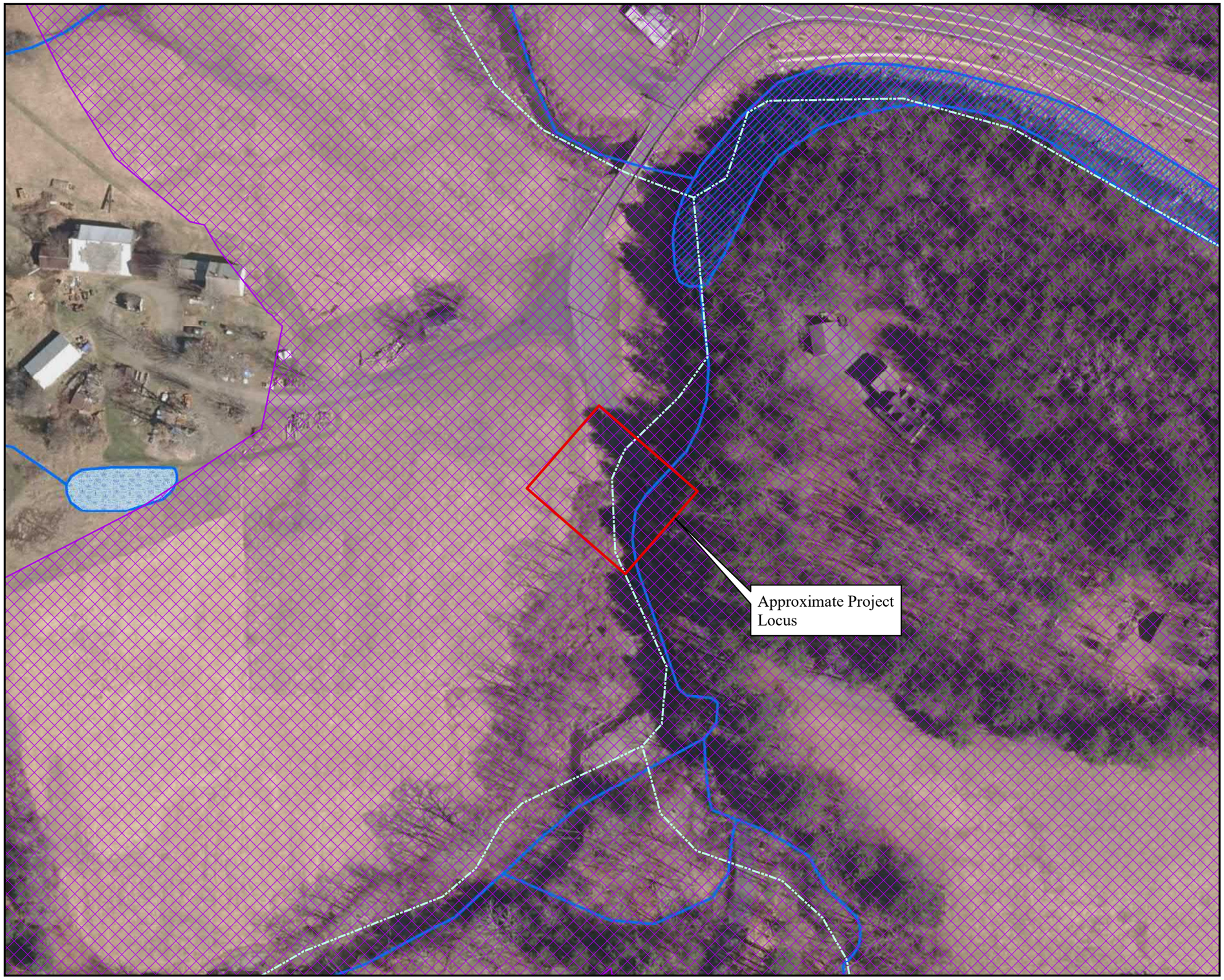

Figure 2
Environmental Resources Map
North Poland Road Bridge
Over Poland Brook
Conway, MA

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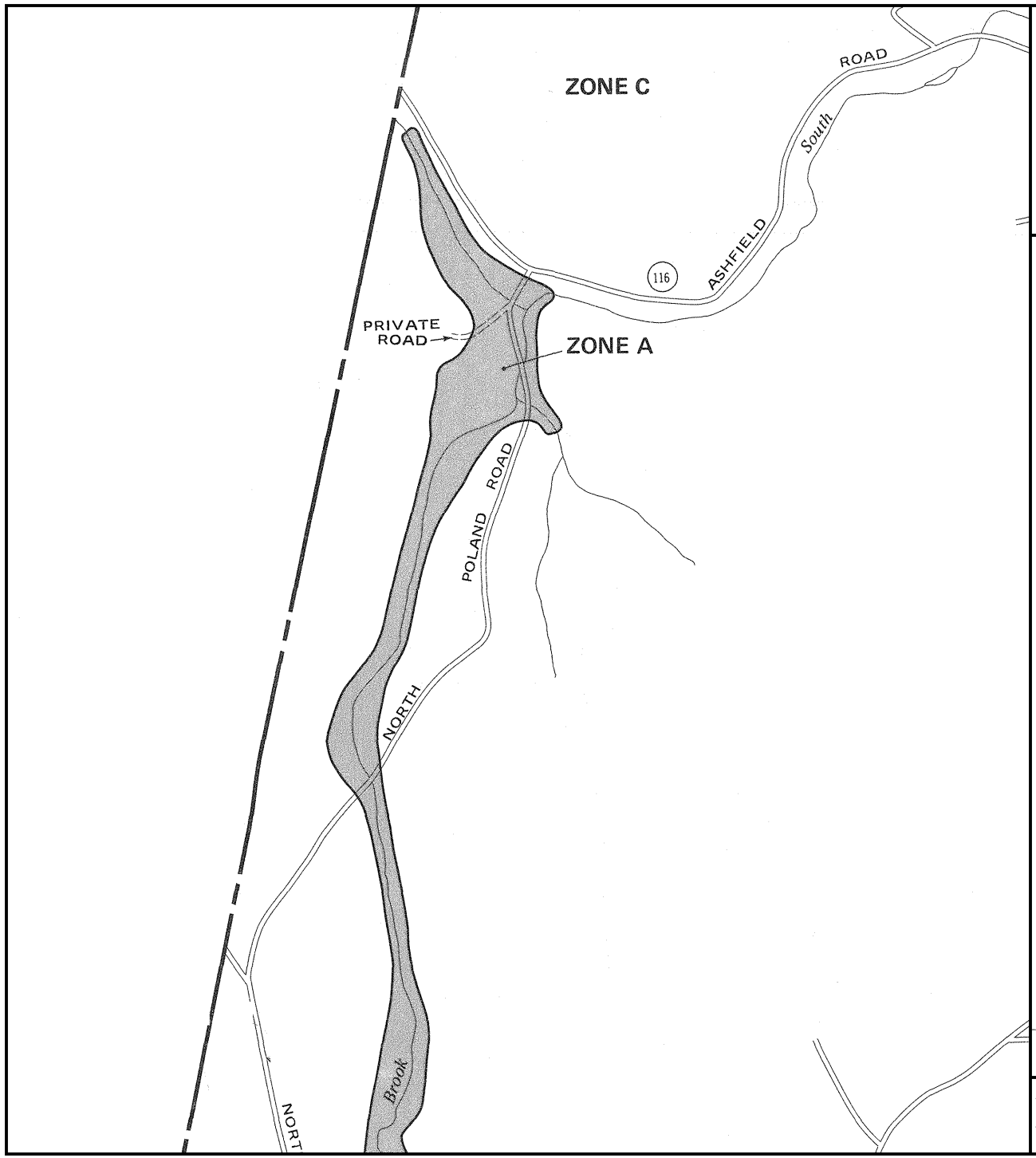
IMPROVING COMMUNITIES TOGETHER



APPROXIMATE SCALE
1000 0

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
CONWAY,
MASSACHUSETTS
FRANKLIN COUNTY

PANEL 10 OF 15

COMMUNITY-PANEL NUMBER
250114 0010 B

EFFECTIVE DATE:
JUNE 4, 1980

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

Photo 1

View of vegetation within the Streambed of Poland Brook, downstream of the North Poland Road Bridge—facing northeast.

Photo 2

View of the armored Stream Bank adjacent to the northerly bridge abutment—facing west.

PHOTOGRAPHIC DOCUMENTATION

North Poland Road Bridge Over Poland Brook

Conway, Massachusetts

Photographs Documented 11.06.2020

Photo 3

View of riffling within Poland Brook, downstream of the bridge—facing southwest.

Photo 4

View of the undercut northerly pier—facing northeast.

PHOTOGRAPHIC DOCUMENTATION
North Poland Road Bridge Over Poland Brook
Conway, Massachusetts
Photographs Documented 11.06.2020

Photo 5

View of the bridge taken from North Poland Road—facing north.

Photo 6

View of North Poland Road conditions—facing south.

PHOTOGRAPHIC DOCUMENTATION
North Poland Road Bridge Over Poland Brook
Conway, Massachusetts
Photographs Documented 11.06.2020

Photo 7

View of deposition caused by an eddy-like feature downstream of the bridge—facing east.

Photo 8

View of an upstream meander that bows outward—facing west.

PHOTOGRAPHIC DOCUMENTATION

North Poland Road Bridge Over Poland Brook

Conway, Massachusetts

Photographs Documented 11.06.2020

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Franklin County, Massachusetts

November 11, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

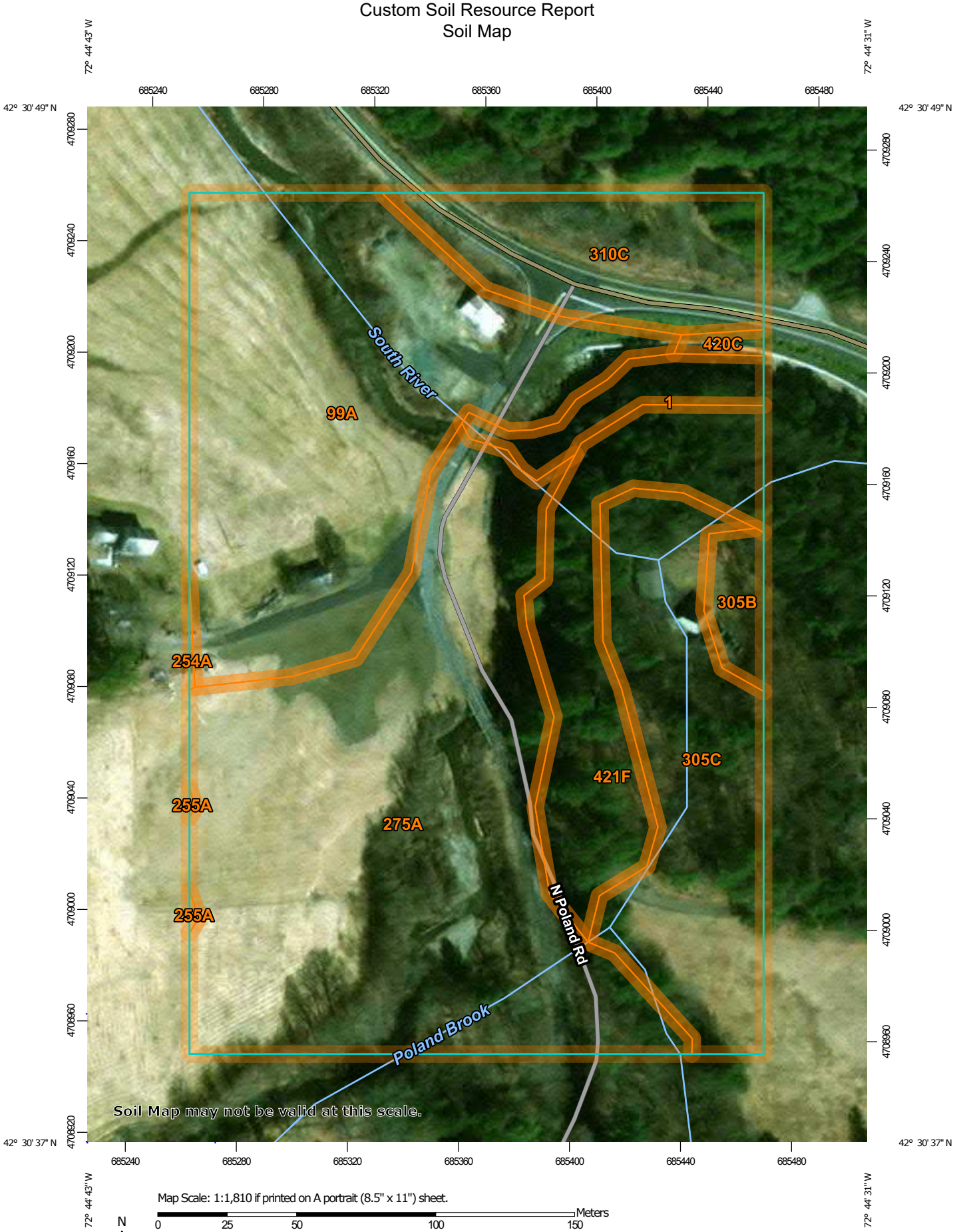
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Franklin County, Massachusetts
Survey Area Data: Version 15, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 29, 2013—Oct 16, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	0.4	2.7%
99A	Occum fine sandy loam, 0 to 3 percent slopes, occasionally flooded	4.3	27.0%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	0.0	0.1%
255A	Windsor loamy sand, 0 to 3 percent slopes	0.0	0.1%
275A	Agawam fine sandy loam, 0 to 3 percent slopes	5.7	36.1%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	0.3	1.6%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	2.2	13.7%
310C	Woodbridge fine sandy loam, 8 to 15 percent slopes	1.3	8.3%
420C	Canton fine sandy loam, 8 to 15 percent slopes	0.1	0.4%
421F	Canton fine sandy loam, 25 to 45 percent slopes, very stony	1.6	10.3%
Totals for Area of Interest		**15.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties

and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Franklin County, Massachusetts

1—Water

Map Unit Setting

National map unit symbol: bpfr
Elevation: 0 to 1,970 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

99A—Occum fine sandy loam, 0 to 3 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 9c4v
Elevation: 100 to 940 feet
Mean annual precipitation: 37 to 51 inches
Mean annual air temperature: 37 to 59 degrees F
Frost-free period: 135 to 182 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Occum, occasionally flooded, and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Occum, Occasionally Flooded

Setting

Landform: Flood plains, terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium over sandy alluvium

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 21 inches: fine sandy loam
Bw2 - 21 to 32 inches: sandy loam
C - 32 to 46 inches: loamy fine sand
Ab - 46 to 49 inches: loamy very fine sand
C' - 49 to 65 inches: fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water capacity: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: A
Ecological site: F144AY010NH - Sandy High Floodplain
Hydric soil rating: No

Minor Components

Pootatuck, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains, terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Suncook, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains, terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hadley, occasionally flooded

Percent of map unit: 2 percent
Landform: Terraces, flood plains
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Winooski, occasionally flooded

Percent of map unit: 2 percent
Landform: Flood plains, terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

254A—Merrimac fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tyqr
Elevation: 0 to 1,100 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Kames, eskers, moraines, outwash terraces, outwash plains
Landform position (two-dimensional): Backslope, footslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury
Percent of map unit: 5 percent
Landform: Terraces, deltas, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley
Percent of map unit: 5 percent
Landform: Outwash plains, eskers, kames, deltas
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam
Percent of map unit: 3 percent
Landform: Eskers, moraines, outwash plains, outwash terraces, stream terraces, kames
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor
Percent of map unit: 2 percent
Landform: Outwash plains, outwash terraces, deltas, dunes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

255A—Windsor loamy sand, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2svkg
Elevation: 0 to 990 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Outwash terraces, outwash plains, dunes, deltas
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Deerfield, loamy sand

Percent of map unit: 10 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hinckley, loamy sand

Percent of map unit: 5 percent
Landform: Outwash plains, eskers, kames, deltas
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

275A—Agawam fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tyqw
Elevation: 0 to 1,040 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Agawam and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Agawam

Setting

Landform: Outwash terraces, outwash plains, kame terraces, kames, moraines
Landform position (two-dimensional): Backslope, shoulder, footslope, summit
Landform position (three-dimensional): Side slope, crest, tread, riser, rise, dip
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

Typical profile

Ap - 0 to 11 inches: fine sandy loam
Bw1 - 11 to 16 inches: fine sandy loam
Bw2 - 16 to 26 inches: fine sandy loam
2C1 - 26 to 39 inches: loamy fine sand
2C2 - 39 to 55 inches: loamy fine sand
2C3 - 55 to 65 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 15 to 35 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Ninigret

Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Windsor

Percent of map unit: 4 percent
Landform: Deltas, dunes, outwash plains, outwash terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Walpole

Percent of map unit: 3 percent
Landform: Deltas, outwash plains, depressions, outwash terraces, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Hinckley

Percent of map unit: 3 percent
Landform: Outwash plains, eskers, kames, deltas
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

305B—Paxton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2qp
Elevation: 0 to 1,570 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Paxton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands

Hydric soil rating: No

Minor Components

Woodbridge

Percent of map unit: 9 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury

Percent of map unit: 6 percent
Landform: Drainageways, hills, ground moraines, depressions
Landform position (two-dimensional): Backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, base slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

305C—Paxton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w66y
Elevation: 0 to 1,320 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Paxton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex

Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 7 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge

Percent of map unit: 6 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury

Percent of map unit: 2 percent
Landform: Hills, ground moraines, depressions, drainageways, drumlins
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear

Hydric soil rating: Yes

310C—Woodbridge fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w689
Elevation: 0 to 1,370 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodbridge and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge

Setting

Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 18 inches: fine sandy loam
Bw2 - 18 to 30 inches: fine sandy loam
Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D

Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton
Percent of map unit: 10 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury
Percent of map unit: 4 percent
Landform: Drainageways, hills, ground moraines, depressions, drumlins
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Sutton
Percent of map unit: 1 percent
Landform: Hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

420C—Canton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2w817
Elevation: 0 to 1,330 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Canton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting
Landform: Hills, ridges, moraines

Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: gravelly fine sandy loam
2C - 26 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Scituate

Percent of map unit: 6 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Montauk

Percent of map unit: 6 percent
Landform: Ground moraines, moraines, drumlins, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Newfields

Percent of map unit: 4 percent
Landform: Moraines, hills, ground moraines
Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Charlton

Percent of map unit: 4 percent
Landform: Ridges, hills, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

421F—Canton fine sandy loam, 25 to 45 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9cf8
Elevation: 220 to 1,100 feet
Mean annual precipitation: 38 to 52 inches
Mean annual air temperature: 35 to 58 degrees F
Frost-free period: 127 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton, very stony, and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Ground moraines, valley sides, hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy supraglacial till derived from gneiss and/or schist over sandy till derived from gneiss and/or schist

Typical profile

Oi - 0 to 0 inches: slightly decomposed plant material
A - 0 to 2 inches: fine sandy loam
Bw1 - 2 to 9 inches: fine sandy loam
Bw2 - 9 to 24 inches: fine sandy loam
Bw3 - 24 to 28 inches: fine sandy loam
2C1 - 28 to 34 inches: gravelly loamy sand
2C2 - 34 to 43 inches: gravelly loamy sand
2C3 - 43 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 25 to 45 percent
Surface area covered with cobbles, stones or boulders: 2.1 percent
Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Charlton, very stony

Percent of map unit: 10 percent
Landform: Toes on moraines, valley sides on moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Gloucester, very stony

Percent of map unit: 10 percent
Landform: Moraines, upland slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Montauk, very stony

Percent of map unit: 10 percent
Landform: Drumlins, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

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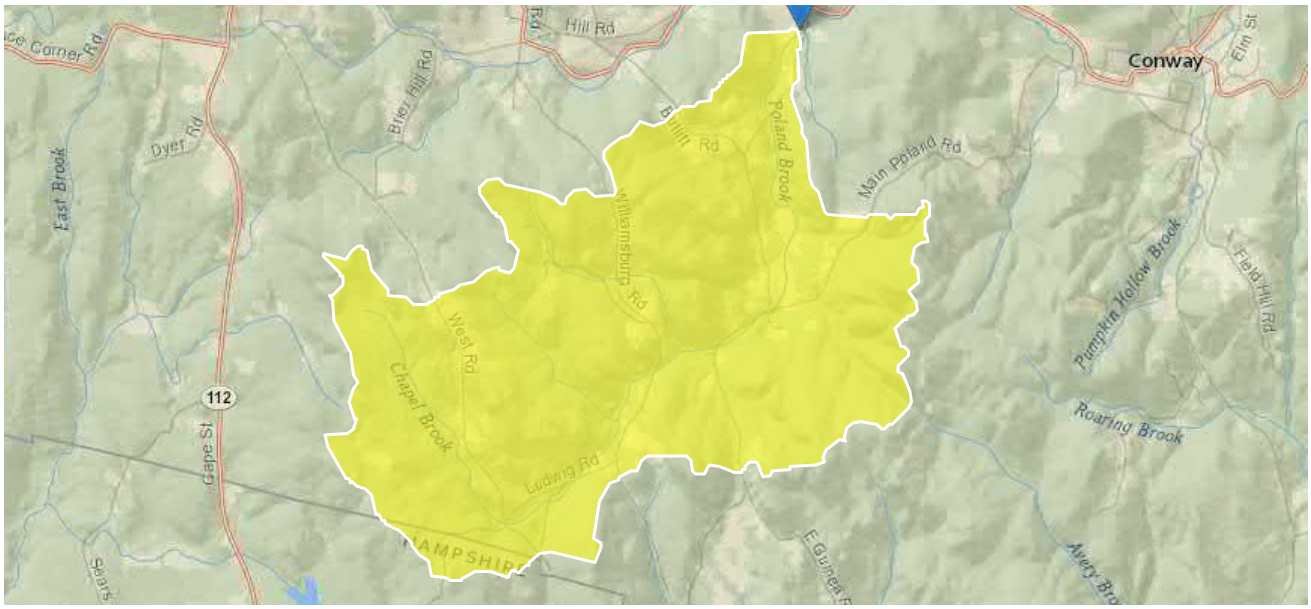
StreamStats Report - North Poland Road

Region ID: MA
Workspace ID: MA20201228213640164000
Clicked Point (Latitude, Longitude): 42.51100, -72.74385
Time: 2020-12-28 16:36:58 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	6.09	square miles
BSLDEM10M	Mean basin slope computed from 10 m DEM	14.205	percent

Bankfull Statistics Parameters[Bankfull Statewide SIR2013 5155]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.09	square miles	0.6	329
BSLDEM10M	Mean Basin Slope from 10m DEM	14.205	percent	2.2	23.9

Bankfull Statistics Flow Report[Bankfull Statewide SIR2013 5155]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
Bankfull Width	34.6	ft	21.3
Bankfull Depth	1.75	ft	19.8
Bankfull Area	60.2	ft^2	29
Bankfull Streamflow	246	ft^3/s	55

APPENDIX D

- **Photographic Documentation**

Photo 1

View of vegetation within the Streambed of Poland Brook, downstream of the North Poland Road Bridge—facing northeast.

Photo 2

View of the armored Stream Bank adjacent to the northerly bridge abutment—facing west.

PHOTOGRAPHIC DOCUMENTATION

North Poland Road Bridge Over Poland Brook

Conway, Massachusetts

Photographs Documented 11.06.2020

Photo 3

View of riffling within Poland Brook, downstream of the bridge—facing southwest.

Photo 4

View of the undercut northerly pier—facing northeast.

PHOTOGRAPHIC DOCUMENTATION
North Poland Road Bridge Over Poland Brook
Conway, Massachusetts
Photographs Documented 11.06.2020

Photo 5

View of the bridge taken from North Poland Road—facing north.

Photo 6

View of North Poland Road conditions—facing south.

PHOTOGRAPHIC DOCUMENTATION
North Poland Road Bridge Over Poland Brook
Conway, Massachusetts
Photographs Documented 11.06.2020

Photo 7

View of deposition caused by an eddy-like feature downstream of the bridge—facing east.

Photo 8

View of an upstream meander that bows outward—facing west.

PHOTOGRAPHIC DOCUMENTATION
North Poland Road Bridge Over Poland Brook
Conway, Massachusetts
Photographs Documented 11.06.2020

APPENDIX E

- **SHPO and THPO Correspondence and PNF**

950 CMR: OFFICE OF THE SECRETARY OF THE COMMONWEALTH

APPENDIX A
MASSACHUSETTS HISTORICAL COMMISSION
220 MORRISSEY BOULEVARD
BOSTON, MASS. 02125
617-727-8470, FAX: 617-727-5128

PROJECT NOTIFICATION FORM

Project Name:	Replacement of Bridge C-20-004 (MassDOT #609082)
Location /Address:	North Poland Road over Poland Brook
City/Town:	Conway
Project Proponent	
Name:	Massachusetts Department of Transportation
Address:	10 Park Plaza
City/Town/Zip/Telephone:	Boston, MA 02116 / T: 207-590-4999

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name	**Type of License or funding (specify)**
FHWA (Lead Federal agency)	Federal Aid funding
US Army Corps of Engineers	Section 404 permit

Project Description (narrative):

The Massachusetts Department of Transportation (MassDOT) proposes to replace Bridge C-20-004, which carries North Poland Road over Poland Brook in Conway. Bridge C-20-004, constructed in 1940, consists of a three-span steel stringer superstructure supported on reinforced concrete piers and stub abutments. The bridge has galvanized steel W-beam railings. The bridge was closed in November 2022 due to severe section loss and crushing evident at several beam ends during inspection of the bridge. Subsequently, the superstructure was removed and a temporary Acrow panel structure was installed on the existing abutments in order to restore service.

The proposed work will include full replacement of the bridge on existing alignment with a structure 10' wider than existing. The proposed bridge and approach roadway cross-section will include two 10'-wide travel lanes with 2'-wide shoulders and no sidewalks. The proposed new bridge will consist of a single-span prestressed, precast concrete New England Deck Bulb Tee beam superstructure supported by precast reinforced concrete abutments and wingwalls on precast concrete pile footings. The bridge will have painted steel S3-TL4 railings with pickets. The proposed abutments will be built behind the existing abutments, increasing the length of the structure by about 10'. The streambanks adjacent to the abutments will be graded and riprap will be placed to augment existing slope armoring. The road will be closed for the duration of construction and traffic will be detoured, to the south along Main Poland Road and to the east along State Route 116 (Ashfield Road).

Roadway reconstruction along the bridge approaches will extend approximately 200' to the south and 230' to the north of the bridge, encompassing a total project length of 505 feet. Work will include full-depth pavement reconstruction along the existing bridge approaches; minor roadway widening along the bridge approaches, to provide a consistent 24' cross-section; installation of granite curb along the bridge and

approaches; grading roadside slopes along the bridge approaches; in-kind replacement of guardrail along the bridge approaches, with installation of new sections along the approaches, as needed; installation of temporary erosion and sedimentation controls, and related work. One new catch basin will be installed to the north of the bridge to capture runoff from coming down grade from the north. The catch basin will outlet to three leaching basins with vegetated swale overflow in the vicinity of Station 14+70-90, Left.

Overhead utility lines within the project area currently cross North Poland Road along an alignment directly above Bridge C-20-004. The utility lines will temporarily be relocated toward the west side of the roadway during construction, with two temporary utility poles set one to either side of the driveway leading to the residence at 42 North Poland Road. Once construction is complete, the utility lines will be permanently moved to an alignment immediately east of the bridge, within 10'-15'of the structure. This will require two new utility poles, set within the existing County Road Layout.

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.

Bridge C-20-004 will be replaced. The bridge was closed in November 2022 and the superstructure was removed in February 2023. A temporary Acrow panel structure was installed on the existing abutments in order to restore service.

The bridge was reviewed by Kurt Jergensen, Historic Bridge Specialist, and determined to be ineligible for listing in the National Register. Before its removal, the bridge was a typical mid-20th century steel stringer design with no architectural character and standard engineering details.

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation

N/A

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

Bridge C-20-004 will be replaced on the same alignment with a structure 10' wider than existing. The approach roadway cross-section will be widened to provide a consistent cross-section, typically by about 8', matching back to the existing roadway width within the project limits.

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.

Review of the National Register of Historic Places revealed that the project area of potential effect (APE) is adjacent to the South River Area (CNW.B). Running from Burkeville village westerly to the Ashfield town line, the South River Area is described as containing some of the oldest houses in the town in an agricultural setting. Most of the inventoried properties in this Area are located along State Route 116, following the South River, and are separated by large expanses of forested and open space as well as non-historic properties constructed during the 20th century. In the opinion of CRU staff, the area lacks the necessary coherence and integrity to form a historic district that would be eligible for listing in the National Register.

While most of the inventoried properties within the South River Area are located along Route 116, one inventoried property is adjacent to the project area: the Joel G. Rice House at 42 North Poland Road (CNW.52). This circa 1880 vernacular five-bay, two-story, center hall clapboarded farmhouse is located to the northwest of Bridge C-20-004. The main house is set well back from North Poland Road and its outbuildings include a sugar house, cottage, milk house and two barns. The property is reported to have been in continuous operation as a farm since the time of Conway's settlement in the mid eighteenth century.
The Rice House and Farm is noteworthy as a farm complex that has been in use from the early settlement of Conway, but the property appears to lack the architectural distinction and historical associations necessary to

be eligible for individual listing in the National Register.

A review of the MHC's archaeological maps in MACRIS revealed no recorded pre-Contact or historic archaeological sites within the project's direct APE. There are few pre-Contact archaeological sites recorded within Conway, with most sites in the greater vicinity recorded along the Connecticut River and Deerfield River over four miles to the north and east of the APE. The nearest recorded pre-Contact sites include: 19-FR-447 (Berger 2303-01 Site), a flake scatter site located approximately 2.12 miles to the northeast of the bridge; 19-FR-496 (Pfersick Road Site), a flake scatter site located approximately 1.9 miles to the north; and 19-FR-492 (Bear River Findspot #1), a findspot located approximately 2.0 miles to the northwest. Although undisturbed areas near Poland Brook and South River may be sensitive for pre-Contact archaeological resources, it is the opinion of the MassDOT Archaeologist that low sensitivity can be ascribed to the project's direct area of potential effect based on the impacts of past roadway, bridge, and utility construction and unfavorable environmental conditions (slope).

The 1940 bridge plans indicate the current bridge was constructed westerly of the earlier timber stringer bridge. The proposed leaching basins and vegetated drainage swale will be located within and adjacent to the earlier bridge and roadway approach alignment. A construction laydown area for storage of materials and vehicles may also be located to the northeast of the bridge crossing in the vicinity of the proposed drainage structures, as necessary. Overhead utilities and a buried hydrant water line are also located in the vicinity of the proposed leaching basins. The current roadway approaches to the bridge were constructed on 5 to 7 feet of fill to elevate the crossing over the steep slopes along Poland Brook. The proposed bridge abutments will be constructed within the roadway fill behind the existing abutments.

A site visit by the MassDOT Archaeologist on August 24, 2022 confirmed that the staging area and infiltration basin will be located in an area with low sensitivity. This area may have been plowed in the past but now currently contains mowed vegetation. Soil coring revealed compact silty fill associated with the leveling and use of the area as a staging area for the buried water line work and for previous rip-rap work along the South River and Poland Brook.

What is the total acreage of the project area?

Woodland		acres	Productive Resources:		
Wetland		acres	Agriculture	<1	acres
Floodplain	<1	acres	Forestry		acres
Open Space		acres	Mining/Extraction		acres
Developed		acres	Total Project Acreage	<2	acres

What is the acreage of the proposed new construction? <1 acres

What is the present land use of the project area?

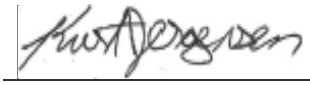
The Project area is situated amid hayfield to the north and west, and woodland to the south. A modern residence sits at the top of a steep wooded hill to the southeast of Bridge C-20-004.

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

950 CMR: OFFICE OF THE SECRETARY OF THE COMMONWEALTH

APPENDIX A (continued)

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of person submitting this form:  **Date:** 8/11/2023

Name: Kurt Jergensen

Address: 10 Park Plaza

City/Town/Zip: Boston, MA 02116

Telephone: 207-590-4999

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St. 1988, c. 254.

Figure 1. Project Location

Jergensen, Kurt E. (DOT)

From: Microsoft Outlook
To: Bettina Washington; tcrm2@wampanoagtribe-nsn.gov
Sent: Friday, August 11, 2023 4:46 PM
Subject: Relayed: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Delivery to these recipients or groups is complete, but no delivery notification was sent by the destination server:

Bettina Washington (thpo@wampanoagtribe-nsn.gov)

tcrm2@wampanoagtribe-nsn.gov (tcrm2@wampanoagtribe-nsn.gov)

Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Conway, Bridge
C-20-004 replac...

Jergensen, Kurt E. (DOT)

From: Jergensen, Kurt E. (DOT)
Sent: Friday, August 11, 2023 4:46 PM
To: Bettina Washington
Cc: tcrm2@wampanoagtribe-nsn.gov; Harwood, Jameson (DOT)
Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)
Attachments: Locus map.pdf; 75% Highway Submission Plans.pdf; 1st Structural Plans Bridge C-20-004.pdf; Conway PNF.pdf

Tracking:

Recipient	Delivery
Bettina Washington tcrm2@wampanoagtribe-nsn.gov	
Harwood, Jameson (DOT)	Delivered: 8/11/2023 4:46 PM

Dear Ms. Washington,

MassDOT is submitting the enclosed information regarding the above-noted project to the Wampanoag Tribe of Gay Head (Aquinnah) to meet the Section 106 consultation requirements of the US Army Corps of Engineers. Please submit any written comments or concerns regarding historic or archaeological properties that may be affected by this project to Carrie Lavallee, P.E., Chief Engineer, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA 02116-3973, Attn: Jameson Harwood.

You also may send comments, questions, or requests for more information by email to Jameson.Harwood@state.ma.us.

Thank you very much.

Kurt Jergensen
Historic Bridge Specialist
Environmental Services
MassDOT, Highway Division
Ten Park Plaza, Boston, MA 02116
Cell: 207-590-4999

Jergensen, Kurt E. (DOT)

From: Jergensen, Kurt E. (DOT)
Sent: Friday, August 11, 2023 4:47 PM
To: David Weeden
Cc: 106Review@mwtribe-nsn.gov; Harwood, Jameson (DOT)
Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)
Attachments: Locus map.pdf; 75% Highway Submission Plans.pdf; 1st Structural Plans Bridge C-20-004.pdf; Conway PNF.pdf

Dear Mr. Weeden,

MassDOT is submitting the enclosed information regarding the above-noted project to the Mashpee Wampanoag Tribe to meet the Section 106 consultation requirements of the US Army Corps of Engineers. Please submit any written comments or concerns regarding historic or archaeological properties that may be affected by this project to Carrie Lavallee, P.E., Chief Engineer, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA 02116-3973, Attn: Jameson Harwood.

You also may send comments, questions, or requests for more information by email to Jameson.Harwood@state.ma.us.

Thank you very much.

Kurt Jergensen
Historic Bridge Specialist
Environmental Services
MassDOT, Highway Division
Ten Park Plaza, Boston, MA 02116
Cell: 207-590-4999

Jergensen, Kurt E. (DOT)

From: Microsoft Outlook
To: thpo
Sent: Friday, August 11, 2023 4:50 PM
Subject: Relayed: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Delivery to these recipients or groups is complete, but no delivery notification was sent by the destination server:

thpo (thpo@mohican-nsn.gov)

Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Conway, Bridge C-20-004 replac...

Jergensen, Kurt E. (DOT)

From: Jergensen, Kurt E. (DOT)
Sent: Friday, August 11, 2023 4:50 PM
To: thpo
Cc: Harwood, Jameson (DOT)
Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)
Attachments: Locus map.pdf; 75% Highway Submission Plans.pdf; 1st Structural Plans Bridge C-20-004.pdf; Conway PNF.pdf

Tracking:

Recipient	Delivery
thpo	
Harwood, Jameson (DOT)	Delivered: 8/11/2023 4:50 PM

Dear Dr. Bendremer,

MassDOT is submitting the enclosed information regarding the above-noted project to the Stockbridge-Munsee Band of Mohicans to meet the Section 106 consultation requirements of the US Army Corps of Engineers. Please submit any written comments or concerns regarding historic or archaeological properties that may be affected by this project to Carrie Lavallee, P.E., Chief Engineer, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA 02116-3973, Attn: Jameson Harwood.

You also may send comments, questions, or requests for more information by email to Jameson.Harwood@state.ma.us.

Thank you very much.

Kurt Jergensen
Historic Bridge Specialist
Environmental Services
MassDOT, Highway Division
Ten Park Plaza, Boston, MA 02116
Cell: 207-590-4999

Jergensen, Kurt E. (DOT)

From: Microsoft Outlook
To: Robinson, David S (EEA)
Sent: Friday, August 11, 2023 4:51 PM
Subject: Delivered: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Your message has been delivered to the following recipients:

Robinson, David S (EEA) (David.S.Robinson@mass.gov)

Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Conway, Bridge
C-20-004 replac...

Jergensen, Kurt E. (DOT)

From: Jergensen, Kurt E. (DOT)
Sent: Friday, August 11, 2023 4:51 PM
To: Robinson, David S (EEA)
Cc: Harwood, Jameson (DOT)
Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)
Attachments: Locus map.pdf; 75% Highway Submission Plans.pdf; 1st Structural Plans Bridge C-20-004.pdf; Conway PNF.pdf

Tracking:

Recipient	Delivery
Robinson, David S (EEA)	Delivered: 8/11/2023 4:51 PM
Harwood, Jameson (DOT)	Delivered: 8/11/2023 4:51 PM

Dear Mr. Robinson,

MassDOT is submitting the enclosed information regarding the above-noted project to the Board of Underwater Archaeological Resources to meet the Section 106 consultation requirements of the US Army Corps of Engineers. Please submit any written comments or concerns regarding historic or archaeological properties that may be affected by this project to Carrie Lavallee, P.E., Chief Engineer, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA 02116-3973, Attn: Jameson Harwood.

You also may send comments, questions, or requests for more information by email to Jameson.Harwood@state.ma.us.

Thank you very much.

Kurt Jergensen
Historic Bridge Specialist
Environmental Services
MassDOT, Highway Division
Ten Park Plaza, Boston, MA 02116
Cell: 207-590-4999

CULTURAL RESOURCES PROJECT RECORD

City/Town: Conway

Project # 609082

Date Cleared 8/7/2023

Project Name: Bridge Replacement, C-20-004, North Poland Road over Poland Brook

Date Filed 8/7/2023

Finding Under Review ☐

FHWA to MHC

Project Type: Bridge Replacement

Review: Section 106 (PA)

Finding: Stip VB - No historic properties affected

Early Coord. Letter Sent: ☑

Comment Received: ☐ MHC ☑ LHC

Reviewer: KJ

Consultant

Comments: PNF to THPOs and BUAR, 8/7/23.

Determination based on: ☑ Scope of Work ☑ Plans ☑ Inventory ☑ Site Visit ☐ Archaeological Survey

Attach appropriate documentation for checked items

Projects Requiring No Massachusetts SHPO Review

Programmatic Agreement, Appendix 1 (check all that apply) :

☐ 1) Interstate bridge or roadway projects
☐ 2) Resurfacing, repair existing roadways
* ☐ 3) Reconstruction on existing roadway
* ☐ 4) Roadway geometrics, intersections
* ☐ 5) Curbs and sidewalks
☐ 6) Pavement markings, rumble strips, etc
☐ 7) Curbs, sidewalks (MAAB, ADA)
* ☐ 8) Removal of trees
☐ 9) Landscaping
☐ 10) Utilities
☐ 11) Railroad crossing
☐ 12) Stream stabilization and restoration
☐ 13) Wetland mitigation area
* ☐ 14) Bridge (NR "Not Eligible" or "Conditionally Not Eligible")
* ☐ 15) Bridge (concrete slab post 1900, steel stringer)
☐ 16) Bridge (less than 20' span)
* ☐ 17) Highway safety improvement
☐ 18) Drainage system element
* ☐ 19) Traffic signal, safety improvement
* ☐ 20) Intelligent Transportation System project
☐ 21) Rest area, maintenance facility
* ☐ 22) Bicycle, pedestrian lane, path or facility
☐ 23) Lighting system
☐ 24) Sign
☐ 25) Hazardous waste
☐ 26) Highway fencing
☐ 27) Emergency repair
☐ 28) Erosion control
☐ 29) Noise barrier

* National Register eligibility evaluation required

-OR-

No Historic Properties Affected
Programmatic Agreement Stipulation V.B. (check one):

☑ No NR listed or -eligible properties within Area of Potential Effect
☐ No effect on National Register listed or -eligible properties

Reviewer's Initials: KJ JMH

CULTURAL RESOURCES PROJECT RECORD

Summary of MassDOT Highway Division Finding
(Appendix 1 and Section V.B. Projects only)

The Massachusetts Department of Transportation (MassDOT) proposes to replace Bridge C-20-004, which carries North Poland Road over Poland Brook in Conway. Bridge C-20-004, constructed in 1940, consists of a three-span steel stringer superstructure supported on reinforced concrete piers and stub abutments. The bridge has galvanized steel W-beam railings. The bridge was closed in November 2022 due to severe section loss and crushing evident at several beam ends during inspection of the bridge. Subsequently, the superstructure was removed and a temporary Acrow panel structure was installed on the existing abutments in order to restore service.

The proposed work will include full replacement of the bridge on existing alignment with a structure 10' wider than existing. The proposed bridge and approach roadway cross-section will include two 10'-wide travel lanes with 2'-wide shoulders and no sidewalks. The proposed new bridge will consist of a single-span prestressed, precast concrete New England Deck Bulb Tee beam superstructure supported by precast reinforced concrete abutments and wingwalls on precast concrete pile footings. The bridge will have painted steel S3-TL4 railings with pickets. The proposed abutments will be built behind the existing abutments, increasing the length of the structure by about 10'. The streambanks adjacent to the abutments will be graded and riprap will be placed to augment existing slope armoring. The road will be closed for the duration of construction and traffic will be detoured, to the south along Main Poland Road and to the east along State Route 116 (Ashfield Road).

Roadway reconstruction along the bridge approaches will extend approximately 200' to the south and 230' to the north of the bridge, encompassing a total project length of 505 feet. Work will include full-depth pavement reconstruction along the existing bridge approaches; minor roadway widening along the bridge approaches, to provide a consistent 24' cross-section; installation of granite curb along the bridge and approaches; grading roadside slopes along the bridge approaches; in-kind replacement of guardrail along the bridge approaches, with installation of new sections along the approaches, as needed; installation of temporary erosion and sedimentation controls, and related work. One new catch basin will be installed to the north of the bridge to capture runoff from coming down grade from the north. The catch basin will outlet to three leaching basins with vegetated swale overflow in the vicinity of Station 14+70-90, Left.

Overhead utility lines within the project area currently cross North Poland Road along an alignment directly above Bridge C-20-004. The utility lines will temporarily be relocated toward the west side of the roadway during construction, with two temporary utility poles set one to either side of the driveway leading to the residence at 42 North Poland Road. Once construction is complete, the utility lines will be permanently moved to an alignment immediately east of the bridge, within 10'-15'of the structure. This will require two new utility poles, set within the existing County Road Layout.

Review of the National Register of Historic Places revealed that the project area of potential effect (APE) is adjacent to the South River Area (CNW.B). Running from Burkeville village westerly to the Ashfield town line, the South River Area is described as containing some of the oldest houses in the town in an agricultural setting. Most of the inventoried properties in this Area are located along State Route 116, following the South River, and are separated by large expanses of forested and open space as well as non-historic properties constructed during the 20th century. In the opinion of CRU staff, the area lacks the necessary coherence and integrity to form a historic district that would be eligible for listing in the National Register.

While most of the inventoried properties within the South River Area are located along Route 116, one inventoried property is adjacent to the project area: the Joel G. Rice House at 42 North Poland Road (CNW.52). This circa 1880 vernacular five-bay, two-story, center hall clapboarded farmhouse is located to the northwest of Bridge C-20-004. The main house is set well back from North Poland Road and its outbuildings include a sugar house, cottage, milk house and two barns. The property is reported to have been in continuous operation as a farm since the time of Conway's settlement in the mid eighteenth century. The Rice House and Farm is noteworthy as a farm complex that has been in use from the early settlement of Conway, but the property appears to lack the architectural distinction and historical associations necessary to be eligible for individual listing in the National Register.

Bridge C-20-004 was reviewed by Kurt Jergensen, Historic Bridge Specialist, and determined to be ineligible for listing in the National Register. Before its removal, the bridge was a typical mid-20th century steel stringer design with no architectural character and standard engineering details.

Reviewer's Initials: _____

CULTURAL RESOURCES PROJECT RECORD

A review of the MHC's archaeological maps in MACRIS revealed no recorded pre-Contact or historic archaeological sites within the project's direct APE. There are few pre-Contact archaeological sites recorded within Conway, with most sites in the greater vicinity recorded along the Connecticut River and Deerfield River over four miles to the north and east of the APE. The nearest recorded pre-Contact sites include: 19-FR-447 (Berger 2303-01 Site), a flake scatter site located approximately 2.12 miles to the northeast of the bridge; 19-FR-496 (Pfersick Road Site), a flake scatter site located approximately 1.9 miles to the north; and 19-FR-492 (Bear River Findspot #1), a findspot located approximately 2.0 miles to the northwest. Although undisturbed areas near Poland Brook and South River may be sensitive for pre-Contact archaeological resources, it is the opinion of the MassDOT Archaeologist that low sensitivity can be ascribed to the project's direct area of potential effect based on the impacts of past roadway, bridge, and utility construction and unfavorable environmental conditions (slope).

The 1940 bridge plans indicate the current bridge was constructed westerly of the earlier timber stringer bridge. The proposed leaching basins and vegetated drainage swale will be located within and adjacent to the earlier bridge and roadway approach alignment. A construction laydown area for storage of materials and vehicles may also be located to the northeast of the bridge crossing in the vicinity of the proposed drainage structures, as necessary. Overhead utilities and a buried hydrant water line are also located in the vicinity of the proposed leaching basins. The current roadway approaches to the bridge were constructed on 5 to 7 feet of fill to elevate the crossing over the steep slopes along Poland Brook. The proposed bridge abutments will be constructed within the roadway fill behind the existing abutments.

A site visit by the MassDOT Archaeologist on August 24, 2022 confirmed that the staging area and leaching basins will be located in an area with low sensitivity. This area may have been plowed in the past but now currently contains mowed vegetation. Soil coring revealed compact silty fill associated with the leveling and use of the area as a staging area for the buried water line work and for previous rip-rap work along the South River and Poland Brook.

Based on the nature and location of the proposed work, with no National Registe-listed or -eligible resources present within or adjacent to the project area, the project meets the exemption requirements under Stipulation V.B of the Section 106 Programmatic Agreement and no further review of the proposed project is necessary.

Reviewer's Initials: _____

APPENDIX F

- **Stormwater Management Report**

Template Version: June 2022

To:	MassDOT	Date:	January 4, 2024
		Project #:	609082
From:	BETA Group, Inc.	Re:	North Poland Road Conway, MA

This Stormwater Management Memorandum has been prepared to show compliance with the Massachusetts Stormwater Management Standards in accordance with the Massachusetts Water Quality Certification Regulations (314 CMR 9.00) to support the Project's Section 401 Water Quality Certificate Application.

Project Description

The Applicant, MassDOT, is proposing Project 609082 to construct a bridge replacement (the Project) located in Conway, MA. As proposed, the Project consists of reconstruction of the existing bridge across Poland Brook (Bridge No. C-20-004) located along North Poland Road. The proposed bridge will have a curb-to-curb roadway width of 24 feet, allowing for two 10-foot vehicle travel lanes and 2-foot shoulders.

The bridge approaches will be tapered to meet the proposed bridge cross-section. Pavement will be rehabilitated on the bridge approaches, and new pavement will be provided as part of the complete bridge reconstruction. New pavement markings will be provided, and signage will be reviewed to determine that adequate and appropriate signage is provided.

Existing and Proposed Drainage Conditions

The project is currently the location of an existing bridge that carries North Poland Road over the Poland Brook, approximately 1000 feet south of the intersection of North Poland Road and Ashfield Road. North Poland Road generally follows a north-south alignment on approach to and through the bridge from Ashfield Road, but then bends to the left to feature a more east-west alignment to the west of the bridge. The Bridge provides a roadway width of 14'-0", with two 1'-7" reinforced concrete safety curbs with guardrails, resulting in an out-to-out bridge width of 17'-2". The existing bridge is structurally deficient.

North Poland Road to the north of the bridge is approximately 22-feet wide, and is approximately 19-feet wide south of the bridge. Both approaches accommodate travel in each direction with no pavement markings.

Areas abutting North Poland Road to the east of the bridge are predominantly woodlands. Areas abutting North Poland Road to the west of the bridge are predominantly grassed lawn areas and farmland. Poland Brook is a perennial stream and considered a "Water of the United States" with an Ordinary High Water mark of elevation 792'±.

Topography at the Site is generally graded to the northwest, towards Poland Brook. Stormwater runoff is conveyed via country drainage and no existing drainage infrastructure is present at the Site.

The Project is partially located within a FEMA-mapped 100-year flood zone (Zone A5) as determined by hydraulic study. The Project is located in proximity to Poland Brook, a cold-water fishery, which is a critical area, and is also located within an NHESP mapped priority habitat of rare species and habitat of rare wildlife.

The Project will include construction of a bridge replacement including modifications to roadway geometry approximately 225'± to the south and 275'± to the north of the bridge. A net increase in impervious area of

approximately 2,275± sq. ft. is proposed. Limited tree clearing will also be conducted for proposed construction activities. Proposed grading is limited to daylighting along roadway side slopes.

Post-development stormwater management includes the installation of a deep-sump catch basin to the northeast of the proposed bridge that will discharge to a series of interconnected leaching catch basins. Overflow from the leaching basins during major storm events (>1") will be through the leaching basin grates and over a level spreader to promote sheet flow over the adjacent vegetated area.

This stormwater management system includes an impervious treatment area of approximately 2,800 ± sq. ft., encompassing the eastern side of the proposed roadway from Station 12+25 to Station 14+55. The Project's remaining impervious areas will continue to be conveyed via country drainage along similar flow patterns to existing conditions. All stormwater runoff from the project site will continue to be directed to Poland Brook.

Massachusetts Department of Environmental Protection (MassDEP) – Stormwater Management Standards

As demonstrated below, the proposed Project complies with the MassDEP Stormwater Management Standards (the Standards). Under the Stormwater Management Standards, the Project is considered a redevelopment project because it involves maintenance and improvement of an existing roadway. Proposed modifications to the bridge and associated roadway include modifying roadway geometry, construction of a bridge replacement, widening of less than a single lane, adding shoulders, improving existing drainage systems, and repaving. The Project has been designed to meet the Stormwater Management Standards to the maximum extent practicable and to improve upon existing conditions.

Standard 1: No New Untreated Discharges

No new stormwater conveyance (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

The Project has been designed to comply with Standard 1. New stormwater outfalls include treated overflow from the leaching catch basins through their grates. This new outfall is designed with a 1' wide vegetated level spreader to promote sheet flow and prevent erosion to North Poland Brook. This outfall is located at least 50' from the nearest bordering vegetated wetlands. No existing outfalls are located within the project boundaries.

See Standard 4 for the water quality treatment provided by the Project.

Standard 2: Peak Rate Attenuation

Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

The Project has been designed to comply with Standard 2 to the maximum extent practicable. Opportunities for peak rate attenuation are limited by the presence of resource areas, steep roadway embankments, and narrow right-of-way. Limited peak rate attenuation will be provided via the leaching basins, which are sized to fully capture and retain the first inch of runoff. Refer to Table 2 for a comparison of pre- and post-development peak discharge rates.

Table 1 depicts the proposed net increase in impervious area:

Table 1: Existing and Proposed Impervious Cover

Existing Impervious Area (sq. ft)	Proposed Impervious Area (sq. ft)	Change (sq. ft)
15,855	18,130	2,275

Table 2 provides a comparison of pre- and post-development peak discharge rates from the study area:

Table 2: Existing and proposed Peak Discharge Rates

Peak Rate of Runoff		Flow (cubic feet per second)							
		1-Year Storm		2 Year Storm		10 Year Storm		100 Year Storm	
Outlet To:		Exist	Prop	Exist	Prop	Exist	Prop	Exist	Prop
POA1	Poland Brook	*0.49*	0.61	*0.83*	0.95	*1.86*	2.00	*4.59*	4.73

Note: Peak discharge rates calculated via HydroCAD.

Standard 3: Stormwater Recharge

Loss of annual recharge to groundwater shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater management practices and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil types. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

The Project has been designed to fully comply with Standard 3 for the new impervious area and a portion of the existing impervious area. The project proposes a net increase in impervious area of 2,275 ± sq. ft. within areas mapped as Hydrologic Soil Group (HSG) A, B, C. The required recharge volume is approximately 70 cu. ft and the proposed leaching catch basins, which are in an area mapped as HSG B, will provide a static storage volume of 312 cu. ft. Refer to Attachment C for calculations.

Standard 4: Water Quality

Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

a) *Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;*
b) *Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and*
c) *Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

The Project has been designed to fully comply with Standard 4 for the new impervious area and a portion of the existing impervious area. A portion of the Project's impervious area will be directed to a treatment train consisting of a deep sump catch basin and a series of interconnected leaching catch basins. The remainder of the site will flow overland over existing vegetated areas similar to existing conditions.

A TSS removal rate of 80% is provided for areas directed to the leaching catch basins and pretreatment will be provided via the deep sump catch basin. The treatment area includes approximately 2,800 sq. ft. of impervious area, which exceeds the new impervious area of 2,275 sq. ft.

The project discharges stormwater to a critical area (refer to Standard 6) and the required 1.0-inch water quality volume for the total post-development impervious area of 18,130 sq. ft. is 1,5,11 cu. ft., which cannot be practicably achieved. However, the water quality volume associated with the 2,275 sq. ft. of new impervious and a portion of the existing impervious area can be provided within the proposed leaching catch basins. Refer to Attachment C for calculations.

The project is constrained by presence of resource areas, steep roadway embankments, and narrow right-of-way. Despite constraints, the project will provide treatment where none currently exists and an overall improvement to water quality within the project limits will be provided.

A Long-Term Pollution Prevention Plan (LTPPP) has been developed for the project in compliance with Standard 4. The Standard 9 section of this document includes this LTPPP.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

For Land Uses with Higher Potential Pollutant Loads (LUHPPLs), source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all LUHPPLs cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from LUHPPLs shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

Standard 5 does not apply to the Project. There are no Land Uses with Higher Potential Pollutant Loads within the project area.

Standard 6: Critical Areas

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and

Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "stormwater discharge" as defined in 314 CMR 3.04(2)(a)1 or (b), to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

The project includes existing overland stormwater discharges to Poland Brook which is designated as a Cold-Water Fishery and is thus a critical area. Deep-sump catch basins and leaching catch basins are considered recommended BMPs for Cold-Water Fisheries.

The project is required to treat the 1-inch water quality volume and provide at least 44% pretreatment prior to discharge to an infiltration BMP. Refer to Standard 4 for discussion of water quality volume. 44% pretreatment cannot be practicably achieved for the leaching basins due to limited right-of-way, presence of steep slopes, and presence of wetland resource areas; however, the proposed BMPs will improve the existing conditions.

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the Maximum Extent Practicable

A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

The Project is considered a redevelopment and has been designed to comply with the Stormwater Management Standards to the maximum extent practicable. Standards 1, 8, 9, and 10 have been fully met. Standard 5 is not applicable. Standards 2 and 6 have been met only to the maximum extent practicable due to project constraints which limit opportunities for peak rate attenuation and pretreatment opportunities. Standards 3 and 4 are met for the net new impervious area and a portion of the existing impervious area.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls

A plan to control construction-related impacts, including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

The implementation of erosion and sediment (E&S) controls during construction is considered a standard practice for all MassDOT projects. E&S controls will be installed before any land disturbance begins for the Project and will remain in place for the duration of the Project. The E&S controls for the Project are shown on the project plans and include sediment control barrier, temporary cofferdams for water control, and designated staging/stockpile areas.

The Project does not proposes disturbance of one or more acres of land; therefore, the project contractor will not require coverage under the NPDES Construction General Permit (CGP) nor be required to develop a Stormwater Pollution Prevention Plan (SWPPP).

Standard 9: Operation and Maintenance Plan

A Long-Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

The roadway and bridge included in this project are not owned by MassDOT. The O&M Plan will be implemented by the municipality. The Town of Conway will be responsible for the operation and maintenance of all stormwater management systems within the project area. Questions or concerns regarding activities associated with this O&M Plan should be addressed to Conway's Highway Department located at 26 Fournier Road, Conway. MA 01341, phone (413) 369-4696.

Long-term pollution prevention for the Project includes litter pick-up, inspection and maintenance of stormwater assets, maintenance of landscaped areas, snow and ice management, street sweeping, prohibition of illicit discharges, and spill prevention and response.

Inspection and maintenance features will be as outlined and documented below:

Deep Sump Catch basins:

- Utilize performance based approach to inspection and maintenance. At each inspection, collect data on sediment, trash, and debris accumulation, signs of contamination, frame and grate condition, and overall structure condition.
- Clean catch basins at an interval that maintains the functionality of the catch basin, at a minimum before the sump is 50% full of sediment.
- Verify that the inlet openings are not clogged by debris or trash. Debris and trash shall be removed from the grate.
- Dispose of all material removed in accordance with applicable local, state, and federal guidelines and regulations.
- Condition of frames, grates, concrete, and bricks should be noted during inspections. Repair or replace damaged materials.

Leaching Basins:

- Inspect and remove debris annually or more frequently as indicated by structure performance.
- Remove sediment when basin is 50% filled.
- Rehabilitate the basin if it fails due to clogging.
- Condition of frames, grates, concrete, and bricks should be noted during inspections. Repair or replace damaged materials.

Standard 10: Prohibition of Illicit Discharges

All illicit discharges to the stormwater management system are prohibited.

Illicit Discharge Statement

The project's stormwater management system, as shown on the plans submitted with this report, have been designed in full compliance with Standard 10. The project area does not have any known illicit connections and there is no existing drainage or sewer infrastructure within the project limits. Any illicit connections found in the project limit of work during construction will be removed and/or resolved through the Town's Illicit Discharge Detention and Elimination (IDDE) Program.

Attachments: A – Stormwater Checklist
B – NRCS Soil Map
C – Supplemental Calculations

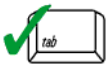
101 Walnut Street
PO Box 9151
Watertown, MA 02472-4026
P 617.924.1770

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

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Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

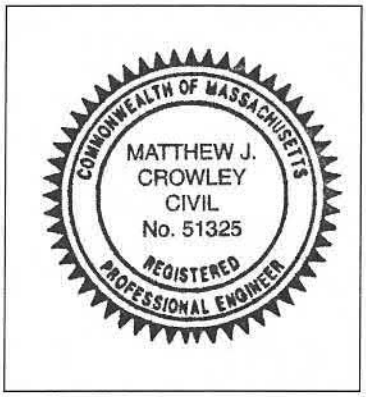
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



12/22/23

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

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Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☐ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☒ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☒ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): _____

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☐ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☐ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☒ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☒ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☒ Critical areas and BMPs are identified in the Stormwater Report.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☒ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☒ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☒ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☒ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☐ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

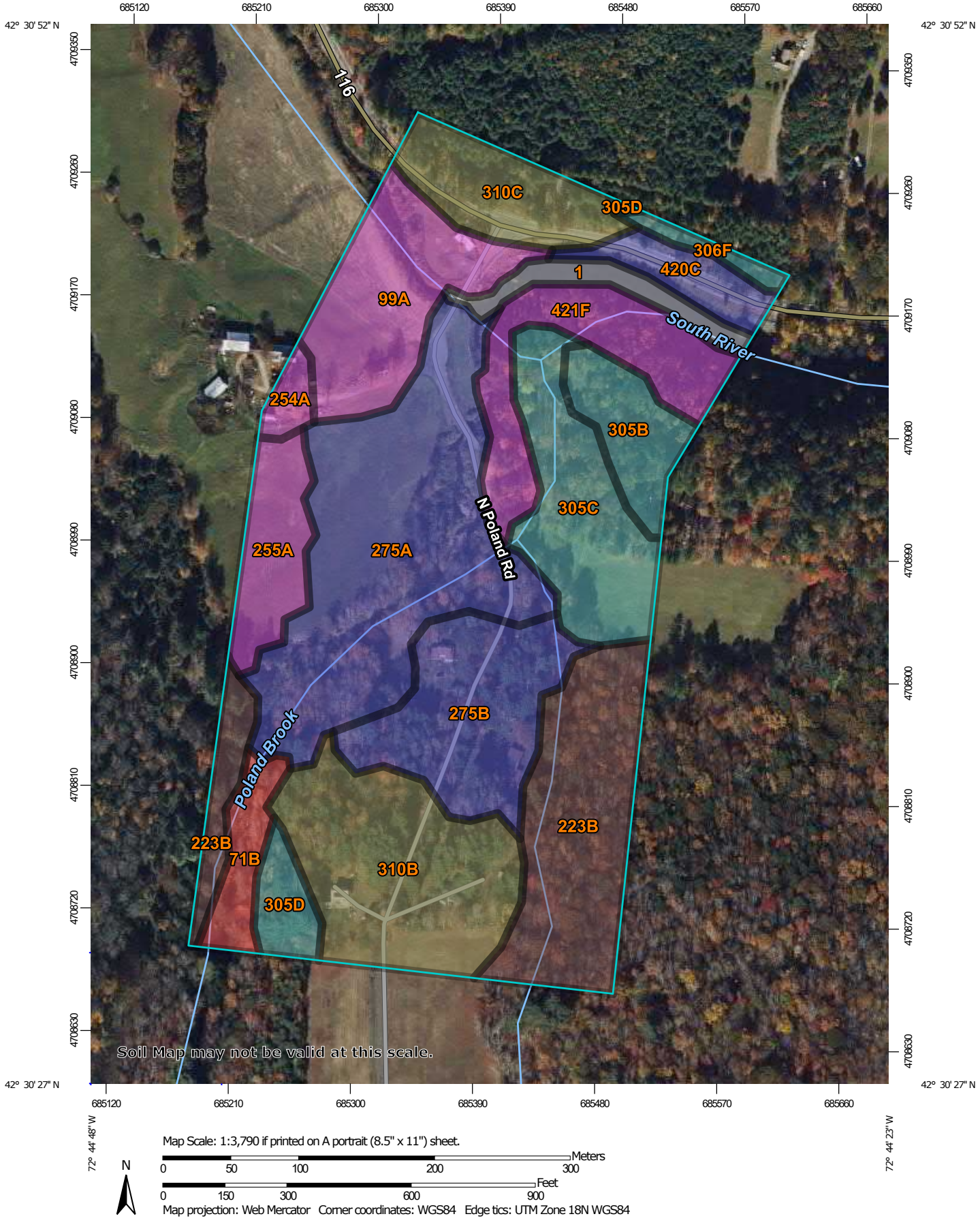
Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Hydrologic Soil Group—Franklin County, Massachusetts



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Franklin County, Massachusetts
Survey Area Data: Version 17, Sep 9, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 15, 2020—Oct 31, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		0.9	2.1%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	1.1	2.5%
99A	Occum fine sandy loam, 0 to 3 percent slopes, occasionally flooded	A	3.7	8.2%
223B	Scio silt loam, 3 to 8 percent slopes	B/D	5.8	12.8%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	A	0.5	1.0%
255A	Windsor loamy sand, 0 to 3 percent slopes	A	1.8	4.0%
275A	Agawam fine sandy loam, 0 to 3 percent slopes	B	8.8	19.6%
275B	Agawam fine sandy loam, 3 to 8 percent slopes	B	4.0	8.9%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	C	1.7	3.7%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	C	3.6	8.1%
305D	Paxton fine sandy loam, 15 to 25 percent slopes	C	0.9	1.9%
306F	Paxton fine sandy loam, 15 to 35 percent slopes, very stony	C	0.4	0.9%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	5.3	11.8%
310C	Woodbridge fine sandy loam, 8 to 15 percent slopes	C/D	2.3	5.2%
420C	Canton fine sandy loam, 8 to 15 percent slopes	B	1.1	2.5%
421F	Canton fine sandy loam, 25 to 45 percent slopes, very stony	A	3.0	6.7%
Totals for Area of Interest			**45.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

IMPROVING COMMUNITIES TOGETHER

JOB	North Poland Road - Conway	NO.	4657-34
CALC	SLB	DATE	12/22/23
DESC	Standards 3 & 4 Worksheet	SHEET	1 OF 2

Recharge Volume (Rv) and Water Quality Volume (WQv) Provided Volumes Worksheet

Project Wide Totals

Required Recharge Volume		Impervious Area (sq. ft.)	Runoff Depth (in.)	Recharge Volume (cu. ft.)
Pre-Development		**15855**		
	HSG A	5445		
	HSG B	10315		
	HSG C	95		
Post-Development		**18130**		
	HSG A	5640		
	HSG B	12395		
	HSG C	95		
Net Change		**2275**		70
	HSG A	195	0.60	10
	HSG B	2080	0.35	61
	HSG C	0	0.25	0

Recharge Volume (R_V) Required = Impervious Area x Runoff Depth (from HSG)

*For sites comprised of primarily HSG C and D soils, proponents are reqired to infiltrate to the maximum extent practicable. All portions of the project located within jurisdictional areas are also located in areas of HSG C and D mapped soils.

Total Recharge Volume Required: **70** **CF**

Total Recharge Volume Provided: (See Page 2) **312** **CF** OK

Required Water Quality Volume	Impervious Area (sq. ft.)	Runoff Depth Depth (in.)	Water Quality Volume (cu. ft.)
Total Impervious Area	18130	1.0	1511
Net New Impervious Area	2275	1.0	190
Treatment Area	2800	1.0	233

Water Quality Volume (WQ_V) Required = Impervious Area x Runoff Depth (1.0" Depth)

Total Water Quality Volume Provided: (See Page 2) **312** **CF**

Basin Summary and TSS Removal
Provided Volumes Worksheet

Total Storage

Storage Within Basins	Grate Elevation (ft.)	Volume Below Grate (cu. ft.)
Leaching Basins - 6' DIA Structure	798.10	212
Leaching Basins - Crushed Stone Bedding	798.10	34
Leaching Basins - Surrounding Stone	798.10	66

Total Storage Volume Provided: 312 CF

TSS Removal

Best Management Practice (BMP)	BMP Removal Rate (%)	Remaining TSS (%)	Cumulative Removal Rate (%)
Deep-Sump Catch Basin (Pretreatment)	0%	100%	0%
Leaching Catch Basin	80%	20%	80%

Leaching Basin
Drawdown Calculations

BMP Leaching Basin (x3)

Rv (cu. ft.) =	312	Drawdown (hrs) =	14.9
K (in/hr) =	1.02		
Bottom Area (sq. ft.) =	247	Less than 72 hrs?	PASS

Soil Type: 275A Agawam Fine Sandy Loam - HSG B

APPENDIX G

- **USFWS Consultation / MESA Documentation**

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: June 01, 2023
Project code: 2023-0052649
Project Name: 609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK

Subject: Concurrence verification letter for the '609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK' project under the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (NLEB).

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated June 01, 2023 to verify that the **609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK** (Proposed Action) may rely on the concurrence provided in the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures, and may affect, but is not likely to adversely affect (NLAA) the endangered Indiana bat (*Myotis sodalis*) and/or the endangered northern long-eared bat (*Myotis septentrionalis*). Consultation with the Service pursuant to section 7(a)(2) of ESA (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*.) is required.

The Service has 14 calendar days to notify the lead Federal action agency or designated non-federal representative if we determine that the Proposed Action does not meet the criteria for a NLAA determination under the PBO. If we do not notify the lead Federal action agency or designated non-federal representative within that timeframe, you may proceed with the Proposed Action under the terms of the NLAA concurrence provided in the PBO. This verification period allows Service Field Offices to apply local knowledge to implementation of the PBO, as we may identify a small subset of actions having impacts that were unanticipated. In such instances,

Service Field Offices may request additional information that is necessary to verify inclusion of the proposed action under the PBO.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities: If your initial bridge/culvert or structure assessment documented signs of bat use or occupancy, or an assessment failed to detect Indiana bats and/or NLEBs, yet are later detected prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office within 2 working days of any potential take. In these instances, potential incidental take of Indiana bats and/or NLEBs is covered under the Incidental Take Statement in the 2018 FHWA, FRA, FTA PBO (provided that the take is reported to the Service).

If the Proposed Action is modified, or new information reveals that it may affect the Indiana bat and/or northern long-eared bat in a manner or to an extent not considered in the PBO, further review to conclude the requirements of ESA Section 7(a)(2) may be required.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities:
If your initial bridge/culvert or structure assessments failed to detect Indiana bats and/or NLEB use or occupancy, yet bats are later detected prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office within 2 working days of the incident. In these instances, potential incidental take of Indiana bats and/or NLEBs may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species, and/or any designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please contact this Service Office.

The following species may occur in your project area and **are not** covered by this determination:

- Monarch Butterfly *Danaus plexippus* Candidate

PROJECT DESCRIPTION

The following project name and description was collected in IPaC as part of the endangered species review process.

NAME

609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK

DESCRIPTION

609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK

This municipally owned one-lane bridge is a stringer/multi-beam or girder type structure built in 1940. It has a length of 70 feet and a curb-to-curb width of 14 feet. The bridge is structurally deficient. MassDOT’s Bridge Database indicates an ADT of 800 vpd with 6% trucks. The proposed project calls for complete replacement of this structure.

Monarch Butterfly: Candidate Species only, no conservation measures at this time.

DETERMINATION KEY RESULT

Based on your answers provided, this project(s) may affect, but is not likely to adversely affect the endangered Indiana bat and/or the endangered northern long-eared bat, therefore, consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required. However, also based on your answers provided, this project may rely on the concurrence provided in the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

QUALIFICATION INTERVIEW

1. Is the project within the range of the Indiana bat[1]?

   [1] See Indiana bat species profile

   Automatically answered
   No

2. Is the project within the range of the northern long-eared bat[1]?

   [1] See northern long-eared bat species profile

   Automatically answered
   Yes

3. Which Federal Agency is the lead for the action?

   A) Federal Highway Administration (FHWA)

4. Are *all* project activities limited to non-construction[1] activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

   [1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

   No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces[1]?

   [1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

   No

6. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum[1]?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

7. Is the project located **within** a karst area?

   Yes

8. Will the project include *any* type of activity that could impact a **known** hibernaculum[1], or impact a karst feature (e.g., sinkhole, losing stream, or spring) that could result in effects to a **known** hibernaculum?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

9. Is there *any* suitable[1] summer habitat for Indiana Bat or NLEB **within** the project action area[2]? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   [2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the User's Guide for the Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat.

   Yes

10. Will the project remove *any* suitable summer habitat[1] and/or remove/trim any existing trees **within** suitable summer habitat?

    [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

    Yes

11. Will the project clear more than 20 acres of suitable habitat per 5-mile section of road/rail?

    No

12. Have presence/probable absence (P/A) summer surveys[1][2] been conducted[3][4] **within** the suitable habitat located within your project action area?

    [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

    [2] Presence/probable absence summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate distance from hibernacula) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

    [3] For projects within the range of either the Indiana bat or NLEB in which suitable habitat is present, and no bat surveys have been conducted, the transportation agency will assume presence of the appropriate species. This assumption of presence should be based upon the presence of suitable habitat and the capability of bats to occupy it because of their mobility.

    [4] Negative presence/probable absence survey results obtained using the summer survey guidance are valid for a minimum of two years from the completion of the survey unless new information (e.g., other nearby surveys) suggest otherwise.

    Yes

    SUBMITTED DOCUMENTS

    - *609082_Conway_Report_compiled.pdf https://ipac.ecosphere.fws.gov/project/QCZMHQDBXZCJLIWJIWL7TW6ICY/projectDocuments/123265399*

13. Did the presence/probable absence (P/A) summer surveys detect Indiana bats and/or NLEB[1]?

    [1] P/A summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate home range) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

    No

14. Were the P/A summer surveys conducted **within** the fall swarming/spring emergence range of a documented Indiana bat hibernaculum[1]?

    [1] Contact the local Service Field Office for appropriate distance from hibernacula.

    No

15. Does the project include activities **within documented NLEB habitat**[1][2]?

    [1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

    [2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

    No

16. Will the removal or trimming of habitat or trees occur **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors?

    Yes

17. What time of year will the removal or trimming of habitat or trees **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors occur?

    C) During both the active and inactive seasons

18. Will *any* tree trimming or removal occur **within** 100 feet of existing road/rail surfaces?

    Yes

19. Will *any* tree trimming or removal occur **between** 100-300 feet of existing road/rail surfaces?

    No

20. Are *all* trees that are being removed clearly demarcated?

    Yes

21. Will the removal of habitat or the removal/trimming of trees involve the use of **temporary** lighting?

    Yes

22. Will the removal of habitat or the removal/trimming of trees include installing new or replacing existing **permanent** lighting?

    No

23. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?

    No

24. Does the project include slash pile burning?

    No

25. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?

    Yes

26. Is there *any* suitable habitat[1] for Indiana bat or NLEB **within** 1,000 feet of the bridge? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

    [1] See the Service's current summer survey guidance for our current definitions of suitable habitat.

    Yes

27. Has a bridge assessment[1] been conducted **within** the last 24 months[2] to determine if the bridge is being used by bats?

    [1] See User Guide Appendix D for bridge/structure assessment guidance

    [2] Assessments must be completed no more than 2 years prior to conducting any work below the deck surface on all bridges that meet the physical characteristics described in the Programmatic Consultation, regardless of whether assessments have been conducted in the past. Due to the transitory nature of bat use, a negative result in one year does not guarantee that bats will not use that bridge/structure in subsequent years.

    Yes

    SUBMITTED DOCUMENTS

    - *609082_Conway_Report_compiled.pdf https://ipac.ecosphere.fws.gov/project/QCZMHQDBXZCJLIWJIWL7TW6ICY/projectDocuments/123265399*

28. Did the bridge assessment detect *any* signs of Indiana bats and/or NLEBs roosting in/under the bridge (bats, guano, etc.)[1]?

    [1] If bridge assessment detects signs of *any* species of bats, coordination with the local FWS office is needed to identify potential threatened or endangered bat species. Additional studies may be undertaken to try to identify which bat species may be utilizing the bridge prior to allowing *any* work to proceed.

    Note: There is a small chance bridge assessments for bat occupancy do not detect bats. Should a small number of bats be observed roosting on a bridge just prior to or during construction, such that take is likely to occur or does occur in the form of harassment, injury or death, the PBO requires the action agency to report the take. Report all unanticipated take within 2 working days of the incident to the USFWS. Construction activities may continue without delay provided the take is reported to the USFWS and is limited to 5 bats per project.

    No

29. Will the bridge removal, replacement, and/or maintenance activities include installing new or replacing existing **permanent** lighting?

    No

30. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)

    No

31. Will the project involve the use of *any* **temporary** lighting in addition to the lighting already indicated for habitat removal (including the removal or trimming of trees), or bridge/structure removal, replacement or maintenance activities?

    Yes

32. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **temporary** lighting (other than the lighting already indicated for habitat removal (including the removal or trimming of trees) or bridge/structure removal, replacement or maintenance activities) will be used?

    Yes

33. Will the project install new or replace existing **permanent** lighting?

    No

34. Does the project include percussives or other activities (**not including tree removal/ trimming or bridge/structure work**) that will increase noise levels above existing traffic/ background levels?

    Yes

35. Will the activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the active season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

36. Will *any* activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the inactive season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

37. Are *all* project activities that are **not associated with** habitat removal, tree removal/ trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives, limited to actions that DO NOT cause any additional stressors to the bat species?

    Examples: lining roadways, unlighted signage , rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.

    Yes

38. Will the project raise the road profile **above the tree canopy**?

    No

39. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the active season within undocumented habitat.

40. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) and/or increase noise levels above existing traffic/background levels consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the inactive season

41. Is the location of this project consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because no bats were detected during presence/probable absence surveys conducted during the summer survey season and outside of the fall swarming/spring emergence periods. Additionally, all activities were at least 0.5 miles from any hibernaculum.

42. Is the bridge removal, replacement, or maintenance activities portion of this project consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the bridge has been assessed using the criteria documented in the BA and no signs of bats were detected

43. **General AMM 1**
    Will the project ensure *all* operators, employees, and contractors working in areas of known or presumed bat habitat are aware of *all* FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable Avoidance and Minimization Measures?

    Yes

44. **Hibernacula AMM 1**
    Will the project ensure that on-site personnel will use best management practices[1], secondary containment measures, or other standard spill prevention and countermeasures to avoid impacts to possible hibernacula?

    [1] Coordinate with the appropriate Service Field Office on recommended best management practices for karst in your state.

    Yes

45. **Hibernacula AMM 1**
    Will the project ensure that, where practicable, a 300 foot buffer will be employed to separate fueling areas and other major containment risk activities from caves, sinkholes, losing streams, and springs in karst topography?

    Yes

PROJECT QUESTIONNAIRE

1. Have you made a No Effect determination for *all* other species indicated on the FWS IPaC generated species list?

   N/A

2. Have you made a May Affect determination for *any* other species on the FWS IPaC generated species list?

   N/A

3. How many acres[1] of trees are proposed for removal between 0-100 feet of the existing road/rail surface?

   [1] If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   0.5

4. Please describe the proposed bridge work:

   The proposed project will be the replacement of the existing North Poland Road bridge (Bridge No. C-20-004) over the Poland Brook. Included in the work will be full depth construction approximately 100 feet from the proposed bridge along both approaches, as well as milling and overlay another 100 feet. The existing bridge is being widened from 14-feet to 24-feet, and the roadway approaches are being widened from 19-feet and 22-feet to 24-feet. The existing structure is a single lane that allows two-way traffic and the existing roadway approaches have two travel lanes. The proposed cross section will be two 10-foot travel lanes and two 2-foot shoulders.

5. Please state the timing of all proposed bridge work:

   Fall 2024 - Fall 2025

6. Please enter the date of the bridge assessment:

   July 12, 2022

AVOIDANCE AND MINIMIZATION MEASURES (AMMS)

This determination key result includes the committment to implement the following Avoidance and Minimization Measures (AMMs):

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

HIBERNACULA AMM 1

For projects located within karst areas, on-site personnel will use best management practices, secondary containment measures, or other standard spill prevention and countermeasures to avoid impacts to possible hibernacula. Where practicable, a 300 foot buffer will be employed to separate fueling areas and other major containment risk activities from caves, sinkholes, losing streams, and springs in karst topography.

DETERMINATION KEY DESCRIPTION: FHWA, FRA, FTA PROGRAMMATIC CONSULTATION FOR TRANSPORTATION PROJECTS AFFECTING NLEB OR INDIANA BAT

This key was last updated in IPaC on April 13, 2023. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which may require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the endangered **northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

IPAC USER CONTACT INFORMATION

Agency: Massachusetts Department of Transportation
Name: Hana Isihara
Address: 10 Park Plaza
City: Boston
State: MA
Zip: 02116
Email hana.l.isihara@dot.state.ma.us
Phone: 6178964454

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Highway Administration

MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

September 14, 2023

Julia Hoogeboom
Massachusetts Department of Transportation - Highway Division, Environmental Services
10 park plaza
Boston, MA 02116

RE: Applicant: Julia Hoogeboom
Project Location: NORTH POLAND ROAD OVER POLAND BROOK
Project Description: 609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK
NHESP File No.: 23-8600

Dear Applicant:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the "Division") received the MESA Project Review Checklist and supporting documentation for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

The MESA is administered by the Division, and prohibits the Take of state-listed species. The Take of state-listed species is defined as "in reference to animals…harm…kill…disrupt the nesting, breeding, feeding or migratory activity…and in reference to plants…collect, pick, kill, transplant, cut or process…Disruption of nesting, breeding, feeding, or migratory activity may result from, but is not limited to, the modification, degradation, or destruction of Habitat" of state-listed species (321 CMR 10.02).

The Division has determined that this Project, as currently proposed, will occur **within** the actual habitat of the following species:

Scientific Name	Common Name	Taxonomic Group	State Status
Glyptemys insculpta	Wood Turtle	Reptile	Special Concern
Catostomus catostomus	Longnose Sucker	Fish	Special Concern

These species and their habitats are protected in accordance with the MESA.

Based on the information provided and the information contained in our database, the Division finds that a

portion of this project, as currently proposed, **must be conditioned** to avoid a prohibited Take of state-listed species (321 CMR 10.18(2)(a)). **To avoid a prohibited Take of state-listed species, the conditions attached to this letter must be met.**

Provided the attached conditions are fully implemented and there are no changes to the project plans, this project will not result in a Take of state-listed species. We note that all work is subject to the anti-segmentation provisions (321 CMR 10.16) of the MESA. This determination is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Melany Cheeseman, Endangered Species Review Assistant, at Melany.Cheeseman@mass.gov, (508) 389-6357.

Sincerely,

Everose Schlüter, Ph.D.
Assistant Director

cc: David Paulson, Massachusetts Department of Transportation
Julia Hoogeboom, Massachusetts Department of Transportation

Attachment: List of Conditions

List of Conditions

Applicant: Julia Hoogeboom
Project Location: NORTH POLAND ROAD OVER POLAND BROOK
Project Description: 609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK
NHESP File No.: 23-8600
Heritage Hub Form ID: RC-65297
Approved Plan: Plan and Profile of North Poland Road
Plan date: 7/21/23 Revised Date: N/A

To avoid a prohibited Take of state-listed species, the following condition(s) must be met:

1. **Turtle Protection Plan:** Prior to the start of work (including vegetation clearing or soil disturbance), the Applicant shall submit Wood Turtle Protection Plan to the Division for review and written approval. Said Plan shall detail procedures for protecting state-listed turtles during construction, and be prepared and implemented by a qualified, Division-approved wildlife biologist. The Division is available for consultation on Plan development and can provide contact information for qualified biologists. The Division-approved Plan shall be implemented as written; any proposed changes to the Plan must be submitted to the Division for review and written approval prior to implementation of said changes. Please note that protective measures for state-listed turtles are required for any construction activities occurring between April 15 and October 15 of any year unless otherwise approved by the Division. By December 31st of any year in which work occurs, the qualified biologist shall submit: a) a summary report to the Division detailing project status and compliance with the Plan; and b) any observations of state-listed turtles at https://www.mass.gov/how-to/report-rare-species-vernal-pool-observations.
2. **Fisheries Protection:** In order to avoid impacts to state-listed fishes, no in water work shall occur during the period of April 1 - July 31.

MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
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11/3/2023

Project: MassDOT Bridge Replacement North Poland Road – Poland Brook, Conway, MA

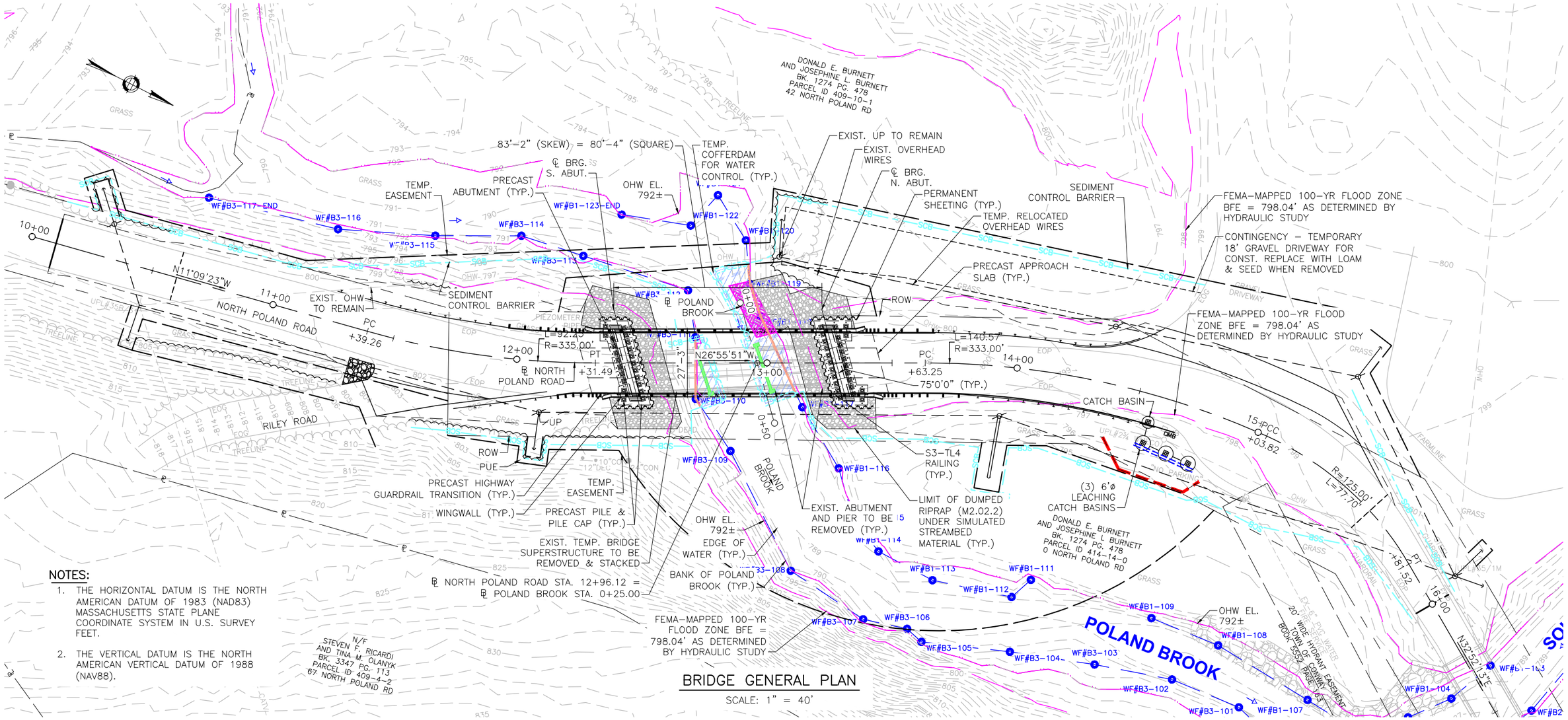
The proposed project will seek to replace the existing bridge over Poland Brook on North Poland Road in Conway. Poland Brook is a Coldwater Fish Resource that supports a wild, naturally-reproducing population of Eastern Brook Trout, as well as Longnose Sucker and Slimy Sculpin. Replacement of the North Poland Road Bridge is unlikely to have any substantial benefit to stream habitat, water temperatures, or fish passage. However, because of the relatively minor and localized expected impact of instream construction activities and the already planned timeframe for construction (late-March through July/August), MassWildlife supports this project and offers no additional Time of Year Restrictions other than what is already in place for Longnose Sucker under MESA requirements.

Thank you and please contact me if you have any questions

Adam Kautza
Coldwater Fisheries Project Leader
Massachusetts Division of Fisheries and Wildlife (MassWildlife)
1 Rabbit Hill Road, Westborough, MA 01581

APPENDIX H

- **Project Plans**



NOTES:

1. THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983 (NAD83) MASSACHUSETTS STATE PLANE COORDINATE SYSTEM IN U.S. SURVEY FEET.
2. THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88).

BRIDGE GENERAL PLAN

SCALE: 1" = 40'

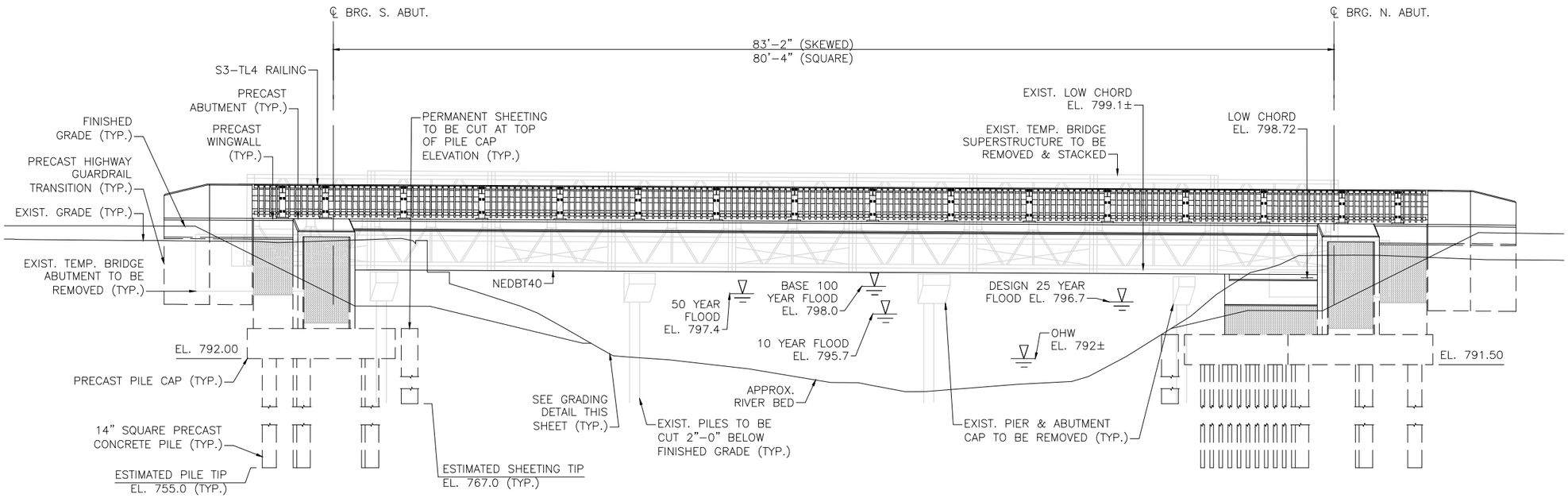
0 40 80 120 160

SCALE: 1" = 40'

SHEET 1 OF 5

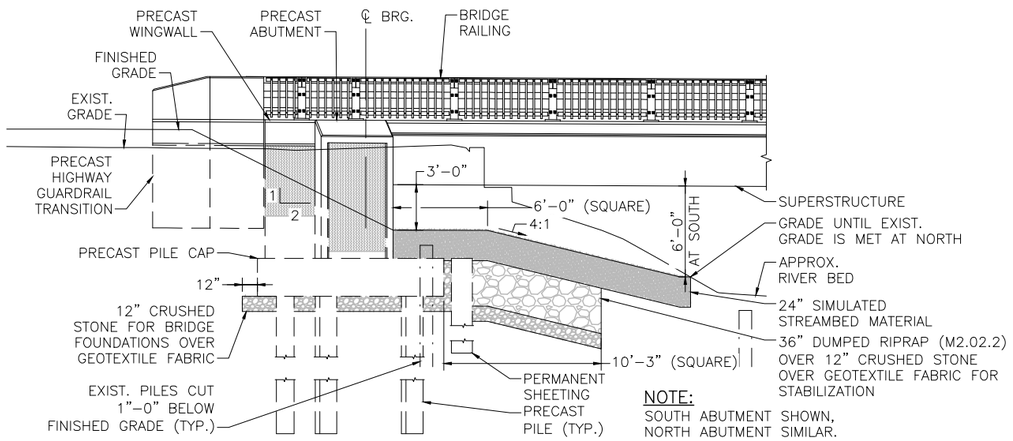
SECTION 401/SECTION 404
PERMIT APPLICATION
CONWAY, MASSACHUSETTS
NORTH POLAND ROAD OVER POLAND BROOK
BRIDGE C-20-004
OCTOBER, 2023

609082_BR(GENPLAN).DWG Plotted on 13-Mar-2024 1:32 PM



BRIDGE GENERAL ELEVATION

SCALE: 1" = 10'



NOTE:
SOUTH ABUTMENT SHOWN,
NORTH ABUTMENT SIMILAR.

TYPICAL GRADING DETAILS AT ABUTMENTS & WINGWALLS

SCALE: 1" = 10'

NOTES:

1. THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983 (NAD83) MASSACHUSETTS STATE PLANE COORDINATE SYSTEM IN U.S. SURVEY FEET.
2. THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88).

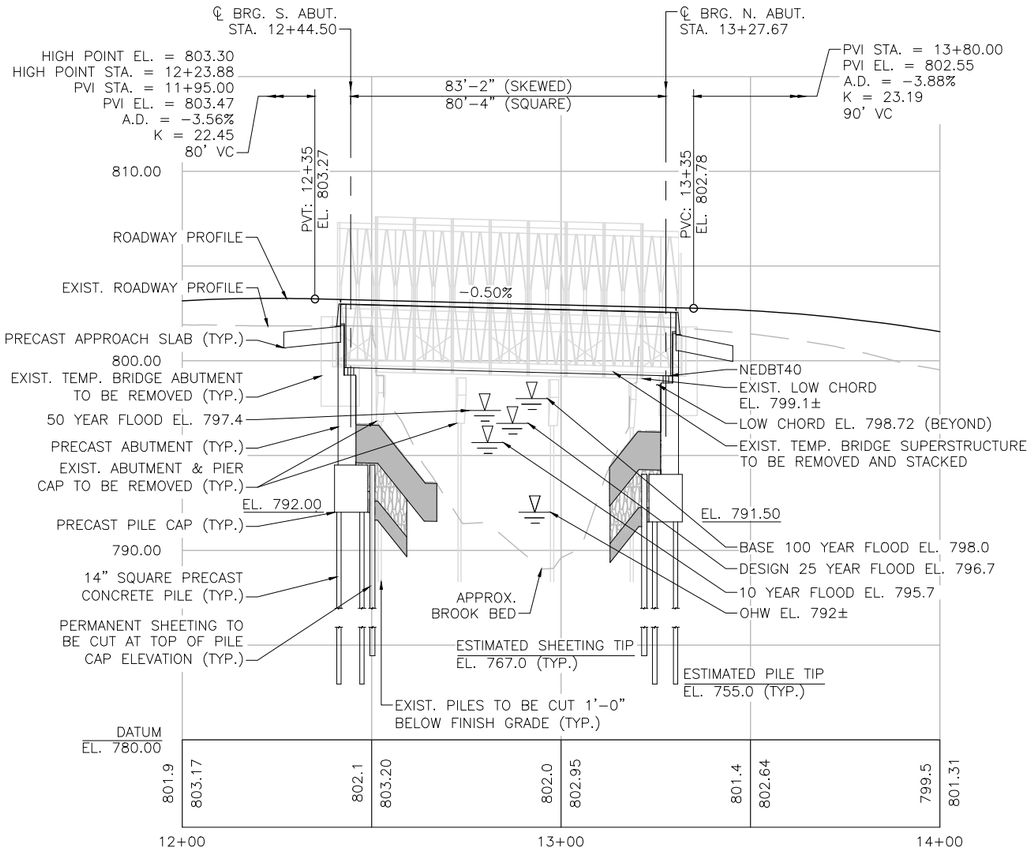
0 10 20 30 40

SCALE: 1" = 10'

SHEET 2 OF 5

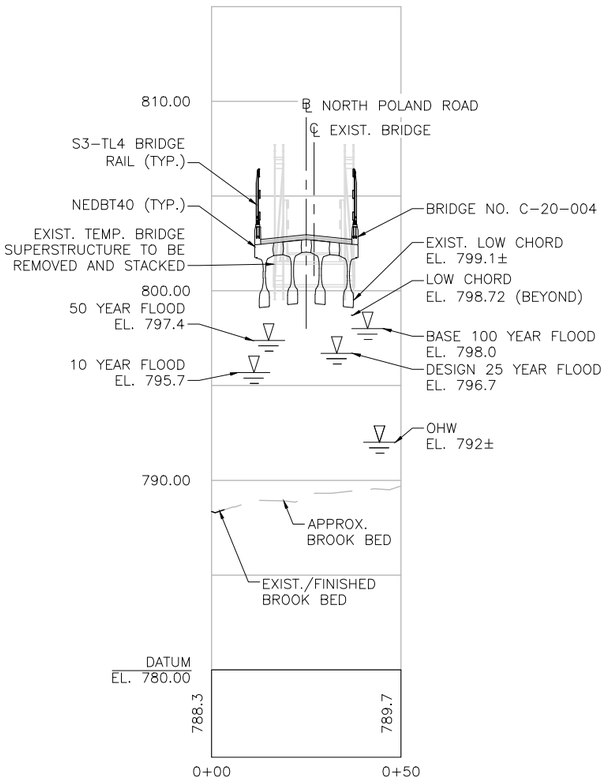
SECTION 401/SECTION 404
PERMIT APPLICATION
CONWAY, MASSACHUSETTS
NORTH POLAND ROAD OVER POLAND BROOK
BRIDGE C–20–004
OCTOBER, 2023

609082_BR(GENELEV).DWG Plotted on 13-Mar-2024 1:32 PM



NORTH POLAND ROAD PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: $\frac{1}{8}$" = 1'−0"



POLAND BROOK PROFILE

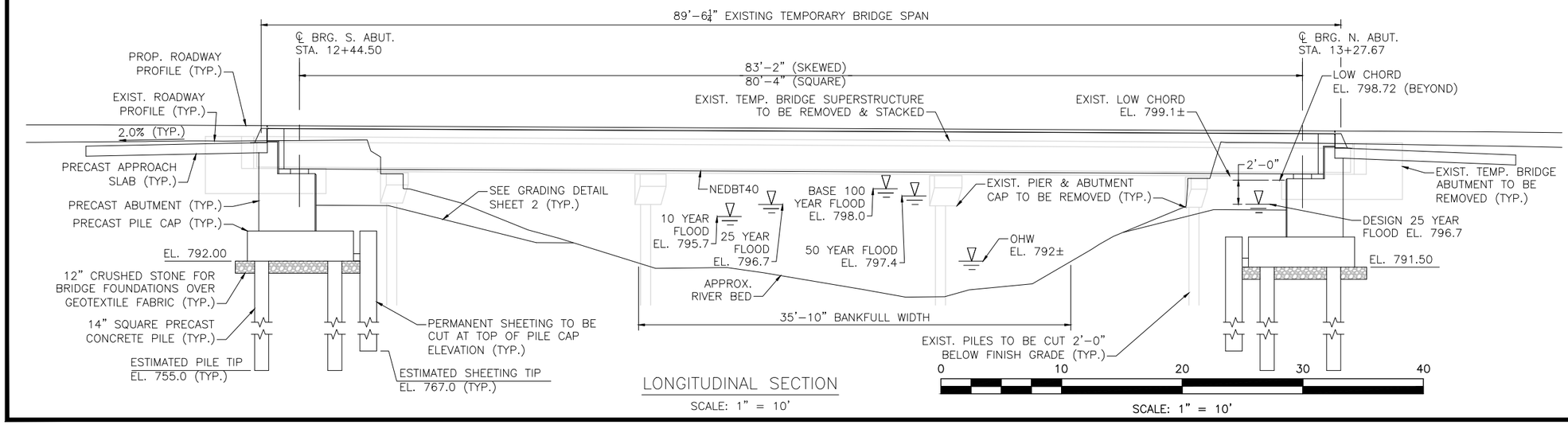
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: $\frac{1}{8}$" = 1'−0"

HORIZONTAL SCALE: 1" = 40'

0 40 80 120 160

0 8 16 24 32

VERTICAL SCALE: $\frac{1}{8}$" = 1'−0"



LONGITUDINAL SECTION

SCALE: 1" = 10'

SCALE: 1" = 10'

NOTES:

1. THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983 (NAD83) MASSACHUSETTS STATE PLANE COORDINATE SYSTEM IN U.S. SURVEY FEET.
2. THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88).

SHEET 3 OF 5

SECTION 401/SECTION 404
PERMIT APPLICATION
CONWAY, MASSACHUSETTS
NORTH POLAND ROAD OVER POLAND BROOK
BRIDGE C−20−004
OCTOBER, 2023

609082_BR(PROFILE).DWG Plotted on 13-Mar-2024 1:32 PM

HIGHWAY GUARD DETAILS

GUARDRAIL TANGENT END TREATMENT, TL-2 - STA 11+23 LT
GUARDRAIL, TL-2 (SINGLE FACED - DEEP POST) - STA 11+33 TO 12+29 LT

TRAILING ANCHORAGE - STA 11+78 RT
GUARDRAIL, TL-2 (SINGLE FACED - DEEP POST) - STA 11+78 TO 12+35 RT

GUARDRAIL, TL-2 (SINGLE FACED - DEEP POST) - STA 13+39 TO 14+45 LT
TRAILING ANCHORAGE - STA 14+45 LT

GUARDRAIL, TL-2 (SINGLE FACED - DEEP POST) - STA 13+46 TO 14+50 RT
TRAILING ANCHORAGE - STA 14+50 RT

WATER SUPPLY ALTERATIONS

NONE

SUMMARY OF RESOURCE AREA IMPACTS				
LEGEND	TYPE	TEMPORARY	PERMANENT	RESTORATION
	BANK	84 LF	N/A	N/A
	WATERS OF THE US	687 SF	185 SF	N/A
	WATERS OF THE US RESTORATION	N/A	N/A	45 SF
	DREDGING	ESTIMATED DREDGE AREA IS 185 SF. ESTIMATED DREDGE VOLUME IS 34 CY.		

BEGINING OF PROJECT
STA. 10+10.00
N 3013722.1531
E 320972.8264
MEET EXISTING

END OF PROJECT
STA. 16+00.00
N 3014277.5744
E 320852.3110
MEET EXISTING

NORTH POLAND ROAD (PUBLIC)

RILEY ROAD (DISCONTINUED) (PRIVATE)

POLAND BROOK

DONALD E. BURNETT AND JOSEPHINE L. BURNETT BK. 1274 PG. 478 PARCEL ID 409-10-1 42 NORTH POLAND RD

DONALD E. BURNETT AND JOSEPHINE L BURNETT BK. 1274 PG. 478 PARCEL ID 414-14-0 0 NORTH POLAND RD

N/F STEVEN F. RICARDI AND TINA M. OLANYK

TEMP CONST EASEMENT LINE (TYP)
PROP SEDIMENT CONTROL BARRIER (TYP)
PROP LOAM & SEED
END GRAN CURB +67
PROP GUARDRAIL
PROP EOP
TRAILING ANCHORAGE +44
CONTINGENCY - TEMPORARY 18' GRAVEL DWY FOR CONST. REPLACE W./ LOAM & SEED WHEN REMOVED
PROP GRAVEL FOR DRIVEWAY
LIMIT OF WORK MEET EXIST
RET GUARDRAIL
LIMIT OF FDC MEET EXIST
PUBLIC UTILITY EASEMENT LINE
TEMP BANK IMPACT (LENGTH = 55.8 LF)
PROP RIP RAP
PROP CLEARING & GRUBBING
BEGIN GRAN CURB +37
DRAINAGE EASEMENT LINE BRIDGE NO. C-20-004
DREDGING AREA
WATERS OF THE U.S. IMPACT (AREA = 871.7 SQ. FT.)
PROP CLEARING & GRUBBING
PROP SEDIMENT CONTROL BARRIER (TYP)
PROP RIP RAP
REM PIPE
REM GUARDRAIL
END OF 1940 COUNTY LAYOUT
PROP GUARDRAIL
PROP EOP
TRAILING END TREATMENT +23
PUBLIC UTILITY EASEMENT LINE
1940 COUNTY LAYOUT SIDELINE BOOK 840 PAGE 196
FULL DEPTH PVMT CONST
NORTH POLAND RD CONST. ℄
PCC +03.82
R&R MB
END GRAN CURB +68
PROP GRAN CURB
PROP GUARDRAIL
PUBLIC UTILITY EASEMENT LINE
TRAILING ANCHORAGE +50
RET
PROP LOAM & SEED
PROP SEDIMENT CONTROL BARRIER (TYP)
BEGIN GRAN CURB +44
PROP TEMP COFFERDAM FOR WATER CONTROL (TYP)
OHW EL. 792±
RET RIPRAP
20' WIDE HYDRANT EASEMENT TOWN OF CONWAY BOOK 3553 PAGE 165
TEMP BANK IMPACT (LENGTH = 27.8 LF)
PROP GUARDRAIL
REM GUARDRAIL
PROP LOAM & SEED
PROP SEDIMENT CONTROL BARRIER (TYP)
RESTORATION OF WATERS OF THE US (AREA = 44.8 SQ. FT.)
FULL DEPTH PVMT CONST
PROP TREE TRIMMING
PUBLIC UTILITY EASEMENT LINE
TEMP CONST EASEMENT LINE (TYP)
LIMIT OF WORK MEET EXIST
PROP GRAVEL FOR DRIVEWAY
TRAILING ANCHORAGE +78
PROP TREE TRIMMING
PROP EOP
PUBLIC UTILITY EASEMENT LINE
TEMP CONST EASEMENT LINE (TYP)
FEMA-MAPPED 100-YR FLOOD ZONE (ZONE A5) BFE = 798.04' AS DETERMINED BY HYDRAULIC STUDY
FLAGGED POLAND BROOK BANK (TYP.)
TEMP CONST EASEMENT LINE (TYP)
OHW EL. 792±

NOTES:

1. THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983 (NAD83) MASSACHUSETTS STATE PLAN COORDINATE SYSTEM IN U.S. SURVEY FEET.
2. THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

ENVIRONMENTAL IMPACTS PLAN

0 40 100 160

SCALE: 1" = 40'

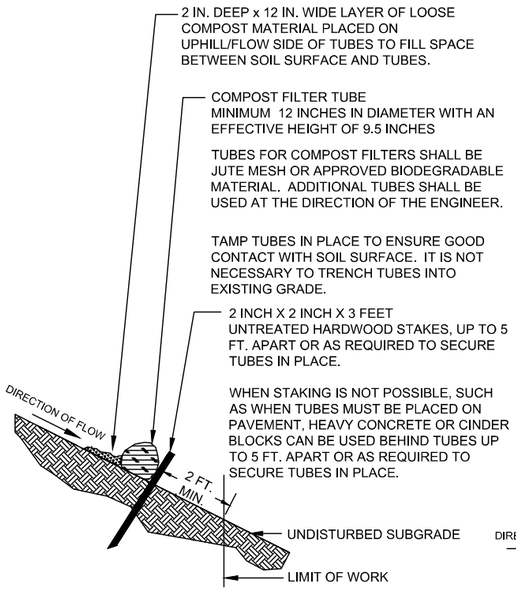
SHEET 4 OF 5

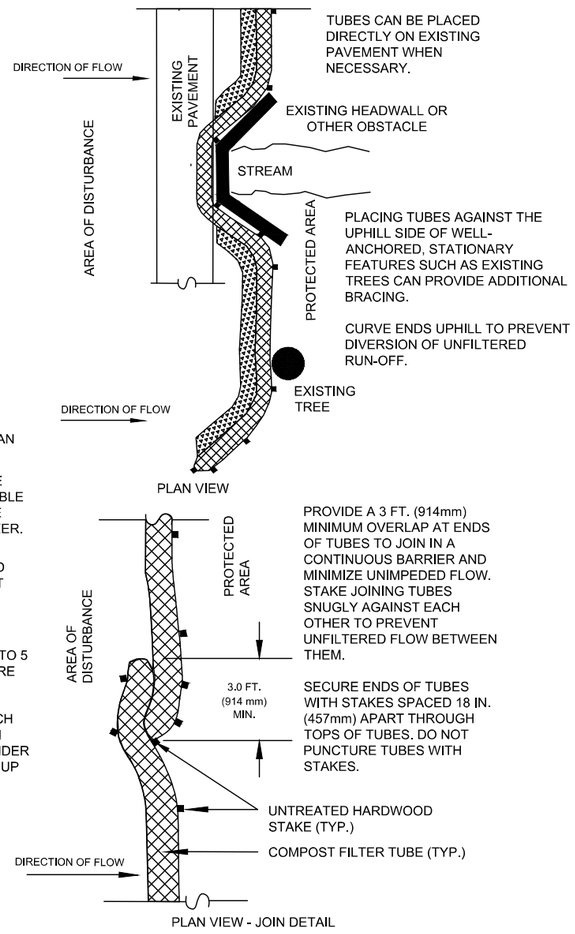
SECTION 401/SECTION 404
PERMIT APPLICATION
CONWAY, MASSACHUSETTS
NORTH POLAND ROAD OVER POLAND BROOK
BRIDGE C-20-004
OCTOBER, 2023

609082_EV(IMPACTS).DWG Plotted on 13-Mar-2024 1:33 PM

GENERAL NOTES:

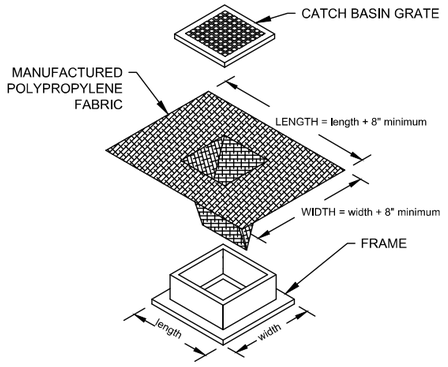
1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES (300mm) FOR SLOPES UP TO 50 FEET (15.24m) IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. INSTALL ONLY IN UPLAND AREAS.
4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.





SINGLE COMPOST FILTER TUBE DETAIL FOR EROSION CONTROL

NOT TO SCALE

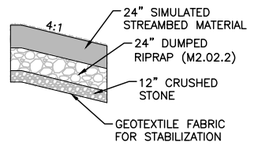


NOTES

1. LENGTH AND WIDTH OF POLYPROPYLENE FABRIC MUST EXCEED EXISTING CATCH BASIN FRAME DIMENSIONS BY A MINIMUM OF 8".
2. REMOVE CATCH BASIN GRATE AND INSTALL POLYPROPYLENE FABRIC OVER CATCH BASIN FRAME. REPLACE CATCH BASIN GRATE TO SECURE POLYPROPYLENE FABRIC IN PLACE.

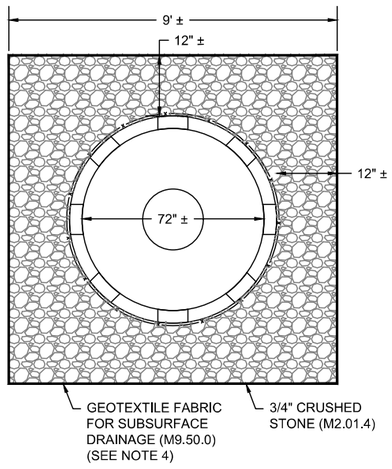
CATCH BASIN EROSION CONTROL PROTECTION (TYP)

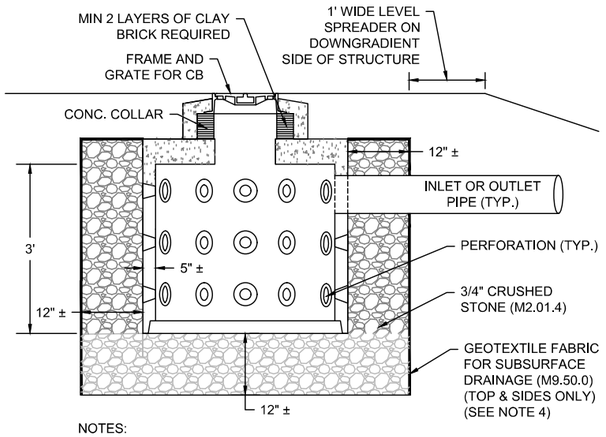
NOT TO SCALE



TYPICAL RIP RAP INSTALLATION DETAIL

NOT TO SCALE



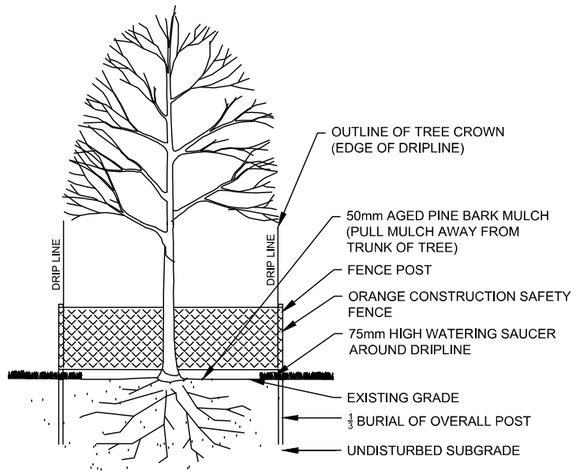


NOTES:

1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS
2. AASHTO H-20 LOADING
3. STEEL REINFORCEMENT PER ASTM A615 GRADE-60
4. FOR LEACHING BASINS INSTALLED IN SERIES GEOTEXTILE SHALL ENVELOPE THE OUTER PERIMETER OF CRUSHED STONE ONLY. GEOTEXTILE SHALL NOT BE INSTALLED BETWEEN LEACHING BASINS.

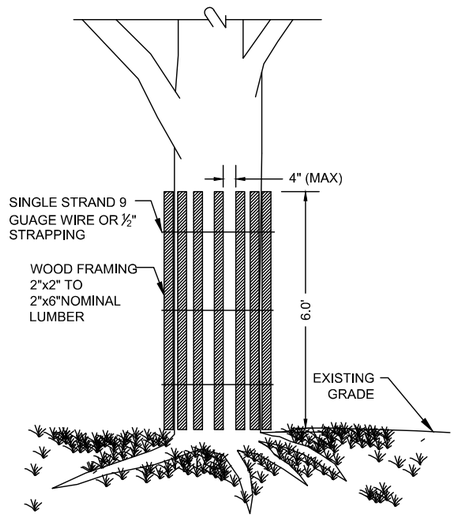
LEACHING BASIN (LB)

NOT TO SCALE



TEMPORARY TREE PROTECTION FENCE

NOT TO SCALE



INDIVIDUAL TREE PROTECTION DETAIL

NOT TO SCALE

SHEET 5 OF 5

SECTION 401/SECTION 404
PERMIT APPLICATION
CONWAY, MASSACHUSETTS
NORTH POLAND ROAD OVER POLAND BROOK
BRIDGE C-20-004
OCTOBER, 2023

609082_EV(DETAILS).DWG Plotted on 13-Mar-2024 1:33 PM

APPENDIX I

- **Public Notice**

Public Notice

Massachusetts Department of Environmental Protection
Division of Wetlands and Waterways
MassDEP Boston Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Pursuant to 33 U.S.C. 1341 and M.G.L. c. 21 §§ 26 - 53, notice is given of a 401 Water Quality Certification application for the replacement of the North Poland Road Bridge over Poland Brook in Conway, Massachusetts by the MassDOT Department of Transportation – Highway Division, Ten Park Plaza, Room 7360, Boston, MA 02116. The proposed work consists of removing a temporary bridge installed in 2023 (which replaced the pre-existing three-span, 65 feet long, 17'-2" wide bridge) and replacing the bridge with a new single-span structure having a span length of 83'-2" and a width of 27'-3". New concrete stub abutments will be constructed immediately behind the existing abutments. Additional information may be obtained from the Massachusetts Department of Transportation – Highway Division at the above address, Attention Courtney Walker or by emailing courtney.l.walker@dot.state.ma.us. Written comments should be sent to MassDEP Wetlands Program, Attention Heidi Davis, 100 Cambridge Street, Suite 900, Boston, MA 02114 or heidi.davis@mass.gov within 21 days of this notice.

Any group of ten persons, any aggrieved person, or any governmental body or private organization with a mandate to protect the environment who submits written comments may appeal the Department's Certification. Failure to submit written comments before the end of the public comment period may result in the waiver of any right to an adjudicatory hearing.

APPENDIX J

- **Project Specifications**

ITEM 102.3 HERBICIDE TREATMENT OF INVASIVE PLANTS HOUR

This work must be performed by persons who meet the qualifications below and are approved by the Landscape Design Section.

Work under this item consists of herbicide treatment of invasive plants currently existing within the project limits and as directed. An Invasive Plant Management Strategy (IPMS) shall be submitted to the Engineer for review and approval and the IPMS shall be implemented on-site. The IPMS shall be measured and paid for under Item 102.33 Invasive Plant Management Strategy.

Work under this item shall be coordinated with work and schedule for Selective Clearing, Clearing and Grubbing, Mowing, Tree Removal, Planting, and Wetland Mitigation items.

Payment is per hour on-site and shall be compensation for a minimum crew of 2 licensed applicators, 2 back-pack sprayers and mist-blowers, a properly equipped spray truck with spray hoses, and a tank with sufficient capacity for a full day of work. If there is only one applicator, hourly payment shall be adjusted to 50 percent of the unit price. This item is not intended for manual removal of plants.

Management of plants determined to have been introduced to the site via imported loam, compost, mulch, plants, equipment, or other construction activities will be the Contractor's responsibility and at the Contractor's expense.

Herbicide shall be applied during daytime hours only.

Measures to prevent the introduction of invasive plant species to the site and to address introduction due to construction-related activities shall be covered under the Standard Specifications, Division I - Subsections 7.01(D) Plant Pest Control and 7.13 Protection and Restoration of Property as amended in these Special Provisions.

Plant species targeted for management under this item shall be as determined in the field per the site walk and as specified in the IPMS.

The definition of invasive plant species shall be as described by Massachusetts Invasive Plant Advisory Group (MIPAG): "non-native species that have spread into native or minimally managed plant systems in Massachusetts, causing economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems."

Control of invasive plants shall begin immediately with the initiation of construction activities and prior to any clearing or site disturbance. Treatment areas shall include stockpile locations and may, upon approval of the Engineer, extend outside the project limit. Treatment shall be done each consecutive year for the duration of the contract unless specified otherwise in the IMPS or unless directed otherwise by the MassDOT invasive species contact. Work shall be done during the growing season from May – October unless otherwise specified in the IPMS.

Areas identified for vegetation control measures shall be as shown on the plans and as determined in the field by the Engineer and a MassDOT Landscape Architect. Contact at MassDOT Landscape Design Section may be contacted at: robbin.bergfors@dot.state.ma.us.

QUALIFICATIONS

The applicators shall submit and meet the qualifications outlined below. A list of contractors specializing in invasive management and approved by MassDOT Landscape Design Section is available on the following website: https://www.mass.gov/lists/landscape-design-and-roadside-maintenance under Invasive Plant Management.

Requirements

1. Company must provide proof of qualifications by providing the following:
   a. Narrative describing company, its expertise and experience with invasive plant control.
   b. Demonstrate experience with herbicide treatment as part of restorations and in sensitive areas.
   c. Describe company's technical qualifications and past performance.

2. Company must meet licensing requirements:
   a. All crew applicators must have a Massachusetts Commercial Applicator License (CORE).
   b. At least one or more applicator must have a ROW certification, if required for work.
   c. Company must provide name(s) of applicator(s) and Applicator License/Certification number for all contractor crew leaders working on the project.
   d. Company must provide documentation of any warnings, penalties or fines received in the last three (3) years.

3. Company must provide proof of experience with invasive plant control and include following:
   a. At least five (5) references from prior invasive plant control work completed in last five (5) years. Provide contact information including address, phone number and email.
   b. Provide a summary of each of these projects including nature of the problem, specific invasive vegetation treated, dates and period of treatment, methodologies used, and summary of success or not in terms of meeting performance objectives. Include summary of equipment used.
   c. Photo documentation of these projects.
   d. GPS coordinates of project locations, if available.

4. Crew leader must have expertise with invasive plant control and provide the following:
   a. Have held Core license for at least five (5) years.
   b. Resume listing five (5) or more years of experience applying pesticides with the company or with another company specializing in vegetation management.

SUBMITTALS

No work shall begin without approval of the submittals.

Submittals include the following items:

Invasive Plant Management Strategy (IPMS)

At least thirty (30) days prior to proposed treatment the IPMS shall be submitted for approval by the Engineer and MassDOT Landscape Architect. All chemicals, methods and work done under this item shall be consistent with the IPMS. The IPMS shall be as described under Item 102.33.

Herbicide Use Report

Within two (2) weeks after each application, the Contractor shall provide to the Engineer a completed and signed MassDOT Herbicide Use Report.

Photo Documentation

Digital photos with date and time of herbicide application work may be required and shall be submitted upon request.

MATERIALS

All proposed herbicides shall be as approved in the IPMS. Herbicides shall be labeled for the method of treatment and shall meet all federal, state and local regulation requirements. Application rates will depend on herbicide proposed and shall be per the manufacturer's label for specific application.

METHODS

All methods used shall be as approved in the IPMS which shall be determined during the Initial Site Walk as described under Item 102.33 Invasive Plant Management Strategy.

The Contractor shall be responsible for marking delineated areas and plants to be preserved, removed, or otherwise treated. Fencing or other materials needed for marking and delineating protected areas shall be incidental to this item.

The Contractor shall notify the Engineer a minimum of 3 days prior to date of expected herbicide application. Applicators shall notify the Engineer upon arriving on-site and upon leaving the site.

Herbicide Applications

All herbicide application shall conform to Massachusetts Pesticide Laws and Regulations per the Massachusetts Department of Agricultural Resources (MDAR) Pesticide Bureau.

Mixing, applying and/or disposing of herbicides shall always be in accordance with instructions on their labels and all applicable federal, state, and local regulations. Mixing shall not occur within sensitive areas, wetlands, or buffer zones.

Contractor shall not spray 2 hours prior to precipitation, during rain, or during windy conditions. The Contractor shall be responsible for monitoring weather conditions and adjusting the work schedule as appropriate for the herbicide and application method to be used.

Targeted vegetation shall be identified and marked prior to treatment. Plants treated by foliar spray, injection or glove application or other methods that leave standing vegetation, as opposed to cut-stump application, shall remain clearly marked for identification through the contract period.

Desirable vegetation shall be protected from both spray and other physical damage.

Contractor is responsible for any damage to vegetation not designated for removal or treatment. Vegetation damaged shall be restored. Cost of replacement plants and/or restoration shall be borne by the Contractor.

Contractor shall ensure that the public does not enter a work area while herbicide application or spraying is underway.

Disposal Of Invasive Plant Material

All material to be cleared shall become the property of the Contractor. The satisfactory disposal of all cleared plant material (seeds, roots, woody vegetation, associated soils, etc.) shall be the Contractor's responsibility.

The Contractor shall take measures to prevent viable plant material from leading to further infestations (seeds, roots, woody material, etc.) while stockpiled, in transit, or at final disposal locations. All precautions shall be taken to avoid contamination of natural landscapes with invasive plants or invasive plant material.

Chipping, shredding, or on-site burning of plant material must be approved by the Engineer and included in the IMPS.

For plant material taken to an incinerating facility per the IPMS, a receipt from that facility shall be submitted to the Engineer as proof of disposal.

Where feasible, it is preferable to dispose of plants on-site or to bury them on-site with on-going monitoring for re-sprouting. Disposal locations and methods must be approved and included in the IPMS. Site work such as grading and seeding to stabilize and restore disposal area shall be incidental to this item.

The Contractor shall be responsible for treating or otherwise managing areas of re-growth due to improper disposal. Treatment shall be at the Contractor's expense.

Follow-Up Treatment

Plants and areas shall be re-treated as necessary and as appropriate to the time of year. Treatment shall be for the duration of the contract and per the IPMS.

MEASURE OF SUCCESS

The expectation is a minimum of 85-95 percent control achieved after the first treatment, depending on plants targeted and extent of population, and based on the expectations laid out in the IPMS. The expectation for the contract duration is 95-100% eradication by the end of the treatment period, unless otherwise specified in the IPMS.

METHOD OF MEASUREMENT

Item 102.3 will be measured for payment by the Hour of crew time spent on the project doing actual herbicide application work. A crew shall be defined as a minimum of two licensed applicators each equipped with (at minimum) back-pack sprayer and mist blower. The crew shall

also have a properly equipped spray truck with hoses and a tank with sufficient capacity for a full day of work.

BASIS OF PAYMENT

Item 102.3 will be paid at the contract unit price per Hour, which price shall include all labor, materials, equipment, tools, and all incidentals required to complete the work.

Payment will be based upon time spent on the project doing actual work and shall not include travel time to and from the Contractor's place of business and shall also not include time for investigative field trips.

If there is only one applicator, hourly payment shall be adjusted to 50 percent of the unit price.

The Invasive Plant Management Strategy will be paid for under Item 102.33.

ITEM 102.33 INVASIVE PLANT MANAGEMENT STRATEGY HOUR

REV. 2023.03.01 *(REV. DATE TO BE REMOVED BY CONTRACTS)*

This item consists of providing an Invasive Plant Management Strategy (IPMS) for the control of invasive plants currently existing on the project site and/or as directed and shall be coordinated with Item 102.3 Herbicide Treatment of Invasive Plants. The IPMS shall be submitted for review and approval and the IPMS shall be implemented on-site.

Herbicide treatment for invasive plants shall be as described under Item 102.3 Herbicide Treatment of Invasive Plants and shall be compensated per that Item.

Work under this item shall be coordinated with work and schedule for Selective Clearing, Clearing and Grubbing, Mowing, Tree Removal, Planting, and Wetland Mitigation as relevant to the project.

Individual attending the site walk and determining the Invasive Plant Management Strategy must demonstrate expertise with vegetation management and invasive plant control and submit qualifications as described below.

QUALIFICATIONS

Individual shall be from the same company as that providing services for Item 102.3 Herbicide Treatment of Invasive Plants and shall submit the following, if not submitted under Item 102.3:

- Submit copy of current Core license.
- Submit a resume listing five (5) or more years of experience managing invasive plants with a company specializing in vegetation management.
- References shall be submitted if requested.

SUBMITTALS

Task Summary & Reports

For measurement of payment, the contractor shall submit the total sum and a breakdown of hours for the tasks performed. At a minimum, the tasks shall include the Initial Site Walk, the IPMS Written Report, and if necessary to accommodate project or site changes, a Follow-up Site Inspection and accompanying IPMS Amendment.

Interim Site Monitoring Reports and/or a Final Report shall be submitted if requested by the MassDOT Landscape Design contact. The MassDOT Landscape Design contact must be notified to attend the final walk through when a Final Report has been requested.

Invasive Plant Management Strategy (IPMS)

At least thirty (30) days prior to construction activities and/or any proposed treatment, submit a written IPMS proposal for approval by the Engineer and MassDOT Landscape Architect. All chemicals and methods proposed shall be consistent with applicable Massachusetts Wetlands Protection Act Order of Conditions.

The IPMS shall be completed in coordination with the Roadway Contractor and the Engineer and shall include the following as appropriate to the project:

I. Project Information

a. Company writing IPMS and performing herbicide application.
b. Date of site walk
c. Attendees at site walk
d. Expected end date of contract and expected last treatment (month/season)

II. Brief Description of Conditions

a. Provide a free-hand sketch on construction plans or aerial image showing species, location, and as relevant, show or note extent of population as relevant to Strategy (i.e., population extends off ROW preventing eradication, small population and eradication deemed feasible within contract schedule, etc.).

III. Coordination with Roadway Contractor regarding other work

a. Tree Work: Note coordination to be implemented with tree removal, clearing, and clearing and grubbing as applicable to the project.
b. Wetland Mitigation - Include management proposed for wetland mitigation areas in the IPMS, if and as required.
c. Planting: If there will be planting in areas proposed for treatment, propose treatment and schedule to avoid herbicide damage to plants.
d. Mowing: If coordination is required with state mowers, note need in IPMS.

IV. Soil Management

a. Provide specifics on how soil with invasive plant roots (in particular) or seeds will be handled (i.e., separate stockpiles, plant material will be buried on-site, re-used on-site, disposed off site and if so, where?).
b. Show stockpile locations on plan and include treatment schedule.
c. Note measures that will be implemented to avoid spread through equipment, including how and where equipment will be cleaned.

V. Invasive Plant Treatment & Management

a. Proposed chemical and methods of treatment for each species or area.
b. Time of treatment based on target plant species.
c. Submit product label including application methods and rates (entire MSDS information need not be submitted if available online).
d. Proposed performance metrics or measure of treatment success if different from that specified under Item 102.3.
e. Method for disposing invasive plant material. This includes material that may result in spread (i.e., seeds, roots) and material that has been treated and/or is not viable (foliage, dead wood, etc.). Methods may include grinding in place, stockpiling and treating, and incinerating offsite.
f. Expected follow-up treatment for duration of contract.

VI. Monitoring Schedule if requested by MassDOT.

Note: The IPMS is critical for identifying pre-construction conditions as well as strategies for minimizing import or spread of invasive plants. Failure to provide an approved IPMS may jeopardize this item, in which case, the contractor will be responsible for management of invasive plants found on-site at no cost to the contract.

Photo Documentation

Digital photos with date and time verification shall be provided with the IPMS and with any follow-up monitoring or reporting.

METHODS

Initial Site Walk

Prior to any construction activities and soil disturbance, the Contractor shall walk the site with the Engineer and the MassDOT Landscape Architect to determine the IPMS. During the site walk the Contractor shall identify limits of work and, as necessary, mark locations of areas designated for treatment and individual plants targeted for treatment or removal. The Contractor shall be responsible for marking delineated areas and plants to be preserved, removed, or otherwise treated. Fencing or other materials needed for marking and delineating protected areas shall be incidental to this item.

IPMS Follow-up Amendment

The IPMS may be amended to address additional concerns or adjust to conditions if required by the MassDOT Landscape Architect. The amended IPMS shall be submitted to the Engineer and MassDOT Landscape Architect for approval at least fourteen (14) days prior to any proposed treatment.

Interim Site Monitoring Inspection Reports

If required by the MassDOT Landscape Architect and Engineer, Interim Site Monitoring and an accompanying report shall be conducted.

Final Inspection

A final inspection and report documenting the status of the invasive control may be required for regulatory purposes or for instances where control will be continued by others. The report shall include photo documentation of pre-construction (existing) and post-treatment conditions, notations on a plan or aerial image of area treated, summary of treatment performed, and control achieved.

METHOD OF MEASUREMENT

Item 102.33 will be measured for payment by the Hour. The basis for measurement shall be per the completion of tasks as approved under the Task Summary submittal.

BASIS OF PAYMENT

Item 102.33 will be paid at the contract unit price per Hour, which price shall include all labor, materials, equipment, tools, and all incidentals required to complete the work.

Payment shall not include travel time to and from the Contractor's place of business.

ITEM 151.9 STREAMBED RESTORATION LUMP SUM

DESCRIPTION

This work shall consist of removing, stockpiling, and replacing river bed material in the proposed bridge replacement and the upstream and downstream approaches in the limits of work. The streambed restoration shall replicate the existing natural channel bed outside the work area in terms of material, rougness, shape, profile, and appearance. The ultimate product will, to the extent possible, replicate the function and appearance of the natural stream channel, as illustrated by photo-documentation herein (Figure A and B).

The Contractor shall coordinate with his/her sub-contractors to ensure all required equipment is available on-site to complete the work in this manner. The streambed restoration is required to comply with environmental permits issued for the project. MassDOT Environmental Services will provide a Fluvial Geomorphologist (Geomorphologist) to provide a pre-construction meeting, on-site oversight during construciton, and assistance during streambed restoration construction to ensure the restoration is constructed as shown on the Plans, as required by these Special Provisions and in accordance with permit requirements.

At least 30 days prior to the commencement of construction, the Contractor shall coordinate with David Paulson (MassDOT Wetlands & Wildlife Unit Supervisor, (508) 389-6366 / david.j.paulson@state.ma.us) to set up an initial (virtual or inperson) meeting with MassDOT's Geomorphologist, Contractor, and Resident Engineer. At this meeting, the Geomorphologist will provide an overview of the restoration work. The Contractor should be prepared to discuss the anticipated means, methods, and schedule.

Process Approval:

In lieu of a mockup, the Contractor shall schedule an onsite meeting to discuss the streambed restoration with the Geomorphologist and respective parties from MassDOT. The Geomorphologist shall be onsite during initial streambed restoration. The Contractor shall provide the Geomorphologist adequate access to observe, direct, and inspect the channel restoration work throughout the duration of the removal, stockpile, and reinstallation of the existing streambed material. If material is being brought to the site for streambed restoration, the Contractor shall provide the Geomorphologist with photographs to see the material.

MATERIAL

The top 2 feet of stremabed material excavated from the existing streambed shall be removed and stockpiled to facilitiate reinstallation and replication of the natural streambed. The excavated streambed material below the top 2 feet shall be stockpiled and reused to fill the voids in the proposed riprap placed below the top streambed restoration layer.

In the event that the excavated material is not suitable or there is not enough available suitable material, additional streambed restoration material shall be locally sourced that matches the

composition of the existing native river bed. The following gradation shall be used as a guide. The channel is a cobble and gravel riffle-pool channel. The median grain size (D50) is approximately 93 mm (small cobble).

Stream Bed Material Gradation

Particle	**Percent (%) Composition**
Boulder	15
Cobble	60
Gravel	25
Sand	0

The streambed material shall be approved by the Resident Engineer and Geomorphologist prior to use.

Related Items

Crushed Stone. Shall conform to the requirements of Item 156.2 Crushed Stone for Slope Treatment and shall be paid for under that item.

Riprap Stone shall conform to the requirements of Item 983. and shall be paid for under that item.

CONSTRUCTION

Channel

The streambed material shall be reinstalled over riprap (MassDOT Item 983.xx), as depicted on the plans, to an average thickness of 2.0 feet, with variations in thickness as necessary to replicate existing channel conditions. The streambed restoration material shall blend into the undisturbed streambed in the center of the channel.

The initial placement of streambed material shall fill / choke the voids in the underlying riprap. Fill voids by shaking stone with the teeth of an excavator bucket, hand tamping with metal tamping rods, and by spraying water to settle fines between large stones. Plate compactors shall not be used. The purpose of filling the voids is to prevent subsurface flow where surface water disappears into large voids between the stone fill below the channel bed surface during low flow conditions. The final streambed shape and appearance shall be finalized in the field as directed by the Geomorphologist.

Reinstallation of the stockpiled streambed material shall be placed on top of the riprap to restore streambed habitat and fish passage. The streambed materials shall be installed during normal low water conditions behind cofferdams in accordance with the environmental permits.

Completion

Once all material has been placed in the stream channel and approved by the Geomorphologist and Resident Engineer, the Contractor shall remove the cofferdams in such a way as to slowly wet the stream to minimize the initial sediment pulse. Every attempt shall be made to minimize the downstream movement of sediment.

The final streambed shall maintain the general configuration of the existing streambed bedform and there shall be minimal subsurface flow upon final inspection by the Resident Engineer and Geomorphologist. The project must be passable by fish and other aquatic organims following construction.

The streambed restoration to be measured for payment will be the complete and accepted work for restoration of the streambed within the limits shown on the Plans as approved by the Resident Engineer and Geomorphologist.

BASIS OF PAYMENT

The accepted streambed restoration will be paid for on a lump sum basis. Payment will be full compensation for excavating, stockpiling, transporting, and placing the material specified and for furnishing all labor, tools, equipment, testing, and incidentals necessary to complete the work.

The Geomorphologist will be provided by MassDOT at no cost to the Contractor.

FIGURES

Figure A: Existing Streambed Material Upstream of Bridge

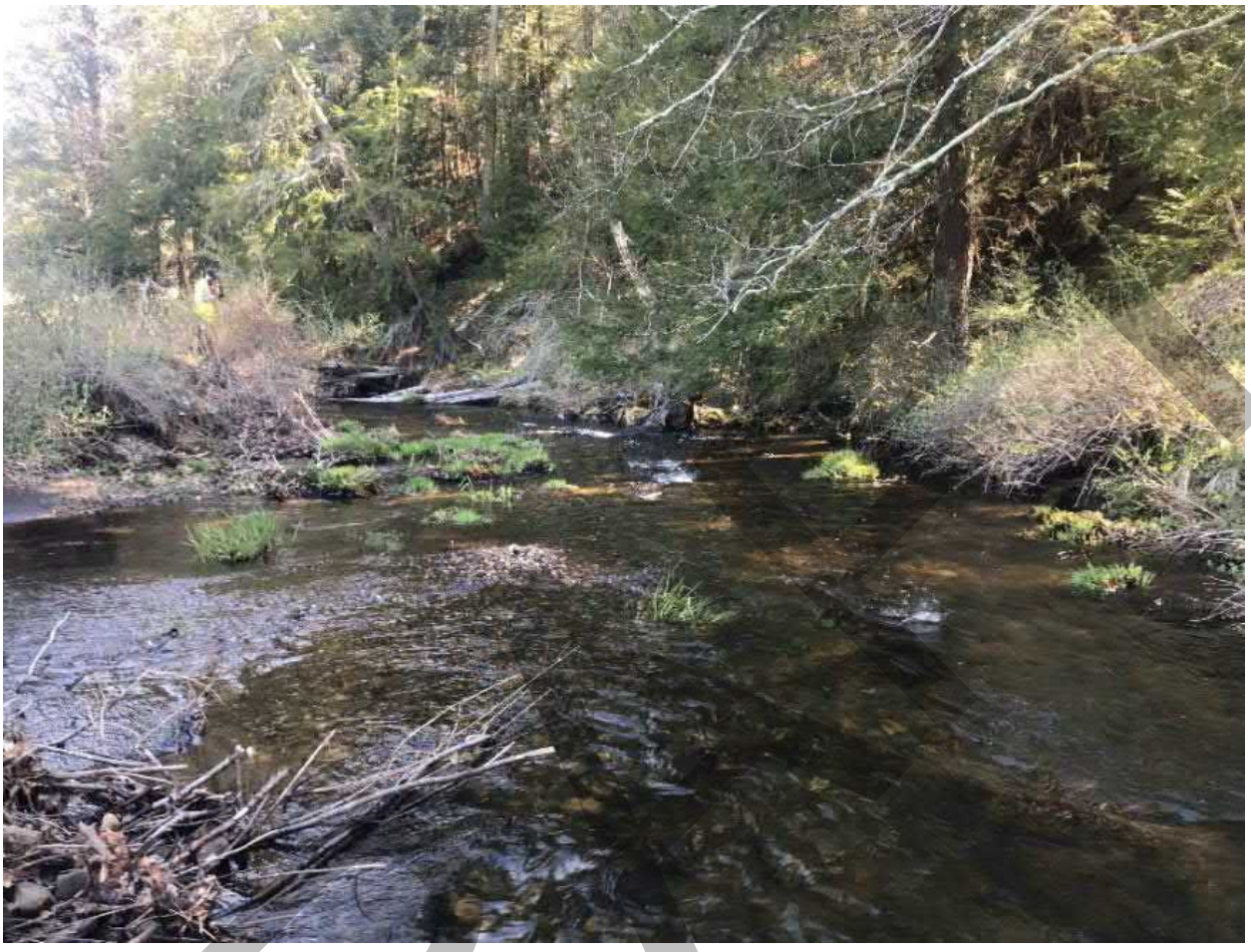


Figure B: Existing Streambed Material Downstream of Bridge

ITEM 767.121 SEDIMENT CONTROL BARRIER FOOT

The work under this item shall conform to the relevant provisions of Subsections 670, 751 and 767 of the Standard Specifications and shall include the furnishing and placement of a sediment control barrier. Sediment control barrier shall be installed prior to disturbing upslope soil.

The purpose of the sediment control barrier is to slow runoff velocity and filter suspended sediments from storm water flow. Sediment barrier may be used to contain stockpile sediments, to break slope length, and to slow or prevent upgradient water or water off road surfaces from flowing into a work zone. Contractor shall be responsible for ensuring that barriers fulfill the intent of adequately controlling siltation and runoff.

Twelve-inch diameter (after installation) compost filter tubes with biodegradable natural fabric (i.e., cotton, jute, burlap) are intended to be the primary sedimentation control barrier. Photo-biodegradable fabric shall not be used.

For small areas of disturbance with minimal slope and slope length, the Engineer may approve the following sediment control methods:

- 9-inch compost filter tubes
- Straw bales which shall be trenched

No straw wattles may be used. Additional compost filter tubes (adding depth or height) shall be used at specific locations of concentrated flow such as at gully points, steep slopes, or identified failure points in the sediment capture line.

When required by permits, additional sediment barrier shall be stored on-site for emergency use and replacement for the duration of the contract.

Where shown on the plans or when required by permits, sedimentation fence shall be used in addition to compost filter tubes and straw bales and shall be compensated under that item.

Sediment control barriers shall be installed in the approximate location as shown on the plans and as required so that no excavated or disturbed soil can enter mitigation areas or adjacent wetlands or waterways. If necessary to accommodate field conditions and to maximize effectiveness, barrier locations may be shifted with approval from the Engineer. Barriers shall be in place prior to excavation work. No work shall take place outside the barriers.

MATERIALS AND CONSTRUCTION

Prior to initial placement of barriers, the Contractor and the Engineer shall review locations specified on the plans and adjust placement to ensure that the placement will provide maximum effectiveness.

Barriers shall be staked, trenched, and/or wedged as specified herein and according to the Manufacturer's instructions. Barriers shall be securely in contact with existing soil such that there is no flow beneath the barrier.

Compost Filter Tube

Compost material inside the filter tube shall meet M1.06.0, except for the following: no peat, manure or bio-solids shall be used; no kiln-dried wood or construction debris shall be allowed; material shall pass through a 2-inch sieve; and the C:N ratio shall be disregarded.

Outer tube fabric shall be made of 100% biodegradable materials (i.e., cotton, hemp or jute) and shall have a knitted mesh with openings that allow for sufficient water flow and effective sediment capture.

Tubes shall be tamped, but not trenched, to ensure good contact with soil. When reinforcement is necessary, tubes shall be stacked as shown on the detail plans.

Straw Bales

Straw bales shall be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

Bales should be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. All bales should be either wire-bound or string-tied. Straw bales should be installed so that bindings are oriented around the sides (rather than along the tops and bottoms) of the bales in order to prevent deterioration of the bindings.

The barrier should be entrenched and backfilled. A trench should be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. The trench must be deep enough to remove all grass and other material which might allow underflow. After the bales are staked and chinked (filled by wedging), the excavated soil should be backfilled against the barrier. Backfill soil should conform to the ground level on the downhill side and should be built up to 4 inches against the uphill side of the barrier.

Each bale should be securely anchored by at least 2 stakes or re-bars driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together. Stakes or re-bars should be driven deep enough into the ground to securely anchor the bales. For safety reasons, stakes should not extend above the bales but should be driven in flush with the top of the bale.

The gaps between the bales should be chinked (filled by wedging) with straw to prevent water from escaping between the bales. Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency. Wedging must be done carefully in order not to separate the bales.

When used in a swale, the barrier should be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment-laden runoff will flow either through or over the barrier but not around it.

Sedimentation Fence

Materials and Installation shall be per Section 670.40 and 670.60 of the Standard Specifications and the following:

Sedimentation fence shall only be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

When used with compost filter tubes, the tube shall be placed on a minimum of 8 inches of folded fabric on the upslope side of the fence. Fabric does not need to be trenched.

When used with straw bales, an 8-inch deep and 4-inch wide trench or V-trench shall be dug on the upslope side of the fence line. One foot of fabric shall be placed in the bottom of the trench followed by backfilling with compacted earth or gravel. Stakes shall be on the down slope side of the trench and shall be spaced such that the fence remains vertical and effective.

Width of fabric shall be sufficient to provide a 36-inch high barrier after fabric is folded or trenched. Sagging fabric will require additional staking or other anchoring.

MAINTENANCE

Maintenance of the sediment control barrier shall be per Section 670.60 of the Standard Specifications or per the Stormwater Pollution Prevention Plan (SWPPP), whichever is more restrictive.

The contractor shall inspect the sediment barrier in accordance with relevant permits. At a minimum, barriers shall be inspected at least once every 7 calendar days and after a rain event resulting in 0.25 inches or more of rainfall. Contractor shall be responsible for ensuring that an effective barrier is in place and working effectively for all phases of the Contract.

Barriers that decompose such that they no longer provide the function required shall be repaired or replaced as directed. If the resulting berm of compost within the fabric tube is sufficiently intact (despite fabric decay) and continues to provide effective water and sediment control, barrier does not necessarily require replacement.

DISMANTLING & REMOVING

Barriers shall be dismantled and/or removed, as required, when construction work is complete and upslope areas have been permanently stabilized and after receiving permission to do so from the Engineer.

Regardless of site context, nonbiodegradable material and components of the sediment barriers, including photo-biodegradable fabric, plastic netting, nylon twine, and sedimentation fence, shall be removed and disposed off-site by the Contractor.

For naturalized areas, biodegradable, natural fabric and material may be left in place to decompose on-site. In urban, residential, or other locations where aesthetics is a concern, the following shall apply:

- Compost filter tube fabric shall be cut and removed, and compost shall be raked to blend evenly (as would be done with a soil amendment or mulch). No more than a 2-inch depth shall be left on soil substrate.
- Straw bales shall be removed and disposed off-site by the Contractor. Areas of trenching shall be raked smooth and disturbed soils stabilized with a seed mix matching adjacent seeding or existing grasses (i.e., lawn or native grass mix).

- Sedimentation fence, stakes, and other debris shall be removed and disposed off-site. Site shall be restored to a neat and clean condition.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 767.121 will be measured and paid for at the contract unit price per foot of sediment control barrier which price shall include all labor, equipment, materials, maintenance, dismantling, removal, restoration of soil, and all incidental costs required to complete the work.

Additional barrier, such as double or triple stacking of compost filter tubes, will be paid for per foot of tube installed.

Barriers that have been driven over or otherwise damage by construction activities shall be repaired or replaced as directed by the Engineer at the Contractors expense.

ITEM 991.2 CONTROL OF WATER – STRUCTURE NO. C-20-004 LUMP SUM

Work under these Items shall conform to the relevant provisions of Sections 7.02 and 140 of the Standard Specifications, all applicable environmental regulations and permits, and the following:

The work to be performed under these Items shall include all work necessary for the control of water within the excavations and demolition areas and to divert and/or channelize the flow of water for the construction of North Poland Road Bridge and the dumped riprap scour protection in the dry. The work shall include designing, furnishing, installing, maintaining, operating, and removing temporary dewatering systems as required, to lower and control water levels. Work also includes properly disposing of pumped water, constructing, maintaining, observing, and removing of equipment and instrumentation for control of the system. The dewatering system shall not directly discharge into Poland Brook.

It is the responsibility of the Contractor to determine the need and extent of dewatering required, sedimentation and dewatering techniques and controls and submit method and materials he/she proposes to use for approval by the Engineer.

Plans and calculations for the water control measures shall be developed by the Contractor for this Item. The plans and calculations shall be prepared and stamped by a Professional Engineer registered in the Commonwealth of Massachusetts and shall be submitted for review and approval prior to the start of construction.

The Contractor shall use such equipment and shall perform the operations in such a manner that boiling or other disturbances of the soil in the foundation area will be prevented. The Contractor shall keep the excavated area dry by such means that the water will be prevented from entering the excavations and adversely affecting the stability of the foundation material or supporting soils.

The pumping discharge shall not be allowed to enter directly into the water from the work areas, rather it shall be pumped to a temporary stilling basin or other appropriate treatment or containment device. The criteria that shall be implemented for the control of water must meet the following:

1. The enclosure shall be adequately sized and designed to achieve adequate water quality treatment/sedimentation trapping and prevent overtopping from dewatering and to provide the required filtering or containment.
2. Seepage removed by the dewatering system shall be free of soil fines.
3. The outlet from the containment structure shall not cause erosion of the surrounding area. An approved method of controlling erosion, such as an erosion control blanket, stone, etc. shall be used at the outlet.
4. Impacts from dewatering will be minimized by designing support walls for minimal leakage, covering trucks, barges and stockpiles during rain events and land contouring to limit surface runoff from leaving the dewatering site.
5. Dewatering will not take place within wetland or water resource areas.
6. Dewatered excavated material will be transported to the disposal site in accordance with local, state, and federal regulations.
7. The control of water containment structure shall be maintained as follows:
   a. Inspect at least twice daily during dewatering operations.
   b. Repair any damage immediately.
   c. Clean containment structure daily. Remove any debris immediately.
   d. Remove sediments when accumulated deposits reach a depth of 6 inches
   e. Dispose sediments outside of saltwater marsh area limits at a location approved by the Engineer.

The Contractor shall inspect the outlet daily and maintain the erosion controls at the outfall.

Placement of the dewatering stilling structure will be specified in the dewatering plan and will be submitted for approval by the Engineer. Pumping shall be conducted in a manner which will not adversely affect the freshly placed concrete within the excavation.

The Contractor shall provide and maintain pumps, pipes and other devices to promptly and continually remove and dispose of water from the excavation areas. The size and configuration of pumps and pipes shall be selected by the Contractor.

The Contractor is advised that the effectiveness of the water control method used will vary based on the field conditions and the time at which the actual excavation work is being performed. The Engineer shall order the Contractor to stop all excavation operations when in his judgment the Contractor's water control operations are failing to produce adequate results or are posing a threat to the environment.

SUBMITTALS

Submit the following documents related to dewatering:

- Qualifications of the Contractor’s Professional Engineer water diversion and dewatering designer
- Design of the water diversion and dewatering systems
- Site visit reports by the Contractor’s Professional Engineer water diversion and dewatering designer.

BASIS OF PAYMENT

Payment for work under these Items shall be paid at the contract unit LUMP SUM bid price. Payment for all water control work, including design for the dewatering and treatment operations, used to

maintain a water free excavation for construction of the proposed work shall include all labor, tools and equipment materials and installation, piping, pumping, maintenance, subsequent removal of all related materials and equipment all as outlined above; and restoration of site shall be included in the lump sum contract price bid under these Items. This work will include preparation of the Construction Water Diversion and Dewatering Plan.

APPENDIX K

- **Hydraulic Analysis**

HYDRAULIC STUDY REPORT
Town of Conway
North Poland Road over Poland Brook

Bridge No. C-20-004 (0F1)

Franklin County, District 1

Project File No. 609082

Prepared By:

MassDOT/Hydraulics Unit

June 27, 2023

massDOT
Massachusetts Department of Transportation

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1. Executive Summary

The following report presents the hydrologic, hydraulic and scour analysis conducted for the North Poland Road crossing over Poland Brook in the Town of Conway, Franklin County in Massachusetts. The intent of this study is to evaluate the hydraulic performance of the existing and replacement alternatives for the subject crossing. This investigation was conducted in a manner consistent with American Association of State Highway Officials (AASHTO), Federal Highway Administration (FHWA), and Massachusetts Department of Transportation (MassDOT) guidelines for preparation of hydraulic studies at bridge sites.

The scope of this investigation consisted of review of pertinent hydrologic analysis data for the Poland Brook at the project site and a detailed hydraulic analysis. Data collected, hydraulic model input/output and scour calculations are presented in the appendices of this report. A narrative discussion of the problem statement, engineering methods, as well as conclusions of the hydraulic study follows.

2. Project Description

The following sections describe the project location along with existing condition and proposed project.

2.1 Project Location

The bridge is located on North Poland Road over Poland Brook, in the Town of Conway in Franklin County, Massachusetts **(Figure 2-1)**.

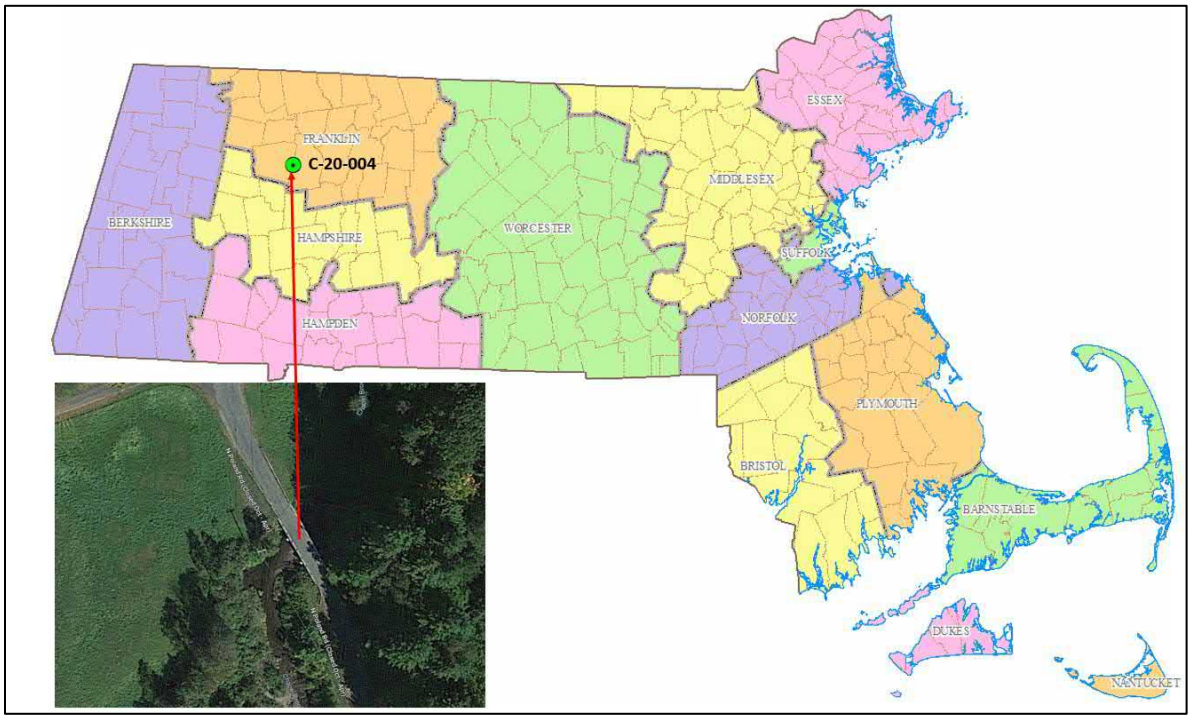


Figure 2-1 Project Location

2.2 Highway Conveyed

North Poland Road is classified as a Rural Major Collector. As per the 2017 average daily traffic (ADT) information, this bridge conveys an ADT volume of about 776 vehicles per day, with 6% of which may be trucks *(1)*.

2.3 Land Use in the Vicinity of the Bridge

Land use near the bridge is a mix of forest, very low density residential and cropland **(Figure 2-2)**.

Figure 2-2 Land Use Pattern

2.4 Special Site Considerations

The existing bridge spans over the National Flood Insurance Program (NFIP) Zone A of the regulatory floodway delineations in the June 4, 1980, Town of Conway, Franklin County Flood Insurance Rate Map (FIRM) *(2,3)*, **Figure 2-3**. Zone A refers to the area where detailed analyses are not performed; no depths or base flood elevations are shown within these zones. Hence, No-Rise analysis is not required.

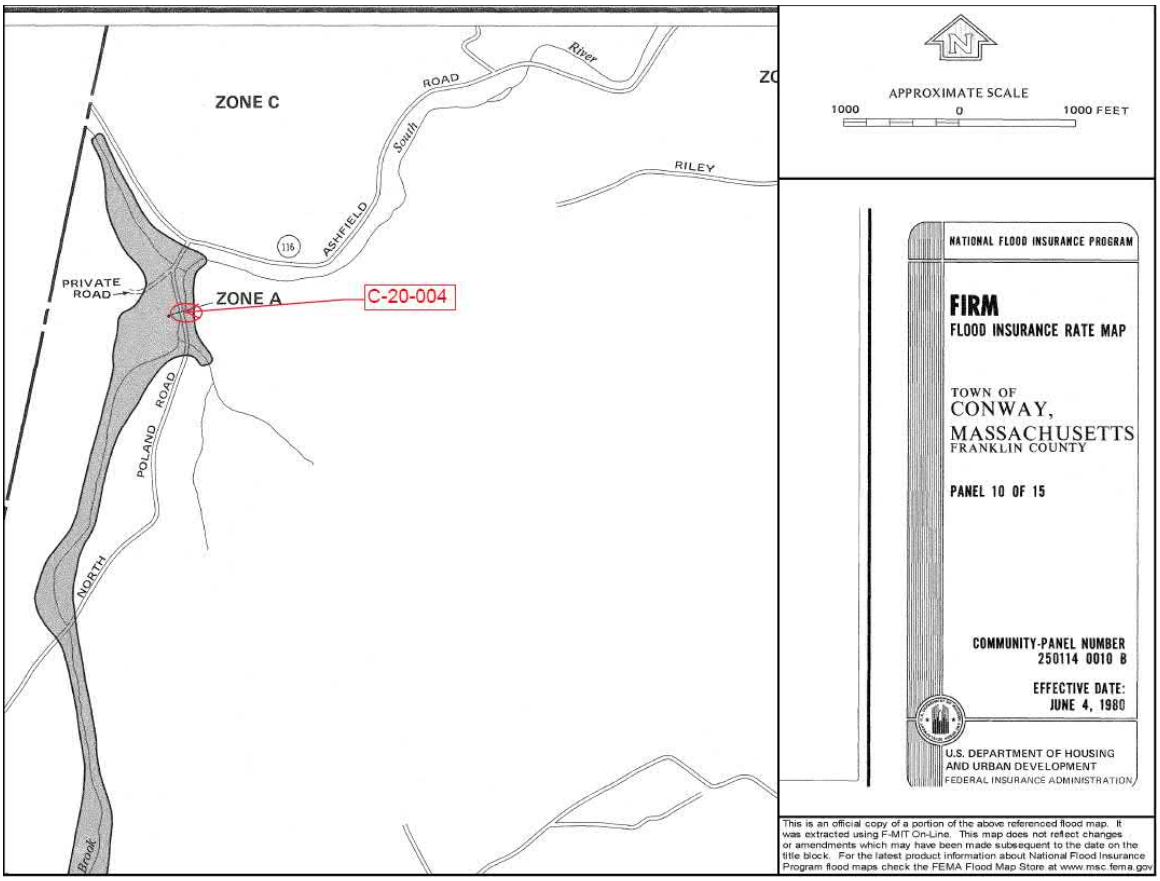


Figure 2-3 Flood Insurance Rate Map (FIRM)

2.5 Existing Structure

The North Poland Road Bridge is designated as Bridge No. C-20-004/0F1 in the NBIS inventory. The existing bridge was built in 1940 with no record of reconstruction. The structure has a National Bridge Inspection Standard (NBIS) Item 113 (Scour Critical Bridges) of 4, which states that the "*Bridge foundations determined to be stable for calculated scour conditions; field review indicates action is required to protect exposed foundations from effects of additional erosion and corrosion" (1,4).*

The existing Bridge is a three-span simply supported steel stringer bridge with concrete stub abutments. The bridge has a clear skew span of about 64'8". The bridge supports a deck with an out-to-out width of approximately 17.4 feet. The Existing bridge low chord is located at elevation 799.4 feet (NAVD88), with the corresponding top of roadway elevation located at elevation 802.4 feet (NAVD88). The channel bottom elevation at the bridge location is around 787.8 feet (NAVD88). **Figures 2-4 and 2-5** show the existing bridge obtained from the recent survey.

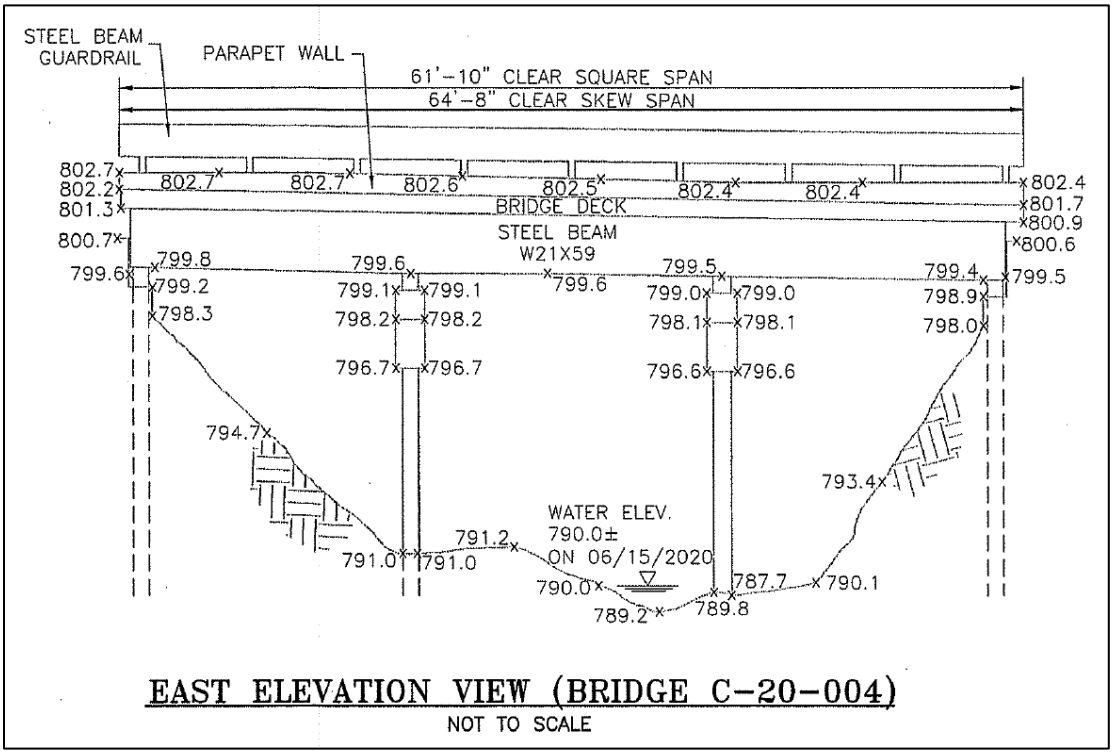


Figure 2-4 Existing Bridge East Elevation View

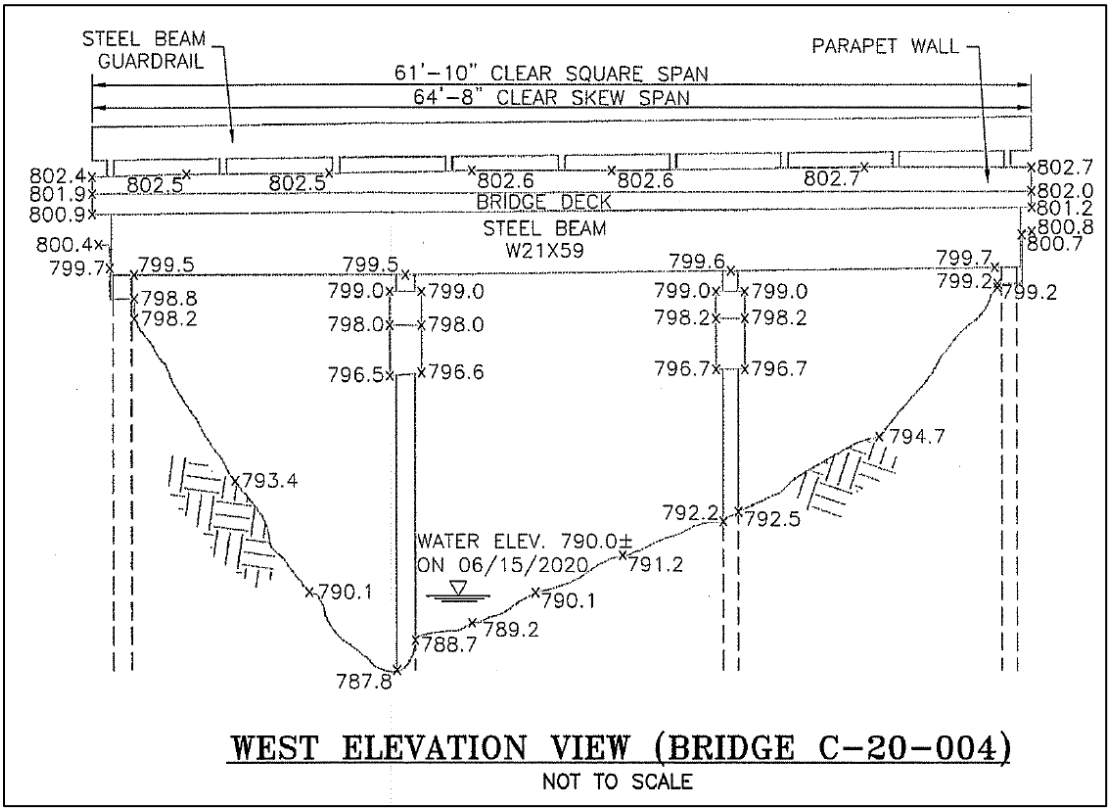


Figure 2-5 Existing Bridge West Elevation View

2.6 Proposed Structure

The principal project objective is to upgrade the existing load and service capacity to current highway standards along North Poland Road. The proposed plan is to replace the existing bridge with increased hydraulic opening by removing piers. The proposed bridge will have a deck out-to-out width of 27'-3" and a low chord of 798.8'. The square span at the bridge is 80'-4". **Figures 2-6 and 2-7** show the proposed cross section and longitudinal section of the bridge.

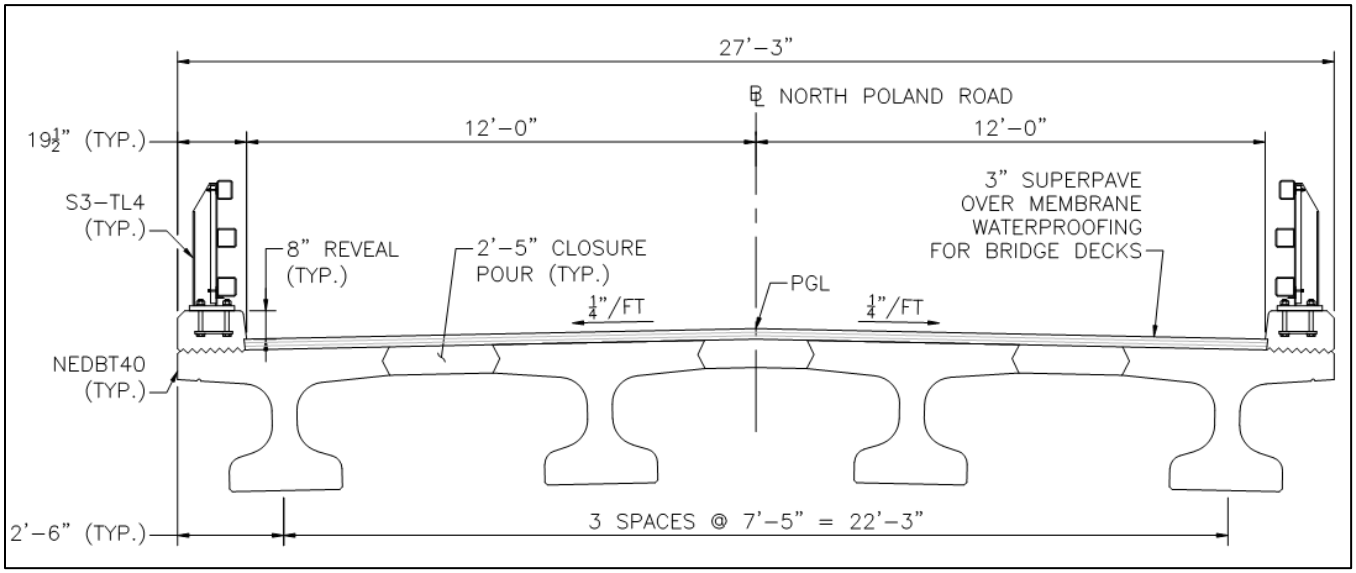


Figure 2-6 Proposed Bridge Cross Section

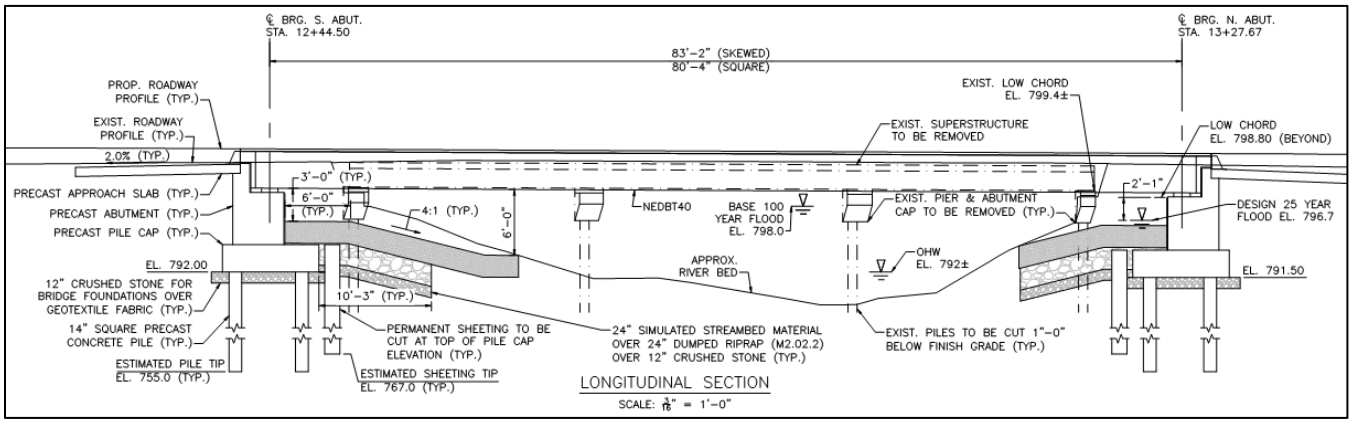


Figure 2-7 Proposed Bridge Longitudinal Section

2.7 Design Criteria

The design of the proposed bridge should comply with certain State and Federal regulations and criteria.

2.7.1 Hydraulic and Scour Design Frequency

In accordance with the MassDOT LRFD Bridge Manual Section 1.3.4, the hydraulic and scour design flood frequencies are as follows *(5)*:

- Hydraulic Deign Flood = 4% AEP [25-year]
- Scour Design Flood = 2% AEP [50-year]
- Scour Check Flood = 1% AEP [100-year]

2.7.2 Freeboard Requirement

In accordance with the MassDOT LRFD Bridge Manual Section 1.3.2, a freeboard of two feet must be provided between the design flood water surface elevation and the proposed bridge's low chord, to allow for the passage of debris and ice.

2.7.3 FEMA Regulatory Compliance

The existing bridge spans over the National Flood Insurance Program (NFIP) Zone A of the regulatory floodway delineations. Hence, the "No Rise" hydraulic analysis, as outlined in MassDOT Bridge LRFD Manual, Chapter 1, and Subsection 1.3.5 *(5)*, is not required for this project.

3. Hydrologic Study and Analysis

The objective of the hydrologic study and analysis was to understand the watershed characteristics and to establish the peak flood discharges and boundary conditions required for the hydraulic and scour analyses. The functional classification of North Poland Road is Rural Major Collector; therefore, the hydraulic design flood frequency is the 4% (25-year) annual chance event based on Table 1.3.4-4 of the LRFD Part I *(5).*

3.1 Watershed Characteristics

The Poland Brook originates from the Town of Ashfield and flows in the northeast direction. It joins the South River soon after it crosses the subject bridge. The South River flows easterly and confluences with Deerfield River. Since the South River confluences with the Poland brook immediately after it crosses the bridge C-20-005, this bridge is also included in the analysis to see its effect on the subject bridge. However, detailed analysis of C-20-005 bridge is beyond the scope of this study.

The contributing drainage area at the bridge was delineated using the USGS StreamStats Web application. The river's drainage area at the crossing site was estimated to be 6.66 square miles as per StreamStats (*6*, **Figure 3-1**). The basin characteristics and estimates of flow statistics using USGS regression equations were also obtained using this application *(7)*.The watershed contains a mix of land use with around 87.02% forest and 3.84% developed (urban) land. The watershed has 3.18% of combined wetlands and water bodies. The mean basin slope computed from a 10-meter DEM was around 14.15% as per StreamStats. The mean basin elevation of the watershed is around 1280 feet. The bankfull width of the stream at the bridge location is around 35.8 feet and bankfull depth is around 1.8 feet. The bankfull streamflow is around 262cfs.

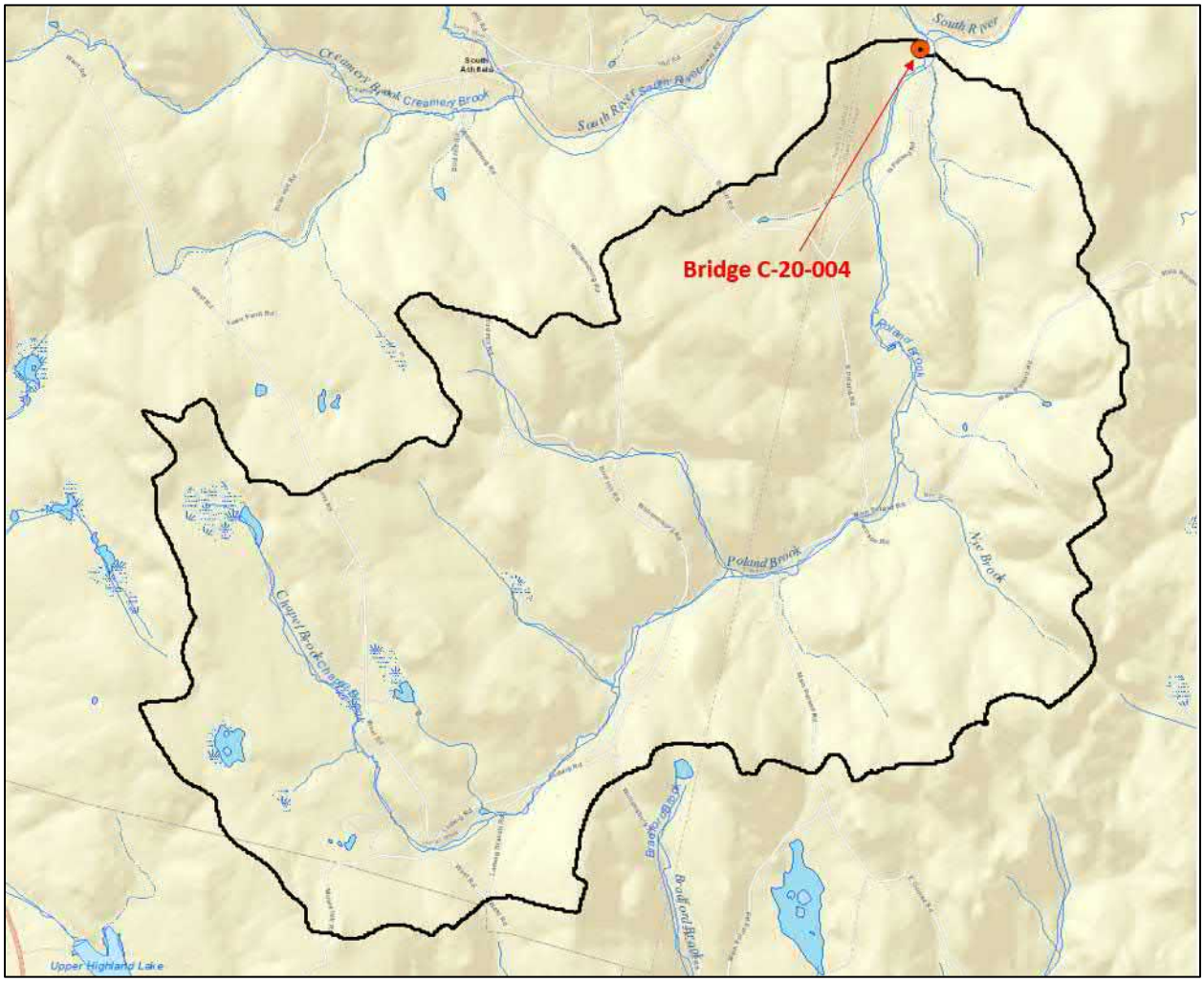


Figure 3-1 Drainage Area

3.2 Nature of Flood Risk

As per the 1979 Flood Insurance Study report, major flooding occurred in the Conway area in 1869 and 1878. Both floods occurred after the failure of dams upstream of the center of the dam.

3.3 Prior Hydrological Studies

This section summarizes any prior studies conducted on Poland River, in the watershed or in the project vicinity.

3.3.1 FEMA

As per the June 4th, 1980, Flood Insurance rate map, the bridge is in Zone A, which refers to the area where detailed analyses are not performed; no depths or base flood elevations are shown within these zones. No other previous reports were available for this study area.

3.4 Hydrologic Analysis (Riverine)

Hydrologic analyses were conducted to estimate the peak design discharges at the bridge location. The following sections briefly describe the analyses performed and the recommended methodology.

3.4.1 Climate Change Indicator

Most bridges are designed and built under current stream and hydrologic conditions. To design a bridge to be resilient to future changes in stream conditions, FHWA recommends using "The Climate Change Indicator (*CCI*)" to determine the levels of analysis for performing risk and vulnerability assessments for a project. The *CCI* is a measure of how much the mean value of the T-year 24-hour precipitation is changing from observed to projected conditions. This projected change is a useful indicator for evaluating the potential for changes in flood flows resulting from projected climate change. *CCI* is calculated using the equation below *(8).*

$$CCI = \frac{P_{24,T,P} - P_{24,T,O}}{P_{24,T,O,U} - P_{24,T,O}}$$

Where:
CCI – is the Climate Change Indicator
$P_{24,T,P}$ – is the Projected T-Year 24-hour precipitation
$P_{24,T,O}$ – is the Observed T-year 24-hour precipitation
$P_{24,T,O,U}$ – is the upper 90% confidence limit T-year 24-hour precipitation for the observed data

The observed T-year 24-hour precipitation ($P_{24,T,O}$) and the upper 90% confidence limit T-year 24-hour precipitation for the observed data ($P_{24,T,O,U}$) were obtained from NOAA Atlas-14 for the project area *(9)*. The downscaled daily precipitation data along with location, global climate models, and emissions scenarios were downloaded for the project site from the DCHP (Downscaled CMIP Climate and Hydrology Projections) archive. The FHWA CMIP (Coupled Model Intercomparison Project) Processing Tool Version 2.1 (2020), is used for processing this data for estimating the projected T-year 24-hour precipitation ($P_{24,T,P}$).

This tool is a web-based software package that processes readily available downscaled climate data at the local level into relevant statistics for transportation planners and designers *(10,11).* Using the FHWA CMIP Climatic Data Processing Tool, this data from the DCHP website was processed to future return period precipitation variables. The hence estimated CCI for various flood frequencies are presented in **Table 3-1**.

Table 3-1 Climate Change Indicator (CCI)

Climate Change Indicator (CCI)							
50% (2-yr)	20% (5-yr)	10% (10-yr)	4% (25-yr)	2% (50-yr)	1% (100-yr)	0.5 % (200-yr)	0.2% (500-yr)
0.83	0.71	0.66	0.48	0.43	0.34	0.33	0.29

3.4.2 Selected Level of Analysis

The level of analysis is selected based on the discussion by the project team on the CCI values. There are 4 levels of analysis.

- A CCI value less than 0.4 requires only Level 1 analysis, which is based on the application of standard hydrologic design techniques.
- A CCI value more than 0.8 requires level 3 or 4 analysis, where detailed analysis on the projected precipitation is recommended.
- For CCI values between 0.4 and 0.8, the project specifics would need to be weighed by the design team and a suitable methodology is selected.

This project has a CCI value between 0.4 and 0.8 for both hydraulic and scour design flood. Hence, the project specifics were weighed by the design team and decided to perform a level 2 analysis. Levels of analysis for range of CCI values are shown in a flow chart created by MassDOT and is presented in Appendix A of this report.

3.4.3 Regional Regression Equations

Various streamflow statistics and peak discharges were estimated using StreamStats' web-based Geographic Information Systems (GIS) application at the bridge location. This was achieved by solving regression equations developed by USGS, prepared in cooperation with MassDOT. The regression equations generally were developed separately for each state and are incorporated into the StreamStats application. Drainage area, mean basin elevation, percent basin area classified as wetlands, and open water are the selected basin characteristics considered in the development of regional flood flow regression equations for Massachusetts. The State Regional equations to estimate peak flood discharges at ungagged sites were developed using known peak flood discharges at selected gaged sites and their respective basin characteristics.

3.4.4 Steep Stream Method

For watersheds with a main channel slope that exceeds 50 feet per mile, peak flows can be estimated using the watershed drainage area and the mean annual precipitation. The series of regression equations developed for these steep watersheds were found to perform as well or better than the individual State regression equations. The Hydraulic Section estimated the peak discharges using steep gradient stream equations (*12*). The Poland brook comes under the steep stream criteria with a mean channel slope of 87 feet per mile and with a mean annual precipitation of 52.3 inches.

3.4.5 Selection of Design Discharges

The USGS StreamStats peak flows and peak flows estimated using Steep Stream equations are presented in **Table 3-2** for comparison. For watersheds having the main channel slopes that exceed 50 feet per mile, the steep watershed regression equations appear to be better than the individual State regression equations. Hence, the Steep stream flows presented in the table below were used for the existing and proposed condition hydraulic and scour analysis. Supporting documents and hydrologic calculations are included in **Appendix A** of this report.

Table 3-2 Summary of Peak Discharges

Methodology	Drainage Area (mi^2)	Peak Discharges (cfs)						
		50% (2-yr)	20% (5-yr)	10% (10-yr)	4% (25-yr)	2% (50-yr)	1% (100-yr)	0.2% (500-yr)
Bridge C-20-004								
Regression Equation	6.66	305	519	697	965	1,190	1,440	2,130
Steep Stream [1]	**6.66**	380	615	826	1,111	1,331	1,564	2,309
Bridge C-20-005								
Regression Equation	8.86	396	671	900	1,240	1,540	1,860	2,740
Steep Stream [1]	**8.86**	**500**	**809**	**1,088**	**1,464**	**1,754**	**2,062**	**3,047**

1. Flows used for design

4. Two Dimensional (2D) Hydraulic Analysis

The scope of this study was to perform a two dimensional steady-state hydraulic analysis to estimate the design flood elevations for the existing and proposed bridge design. The two-dimensional hydrodynamic model was developed using US Department of Interior, Bureau of Reclamation's SRH-2D model, in Aquaveo's Surface Water Modeling (SMS 13.1.17) interface (*13*). SRH-2D is a two-dimensional finite-volume numerical model for the river systems and solves the 2D depth averaged dynamic wave equations. The SRH-2D model was used to develop flood elevation profiles for various return events at the project site. The datum used in all hydraulic models is NAVD 1988 unless specified.

4.1 Existing Condition Model Development and Analysis

The existing condition SRH-2D model was developed using the actual surveyed channel bathymetry and extracting model parameters such as manning's roughness co-efficient as per actual ground conditions and land use data. Following sub sections describe the model development.

4.1.1 Model Domain and Mesh Development

A hybrid mesh was developed using triangular and quadrilateral cells with smaller cell size within the channel and around the bridge and larger cell size at the overbanks where flow is not much affected. The upstream limit of the 2D hydrodynamic mesh is located approximately 1,475 feet stream length upstream of the subject bridge and the downstream limit of the model is located approximately 775 feet stream length downstream of the subject bridge. The 2D model domain is shown in **Figure 4-1** which includes the subject bridge. This model domain includes bridge C-20-005 as well to see the effect of backwater, if any, at the C-20-004 bridge. The flow

from C-20-004 bridge confluences with the flow from C-20-005 bridge and then flows downstream.

Figure 4-1 Existing Condition 2D Model Domain

4.1.2 Terrain Data and Scatter Set

The two-dimensional existing condition SRH-2D model was developed by incorporating relevant elevation data upstream and downstream of the subject bridge. The terrain data was obtained by MassDOT Survey Unit. However, the survey data covered the channel bathymetry only. Hence, the survey data was supplemented with LiDAR data, which was obtained from MassGIS website, to cover the floodplain areas (*14*). The terrain data was processed using ArcGIS, Civil 3D and SRH-2D (*18,19,20*) . This merged terrain data was then converted to a scatter set to provide elevation information for the existing mesh. **Figure 4-2** shows the model domain with elevation data. The mesh is color hatched to represent the topographic and bathymetric surface. **Figure 4-3** shows a three-dimensional closer view of the bridge.

Figure 4-2 SRH-2D Finite Element Mesh for the 2D Existing Condition Analysis

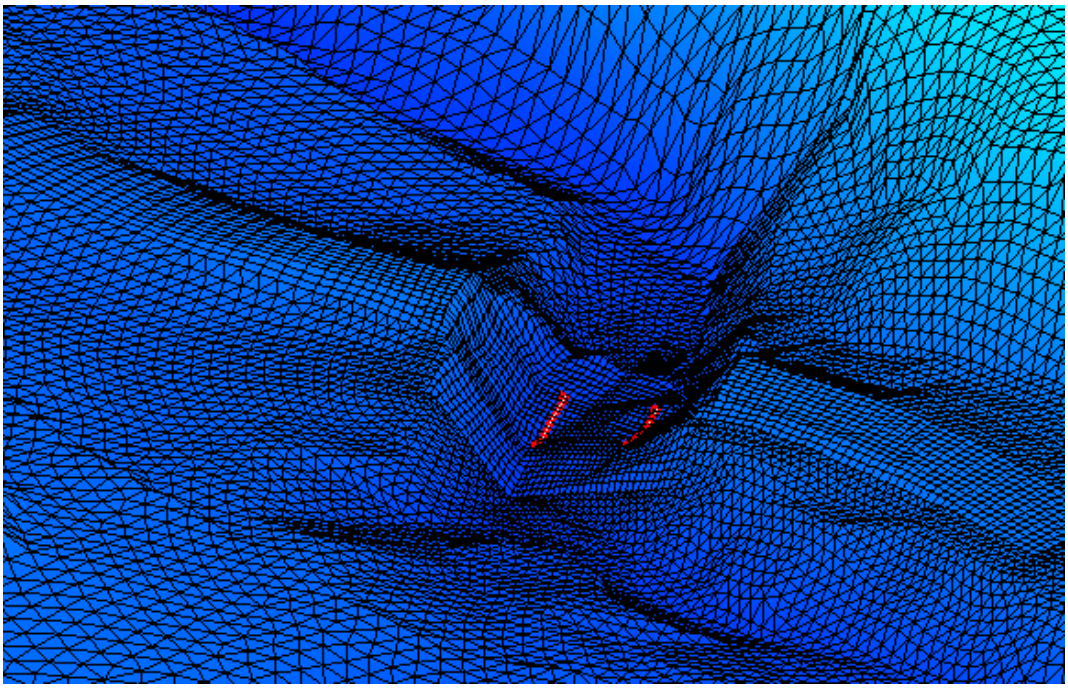


Figure 4-3 Existing Bridge (C-20-004) Mesh-3D View

4.1.3 Material File or Manning's n Value

The Manning's roughness coefficient was selected based on aerial photographs and site visit photographs to reflect current conditions. For this, the land use data was obtained from Massachusetts GIS land use digital dataset. This dataset was then used for creating the material file for the 2D model. Manning's n values were assigned to the material file depending on the type of land use. A manning's 'n' values of 0.035 was used for the channel flow and values between 0.04 and 0.1 were used for overland flows. **Table 4-1** shows the manning's 'n' value used for the material file. The land use coverage for the SRH-2D model is shown in **Figure 4-4**.

Table 4-1 Land Use Type and Manning's n Value

Land Use	Manning's n roughness Coefficient[1,2]
Forest	0.1
Water/Channel	0.035
Very low density residential	0.1
Low density residential	0.1
Non-Forested Wetland	0.07
Cropland	0.04
Open land	0.04
Nursery	0.04

(1) Hydraulic Design Series-4, Appendix B

Figure 4-4 Land Use Coverage used in SRH-2D Model

4.1.4 Monitoring Lines

Monitoring lines were added upstream and downstream of the subject bridge, to confirm that continuity is met. Monitor points were added upstream where the flow is introduced, under the bridge and downstream of the bridge before the flow exits the mesh. It was verified that the model produced a stable solution and the simulation had run long enough to attain a steady state condition.

4.1.5 Observation lines

Observation arcs were created to get the river profile, at the approach section and at the bridge contracted section of the subject bridge to extract model results for hydraulic and scour calculations.

4.1.6 Boundary Conditions

Steady-State boundary conditions were applied to all 2D model scenarios. Three boundary condition lines were added in the model. The peak flows highlighted in Table 3-2 were applied as subcritical inflows at the upstream boundary condition line for the subject bridge in the SRH-2D model. Also corresponding flows were added at the C-20-005 bridge. Subcritical outflow was selected as the downstream boundary condition. A constant water surface elevation was estimated at the downstream boundary condition line using manning's equation. The energy slope selected for the normal depth boundary condition was 0.0027 to estimate the downstream constant water surface elevation.

The hence developed, existing condition model was used for the two dimensional steady-state SRH-2D analysis. All simulations were run until a steady state result was obtained.

4.2 Proposed Condition Analysis

The recommended proposed alternative described in Section 2.6 was evaluated in the proposed condition analysis. The existing mesh was modified to reflect the proposed opening. All other model parameters were maintained from the existing condition model. Hydraulic Analysis to evaluate the project impact due to proposed construction was performed. The proposed mesh developed for 2D modeling is shown in **Figure 4-5**.

4.2.1 Project Impact

The proposed condition analysis was performed to evaluate the project impact due to bridge replacement. All flood simulations were run in a subcritical flow regime. For the peak flows presented in Table 3-3, constant water surface elevations calculated based on normal depth slopes were used as the upstream and downstream boundary conditions, respectively.
It is observed that the proposed alternative did not have any increase in WSEL for the hydraulic and scour design flood event and it safely conveyed the maximum allowed design flood.

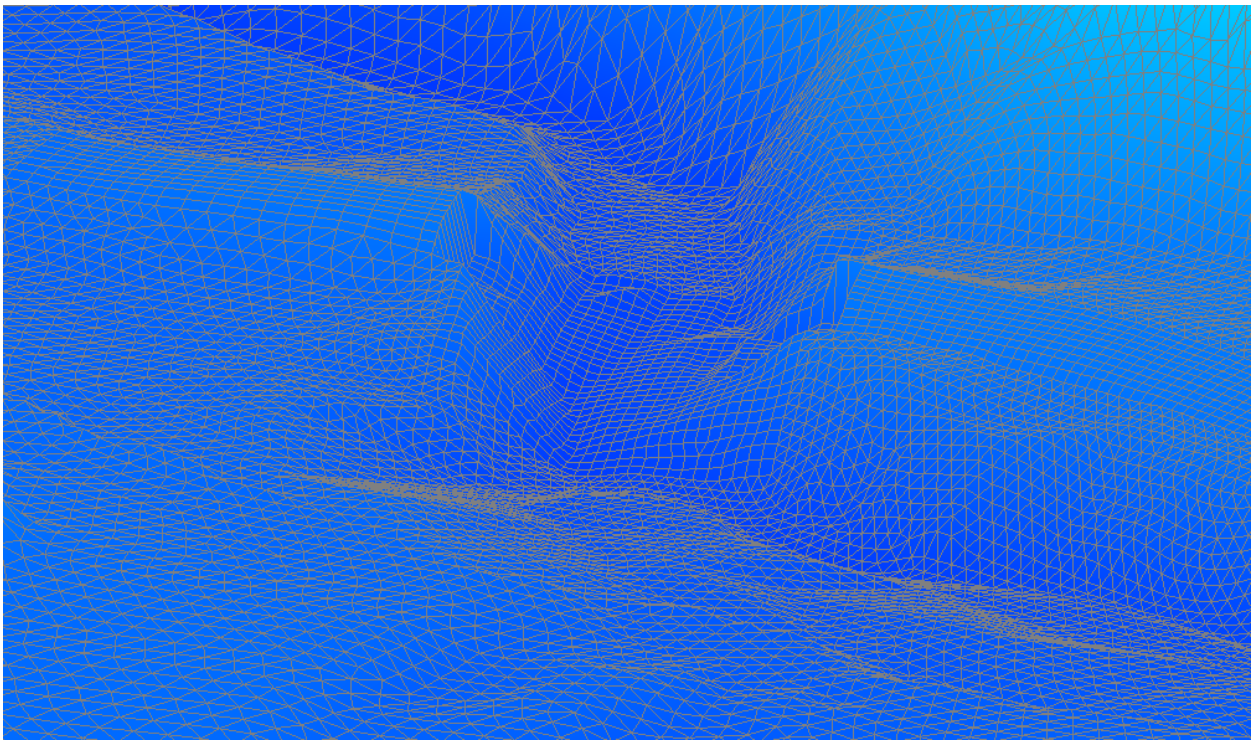


Figure 4-5 Proposed Bridge Mesh-3D View

4.3 Summary of Hydraulic Performance

The hydraulic performance at the upstream of bridge for both existing and proposed condition is summarized in **Table 4-2**. The water surface elevations are taken from the bridge upstream observation arc. The velocity results are taken between the banks of the channel at the contracted bridge section. For both water surface elevation and velocity, maximum values are taken for design. The freeboard predicted by the hydraulic model during the 4% annual chance design flood event for the existing and proposed alternative is 2.45 feet and 2.12 feet, respectively. The proposed structure meets the recommended freeboard requirements. Hydraulic model results are included in the **Appendix B** of this report.

Table 4-2 Summary of Hydraulic Performance

AEP % (Return period year)	Peak Flow @ C-20-004 (cfs)	Existing Condition		Proposed Alternative	
		WSEL (ft, NAVD)	Velocity (ft/s)	WSEL (ft, NAVD)	Velocity (ft/s)
10% (10yr)	826	796.08	5.88	795.68	5.38
4% (25yr)	1,111	797.09	6.23	796.68	5.71
2% (50yr)	1,331	797.81	6.41	797.38	5.96
1% (100yr)	1,564	798.54	6.51	798.04	6.11

5. Scour Analysis and Countermeasure Design

The functional classification of North Poland Road is Rural Major Collector; therefore, the scour design frequency for the bridge is the 2% (50-year), and the scour check frequency is the 1% (100-year) annual chance event based on Table 1.3.4-4 of the LRFD Part I. This section describes the methodology and analysis used to evaluate scour and design scour countermeasure.

5.1 Bridge Site Scour History

The Item 113 in the Structure Inventory and Inspection (SI&A) report is 4, which states that the bridge foundations are stable for the calculated scour. However, action is required to protect exposed foundations from the effects of additional erosion and corrosion. The channel has a history of scour exposing the pier walls. The 2019 inspection report indicated that there is scour along the north abutment up to 5" high and 10' long below bays 2 and 3 extends approximately 2' under the breastwall and has exposed two steel piles. Piles are exposed on the north and south piers. The SI&A Item 61 which describes the physical condition of the channel and stream stability has a code of 4. This indicates that "*bank and embankment protection is severely undermined. River control devices have severe damage. Large deposits of debris are in the channel."* Currently the bridge is closed.

5.2 Scour Analysis

Scour potential at the crossing site under MassDOT's existing and proposed conditions was analyzed using the requirements set forth by MassDOT's LRFD Bridge Manual and AASHTO LRFD Bridge Design Specifications, Sections 2.6.4.4.2 and 3.7.5 and using the guidelines by FHWA HEC-18, "Evaluating scour at bridges" *(15)*, HDS-7, "Hydraulic Design of Safe Bridges" *(16)* and HEC-23, "Bridge Scour and Stream Instability Countermeasures" *(17)*.

Our general analytical approach was to estimate long term aggradation/degradation, flood related contraction (conveyance reduction) and local (vortex induced) abutment scour depths for the 2% and 1% chance flood events. In this study, the abutment scour is calculated using National Cooperative Highway Research Program (NCHRP 24-20) method described in HEC-18.
The hydraulic variables for scour calculations were obtained from the SRH-2D hydrodynamic model results at the approach and contracted bridge sections. The soil data for scour calculations was obtained from sampling and analysis conducted as part of this project. No historical data was available to calculate scour due to long term aggradation and degradation. In the scour design and check event analyses, it is assumed that the channel bed elevation will not degrade over the service life of the bridge. This was based on the available historic and current streambed data. A summary of computed 2% and 1% annual chance flood scour depths under existing and proposed site conditions is presented in **Table 5-1**. See **Appendix C** for detailed scour calculations.

Table 5-1 Summary of Calculated Scour

Alternative	AEP % (Return period year)	Contraction Scour (feet)	Design Abutment Scour (feet)
Existing Condition	2% (50yr)	0.11	5.05
	1% (100yr)	0.21	5.76
Proposed Alternative	2% (50yr)	0.0	2.05
	1% (100yr)	0.0	2.58

5.3 Scour Countermeasure Design

Scour countermeasures are designed for the proposed crossing using the guidance set forth in the Federal Highway Administration, Hydraulic Engineering Circular-23 (HEC-23) Bridge Scour and Stream Instability Countermeasures. The summary of scour countermeasure design recommended for the subject bridge is presented in **Table 5-2**.

The FHWA HEC-23 recommended rip rap extents should be verified against actual site conditions and adjusted were necessary to fit within the actual project footprint sufficiently to project against scour. It is recommended that the existing channel bed material should be reclaimed and overlaid on top of the rip rap to maintain a natural channel through the crossing.

Table 5-2 Scour Countermeasure Design

Alternative	Riprap Size D_{50} (Inches)	Riprap Size D_{100} (Inches)	Riprap Thickness (Feet)	Riprap Extend along u/s and d/s face of the Embankment (Feet)
Proposed Alternative	9.0	18.0	1.5	25.0

6. Conclusions & Recommendations

6.1 Conclusions

1. The project hydraulic model predicts that both the existing bridge and the preferred replacement bridge type will safely convey the maximum allowed design flood.
2. The freeboard predicted by the hydraulic model during the 4% annual chance design flood event for the existing and proposed alternative is 2.45 feet and 2.12 feet, respectively. The proposed structure meets the recommended two feet freeboard requirements.

6.2 Recommendations

1. The information in **Table 6-1** for the recommended alternative should be presented within the Hydraulic Data Tables in the General Notes of the Bridge Sketch and Construction Plan sets.
2. If countermeasure is used, the grades that will exist at the abutments should be stabilized with flexible revetments consisting of MassDOT Standard Specification M2.02.0 Riprap over a composite filter medium consisting of a layer of MassDOT

Standard Specification M2.01.0, crushed stone placed over an appropriate MassDOT Standard Specification M9.50.0 Geotextile Fabric membrane.

3. The calculated total scour depth presented in **Table 6-1** for the recommended alternative should be considered for use as a bridge foundation condition in LRFD strength and service and extreme event limit state foundation stability determination. Also, the design engineer should be cognizant that the proposed bridge substructure will meet the foundation scour stability requirements set forth in MassDOT Bridge LRFD Manual, Section 3.2.10.4, and presented below.

For new bridges or full bridge replacements, the substructures shall be designed to meet the requirements of Paragraphs 3.2.10.2 and 3.9.10.3 for the calculated design and check scour without using scour countermeasures.

Table 6-1 Hydraulic Design Data (Proposed Condition)

Hydraulic Design Data	
Drainage Area:	6.66 Square miles
Design Flood Annual Chance (Return Frequency):	4% (25 year)
Design Flood Discharge:	1,111 Cubic Feet Per Second
Design Flood Velocity:	5.71 Feet Per Second
Design Flood Elevation:	796.68 feet NAVD
Base (100- YEAR) Flood Data	
Base Flood Discharge:	1,564 Cubic Feet per Second
Base Flood Elevation:	798.04 Feet, NAVD
Design and Check Scour Data	
Scour Design Flood Annual Chance (Return Frequency):	2% (50 year)
Design Flood Abutment Scour Depth:	2.05 Feet
Scour Check Flood Annual Chance (Return Frequency):	1% (100 year)
Check Flood Abutment Scour Depth:	2.58 Feet
Flood of Record	
Discharge:	Not Known
Frequency (If known):	Not Known
Maximum Elevation:	Not Known
Date:	September 1938
History of Ice Floes:	None Documented
Evidence of Scour and Erosion:	Scour along north abutment and piers exposing piles

7. References

1. MassDOT NBIS Bridge Inspection File, Bridge No. C-20-004 (0F1)
2. Town of Conway, Flood Insurance Study (FIS), December 1979
3. Town of Conway, Flood Insurance Rate Map (FIRM), Number 250114 0010 B, June 4, 1980
4. Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges, FHWA-PD-96-001, December 1995 https://www.fhwa.dot.gov/bridge/mtguide.pdf & June 2012 Errata Sheet https://www.fhwa.dot.gov/bridge/errata.pdf
5. MassDOT Bridge Load and Resistance Factor Design (LRFD) manual, January 2020 Revision https://www.mass.gov/doc/chapter-1-bridge-site-exploration/download
6. U.S. Geological Survey (USGS) StreamStats Application. https://streamstats.usgs.gov/ss/
7. Zarriello, P.J., 2017, Magnitude of flood flows at selected annual exceedance probabilities for streams in Massachusetts: USGS Scientific Investigations Report 2016–5156, 54 p., https://doi.org/10.3133/sir20165156.
8. U.S. Department of Transportation, Federal Highway Administration, Publication No. FHWA-HIF-16-018_ Hydraulic Engineering Circular No. 17 (HEC-17), 2nd Edition, June 2016 "Highways in the River Environment-Floodplains, Extreme Events, Risk, and Resilience". https://www.fhwa.dot.gov/engineering/hydraulics/pubs/hif16018.pdf
9. NOAA Atlas 14 Point Precipitation Frequency Estimate: MA https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ma
10. FHWA Coupled Model Intercomparison Project (CMIP) Climate Data Processing Tool 2.1 https://fhwaapps.fhwa.dot.gov/cmip &
11. FHWA CMIP User's Guide, March 2021 https://www.fhwa.dot.gov/engineering/hydraulics/pubs/CMIP_Tool_User_Guide_Version_2_1_508_version_03092021.pdf
12. Dr. Jennifer Jacobs, PI, November 17, 2010, Estimating the Magnitude of Peak Flows for Steep Gradient Streams in New England, Prepared for The New England Transportation Consortium
13. Aquaveo, Surface-Water Modeling System Sedimentation and River Hydraulics – Two-Dimensional Model, Version 13.1.17.
14. MassGIS (Bureau of Geographic Information) https://www.mass.gov/orgs/massgis-bureau-of-geographic-information
15. Federal Highway Administration (FHWA), Hydraulic Engineering Circular, HEC-18 "Evaluating Scour at Bridges", April 2013
16. Federal Highway Administration (FHWA), Hydraulic Design Series, HDS-7 "Hydraulic Design of Safe Bridges", April 2012
17. Federal Highway Administration (FHWA), Hydraulic Engineering Circular, HEC-23 "Bridge Scour and Stream Instability Countermeasures", September 2009

8. Applications/Software

18. Sedimentation and River Hydraulics (SRH-2D), Version 13.1.17
19. Autodesk Civil 3D 2022
20. ESRI ArcGIS Desktop version 10.6.1

9. Appendices

Appendix A. Hydrologic Analysis

1. CCI Calculations
2. USGS StreamStats Report
3. Steep Stream Analysis Results

Appendix B. Hydraulic Analysis

1. Existing WSEL
2. Proposed WSEL
3. Existing River Profile
4. Proposed River Profile
5. Existing Condition Analysis Results
6. Proposed Condition Analysis Results

Appendix C Scour and Countermeasure Design

1. Soil Sample Results
2. Scour Calculations
3. Scour Countermeasure Design

Appendix A. Hydrologic Analysis

1. CCI Calculations
2. USGS StreamStats Report
3. Steep Stream Analysis Results

$P_{24,T,O}$ = Observed T-year 24-hour precipitation (*from NOAA Atlas 14 PFDS)*

$P_{24,T,O,U}$ = Upper 90% confidence limit T-year 24-hour precipitation for the observed data (*from NOAA Atlas 14 PFDS*)

	2-year	5-year	10-year	25-year	50-year	100-year	200-year	500-year
$P_{24,T,O}(P_{q,h})$ =	2.88	3.7	4.39	5.34	6.03	6.79	7.73	9.2
$P_{24,T,O,u}$ =	3.54	4.58	5.46	7	8.11	9.56	11	13.6

Projected T-year 24-hour precipitatipn ($P_{24,T,P}$) :

$$P_{q,p} = P_{q,h}(RFB_q)$$

$$P_{q,p} = P_{q,h}(RFB_{0.1})$$

RFB_q = Ratio of the model future to model baseline for the 24-hour precipitation quantile (*from CMIP tool*)

$RFB_{0.1}$ = Ratio of the model future to model baseline for the 24-hour precipitation 0.1 AEP quantile (*from CMIP tool*)

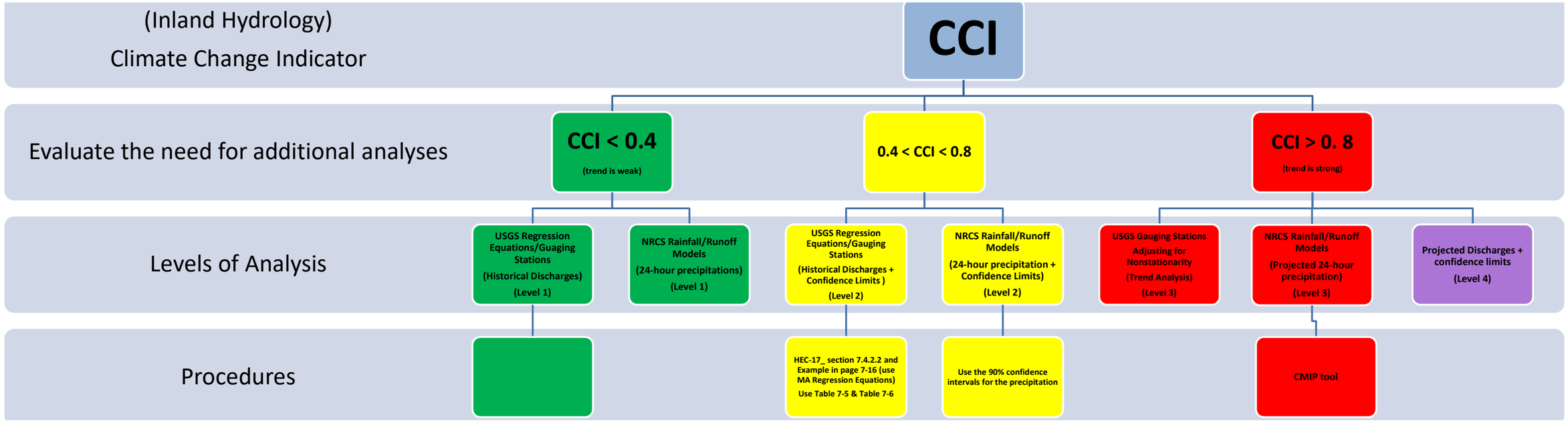
$P_{24,T,P}$ ($P_{q,p}$) = Projected T-year 24-hour precipitation

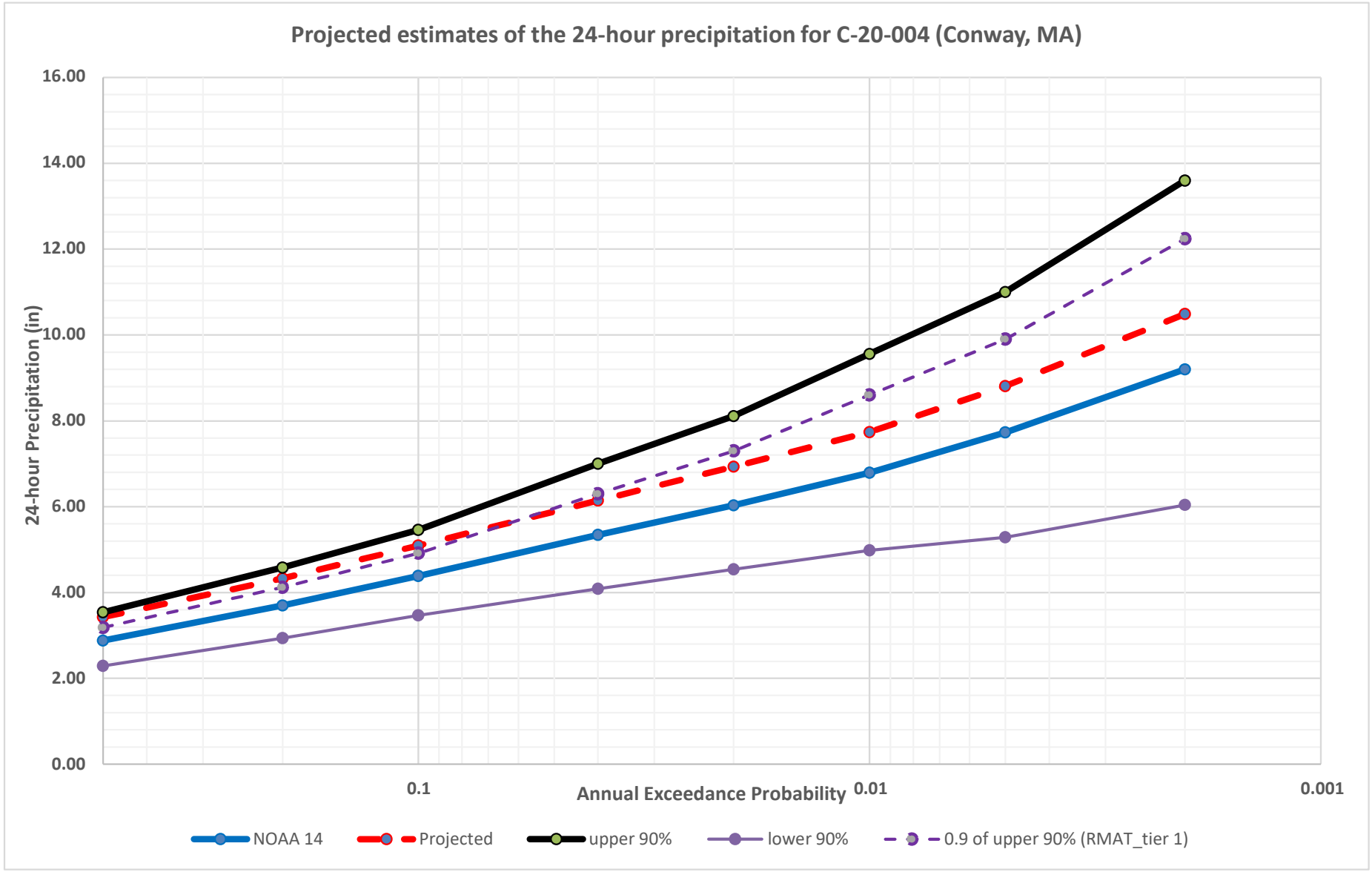
	2-year	5-year	10-year	25-year	50-year	100-year	200-year	500-year
RFB_q =	1.19	1.17	1.16	1.15	1.15	1.14	1.14	1.14
$P_{24,T,P}$ =	3.43	4.33	5.09	6.14	6.93	7.74	8.81	10.49

Climate Change Indicator (*CCI*) :

$$CCI = \frac{P_{24,T,P} - P_{24,T,O}}{P_{24,T,O,U} - P_{24,T,O}}$$

	2-year	5-year	10-year	25-year	50-year	100-year	200-year	500-year
CCI =	0.83	0.71	0.66	0.48	0.43	0.34	0.33	0.29


(Inland Hydrology)
Climate Change Indicator
CCI
Evaluate the need for additional analyses
CCI < 0.4
(trend is weak)
0.4 < CCI < 0.8
CCI > 0. 8
(trend is strong)
Levels of Analysis
USGS Regression Equations/Guaging Stations
(Historical Discharges)
(Level 1)
NRCS Rainfall/Runoff Models
(24-hour precipitations)
(Level 1)
USGS Regression Equations/Gauging Stations
(Historical Discharges + Confidence Limits)
(Level 2)
NRCS Rainfall/Runoff Models
(24-hour precipitation + Confidence Limits)
(Level 2)
USGS Gauging Stations
Adjusting for Nonstationarity
(Trend Analysis)
(Level 3)
NRCS Rainfall/Runoff Models
(Projected 24-hour precipitation)
(Level 3)
Projected Discharges + confidence limits
(Level 4)
Procedures
HEC-17_ section 7.4.2.2 and Example in page 7-16 (use MA Regression Equations)
Use Table 7-5 & Table 7-6
Use the 90% confidence intervals for the precipitation
CMIP tool


Projected estimates of the 24-hour precipitation for C-20-004 (Conway, MA)
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
24-hour Precipitation (in)
0.1
0.01
0.001
Annual Exceedance Probability
NOAA 14
Projected
upper 90%
lower 90%
0.9 of upper 90% (RMAT_tier 1)

C-20-004 StreamStats Report

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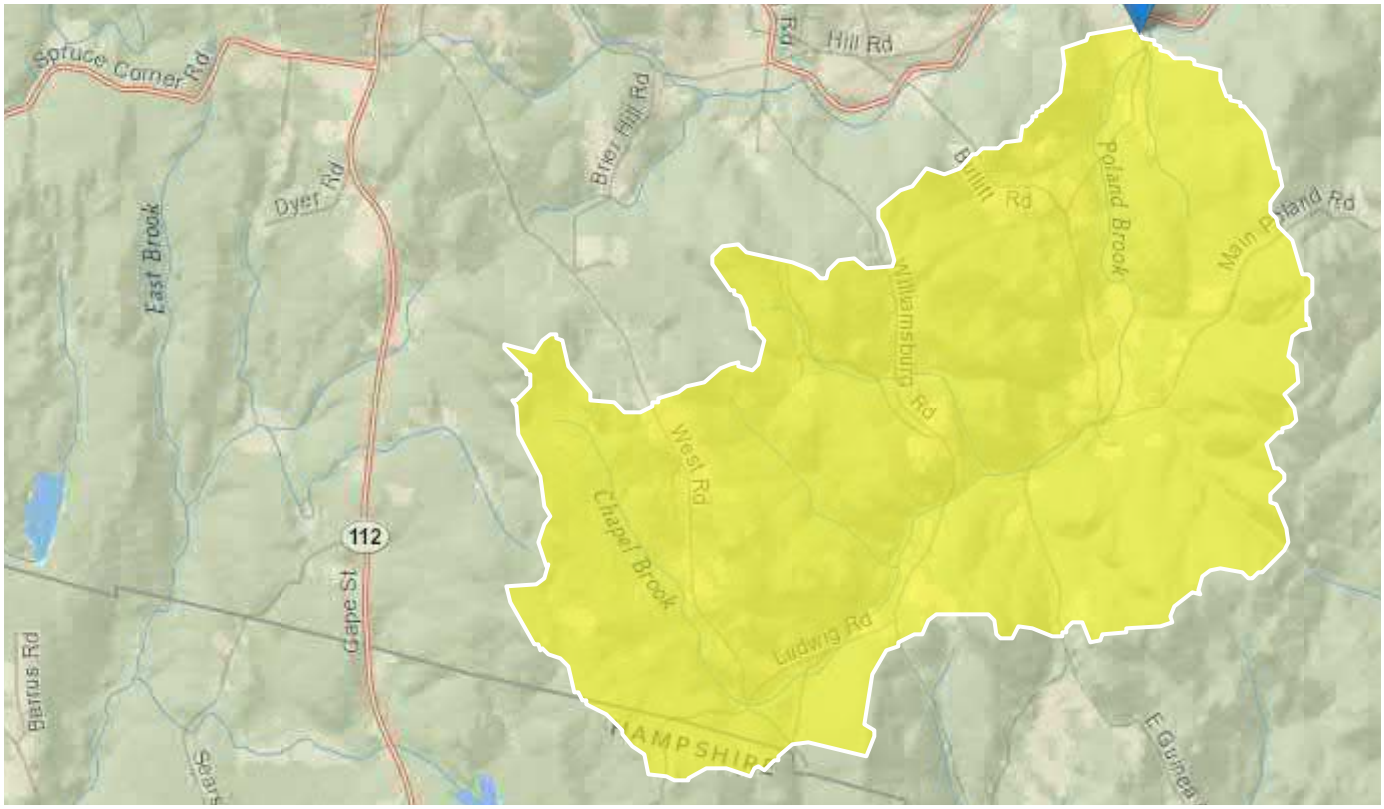
Workspace ID: MA20191007140848993000
Clicked Point (Latitude, Longitude): 42.51189, -72.74370
Time: 2019-10-07 10:09:04 -0400



C-20-004

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	6.66	square miles
ELEV	Mean Basin Elevation	1280	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	3.18	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.0182	square mile per mile

Parameter Code	Parameter Description	Value	Unit
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	1	dimensionless
BSLDEM250	Mean basin slope computed from 1:250K DEM	8.399	percent
ACRSDFT	Area underlain by stratified drift	0.26	square miles
BSLDEM10M	Mean basin slope computed from 10 m DEM	14.15	percent
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	96337.9	feet
CENTROIDY	Basin centroid vertical (y) location in state plane units	915928	feet
CRSDFT	Percentage of area of coarse-grained stratified drift	2.16	percent
FOREST	Percentage of area covered by forest	87.02	percent
LAKEAREA	Percentage of Lakes and Ponds	0.11	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	3.84	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.29	percent
MAXTEMPC	Mean annual maximum air temperature over basin area, in degrees Centigrade	12.8	feet per mi
OUTLETX	Basin outlet horizontal (x) location in state plane coordinates	97795	feet
OUTLETY	Basin outlet vertical (y) location in state plane coordinates	918675	feet
PCTSNDGRV	Percentage of land surface underlain by sand and gravel deposits	2.16	percent
PRECPRIS00	Basin average mean annual precipitation for 1971 to 2000 from PRISM	52.3	inches
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	14.1	miles
WETLAND	Percentage of Wetlands	4.32	percent

Peak-Flow Statistics Parameters[Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.66	square miles	0.16	512
ELEV	Mean Basin Elevation	1280	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	3.18	percent	0	32.3

Peak-Flow Statistics Flow Report[Peak Statewide 2016 5156]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SEp
2 Year Peak Flood	305	ft^3/s	150	622	42.3
5 Year Peak Flood	519	ft^3/s	250	1070	43.4
10 Year Peak Flood	697	ft^3/s	328	1480	44.7
25 Year Peak Flood	965	ft^3/s	437	2130	47.1
50 Year Peak Flood	1190	ft^3/s	523	2730	49.4
100 Year Peak Flood	1440	ft^3/s	610	3420	51.8
200 Year Peak Flood	1720	ft^3/s	704	4210	54.1
500 Year Peak Flood	2130	ft^3/s	904	5020	57.6

Peak-Flow Statistics Citations

Zarriello, P.J.,2017, Magnitude of flood flows at selected annual exceedance probabilities for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2016–5156, 99 p. (https://dx.doi.org/10.3133/sir20165156)

Flow-Duration Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.66	square miles	1.61	149
DRFTPERSTR	Stratified Drift per Stream Length	0.0182	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
BSLDEM250	Mean Basin Slope from 250K DEM	8.399	percent	0.32	24.6

Flow-Duration Statistics Flow Report[Statewide Low Flow WRIR00 4135]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SE	SEp
50 Percent Duration	6.61	ft^3/s	3.49	12.4	17.6	17.6
60 Percent Duration	4.3	ft^3/s	1.96	9.38	19.8	19.8
70 Percent Duration	2.85	ft^3/s	1.29	6.23	23.5	23.5
75 Percent Duration	2.26	ft^3/s	1.03	4.88	25.8	25.8
80 Percent Duration	1.81	ft^3/s	0.809	3.98	28.4	28.4
85 Percent Duration	1.43	ft^3/s	0.608	3.29	31.9	31.9
90 Percent Duration	1.04	ft^3/s	0.429	2.49	36.6	36.6
95 Percent Duration	0.694	ft^3/s	0.256	1.82	45.6	45.6
98 Percent Duration	0.465	ft^3/s	0.146	1.4	60.3	60.3
99 Percent Duration	0.351	ft^3/s	0.103	1.12	65.1	65.1

Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Low-Flow Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.66	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	8.399	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.0182	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

Low-Flow Statistics Flow Report[Statewide Low Flow WRIR00 4135]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SE	SEp
7 Day 2 Year Low Flow	0.666	ft^3/s	0.232	1.84	49.5	49.5
7 Day 10 Year Low Flow	0.322	ft^3/s	0.0874	1.1	70.8	70.8

Low-Flow Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

August Flow-Duration Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.66	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	8.399	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.0182	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

August Flow-Duration Statistics Flow Report[Statewide Low Flow WRIR00 4135]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SE	SEp
August 50 Percent Duration	1.49	ft^3/s	0.634	3.44	33.2	33.2

August Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Bankfull Statistics Parameters[Bankfull Statewide SIR2013 5155]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.66	square miles	0.6	329
BSLDEM10M	Mean Basin Slope from 10m DEM	14.15	percent	2.2	23.9

Bankfull Statistics Flow Report[Bankfull Statewide SIR2013 5155]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
Bankfull Width	35.8	ft	21.3
Bankfull Depth	1.8	ft	19.8
Bankfull Area	63.9	ft^2	29
Bankfull Streamflow	262	ft^3/s	55

Bankfull Statistics Citations

Bent, G.C., and Waite, A.M.,2013, Equations for estimating bankfull channel geometry and discharge for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2013–5155, 62 p., (http://pubs.usgs.gov/sir/2013/5155/)

Probability Statistics Parameters[Perennial Flow Probability]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.66	square miles	0.01	1.99
PCTSNDGRV	Percent Underlain By Sand And Gravel	2.16	percent	0	100
FOREST	Percent Forest	87.02	percent	0	100
MAREGION	Massachusetts Region	1	dimensionless	0	1

Probability Statistics Disclaimers[Perennial Flow Probability]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Probability Statistics Flow Report[Perennial Flow Probability]

Statistic	Value	Unit
Probability Stream Flowing Perennially	0.969	dim

Probability Statistics Citations

Bent, G.C., and Steeves, P.A.,2006, A revised logistic regression equation and an automated procedure for mapping the probability of a stream flowing perennially in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2006–5031, 107 p. (http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR_2006-5031rev.pdf)

Application Version: 4.3.8

C-20-005 StreamStats Report

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Workspace ID: MA20210412183339372000
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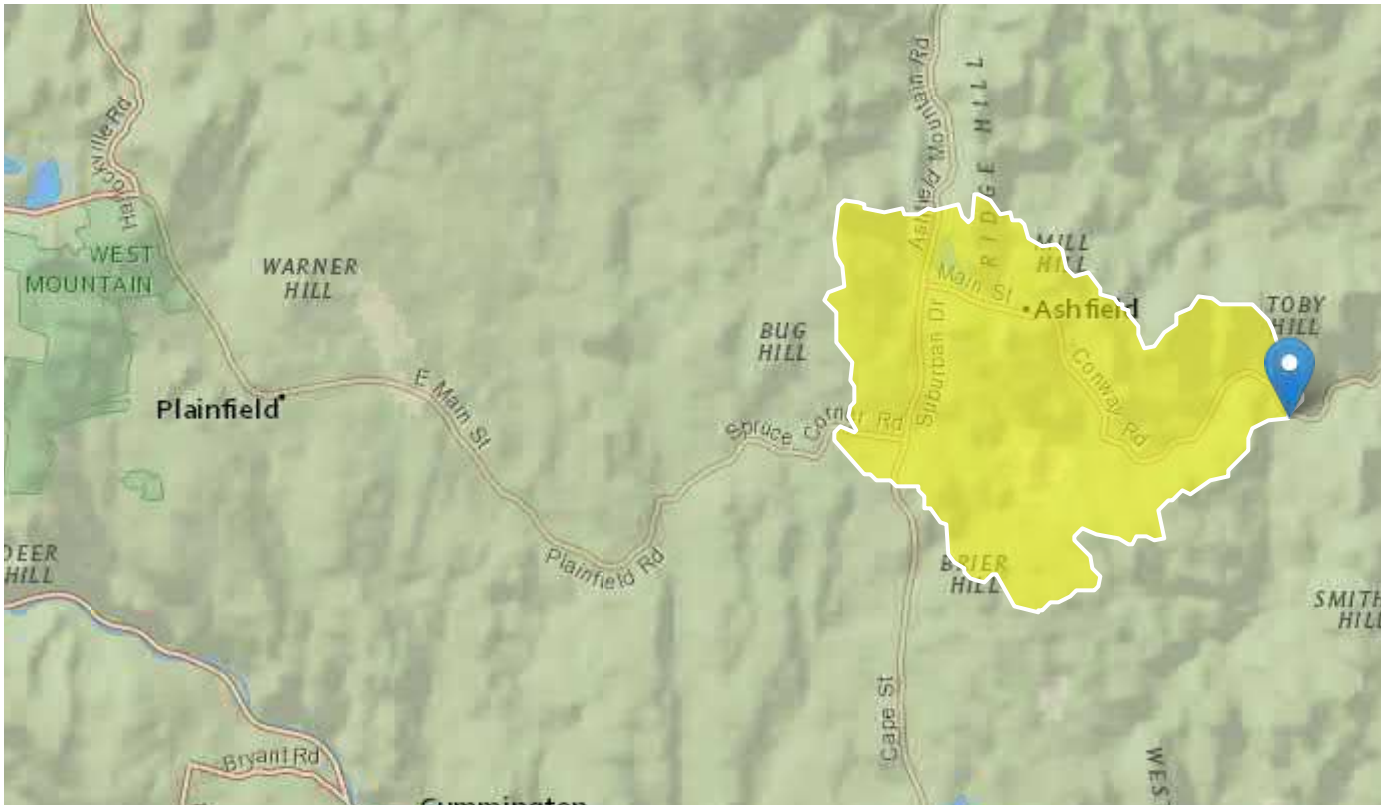
Time: 2021-04-12 14:33:56 -0400



C-20-005 StreamStats Report

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	8.86	square miles
ELEV	Mean Basin Elevation	1280	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	1.92	percent
BSLDEM250	Mean basin slope computed from 1:250K DEM	9.287	percent

Parameter Code	Parameter Description	Value	Unit
DRFTPERSTR	Area of stratified drift per unit of stream length	0.094	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	1	dimensionless
BSLDEM10M	Mean basin slope computed from 10 m DEM	14.989	percent
PCTSNDGRV	Percentage of land surface underlain by sand and gravel deposits	18.56	percent
FOREST	Percentage of area covered by forest	73.86	percent
ACRSDFT	Area underlain by stratified drift	1.66	square miles
CAT1ROADS	Length of interstates lmtd access highways and ramps for lmtd access highways, includes cloverleaf interchanges (USGS Ntl Transp Dataset)	0	miles
CAT2ROADS	Length of sec hwy or maj connecting roads; main arteries & hwys not lmtd access, usually in the US Hwy or State Hwy systems (USGS Ntl Transp Dataset)	0	miles
CAT3ROADS	Length of local connecting roads; roads that collect traffic from local roads & connect towns, subdivisions & neighborhoods (USGS Nat Transp Dataset)	7.69	miles
CAT4ROADS	Length of local roads; generally paved street, road, or byway that usually have single lane of traffic in each direction (USGS Ntnl Transp Dataset)	26.6	miles
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	94230	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	919166.9	meters
CROSCOUNT1	Number of intersections between streams and roads, where the roads are interstate, limited access highway, or ramp (CAT1ROADS)	0	dimensionless
CROSCOUNT2	Number of intersections between streams and roads, where the roads are secondary highway or major connecting road (CAT2ROADS)	0	dimensionless
CROSCOUNT3	Number of intersections between streams and roads, where roads are local conecting roads (CAT3ROADS)	11	dimensionless

Parameter Code	Parameter Description	Value	Unit
CROSCOUNT4	Number of intersections between streams and roads, where roads are local roads (CAT4ROADS)	27	dimensionless
CRSDFT	Percentage of area of coarse-grained stratified drift	18.56	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	75.7	feet per mi
LAKEAREA	Percentage of Lakes and Ponds	0.77	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	7.69	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	1.29	percent
LFPLENGTH	Length of longest flow path	7.65	miles
MAXTEMPC	Mean annual maximum air temperature over basin area, in degrees Centigrade	12.6	feet per mi
OUTLETX	Basin outlet horizontal (x) location in state plane coordinates	97805	feet
OUTLETY	Basin outlet vertical (y) location in state plane coordinates	918755	feet
PRECPRIS00	Basin average mean annual precipitation for 1971 to 2000 from PRISM	52.8	inches
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	17.6	miles
WETLAND	Percentage of Wetlands	2.06	percent

Peak-Flow Statistics Parameters [Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	8.86	square miles	0.16	512
ELEV	Mean Basin Elevation	1280	feet	80.6	1948

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
LC06STOR	Percent Storage from NLCD2006	1.92	percent	0	32.3

Peak-Flow Statistics Flow Report [Peak Statewide 2016 5156]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIl	PIu	SEp
50-percent AEP flood	396	ft^3/s	195	806	42.3
20-percent AEP flood	671	ft^3/s	324	1390	43.4
10-percent AEP flood	900	ft^3/s	424	1910	44.7
4-percent AEP flood	1240	ft^3/s	562	2730	47.1
2-percent AEP flood	1540	ft^3/s	674	3520	49.4
1-percent AEP flood	1860	ft^3/s	787	4390	51.8
0.5-percent AEP flood	2210	ft^3/s	905	5400	54.1
0.2-percent AEP flood	2740	ft^3/s	1070	7040	57.6

Peak-Flow Statistics Citations

Zarriello, P.J.,2017, Magnitude of flood flows at selected annual exceedance probabilities for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2016–5156, 99 p. (https://dx.doi.org/10.3133/sir20165156)

Low-Flow Statistics Parameters [Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	8.86	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	9.287	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.094	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

Low-Flow Statistics Flow Report [Statewide Low Flow WRIR00 4135]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIl	PIu	SE	SEp
7 Day 2 Year Low Flow	1.44	ft^3/s	0.522	3.82	49.5	49.5
7 Day 10 Year Low Flow	0.849	ft^3/s	0.238	2.82	70.8	70.8

Low-Flow Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Flow-Duration Statistics Parameters [Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	8.86	square miles	1.61	149
DRFTPERSTR	Stratified Drift per Stream Length	0.094	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1
BSLDEM250	Mean Basin Slope from 250K DEM	9.287	percent	0.32	24.6

Flow-Duration Statistics Flow Report [Statewide Low Flow WRIR00 4135]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIl	PIu	SE	SEp
50 Percent Duration	8.84	ft^3/s	4.93	15.7	17.6	17.6
60 Percent Duration	6.16	ft^3/s	3.55	10.6	19.8	19.8
70 Percent Duration	4.61	ft^3/s	2.33	9.04	23.5	23.5
75 Percent Duration	3.8	ft^3/s	1.92	7.44	25.8	25.8
80 Percent Duration	3.51	ft^3/s	1.62	7.49	28.4	28.4
85 Percent Duration	2.88	ft^3/s	1.27	6.41	31.9	31.9
90 Percent Duration	2.41	ft^3/s	1.03	5.52	36.6	36.6
95 Percent Duration	1.64	ft^3/s	0.616	4.22	45.6	45.6
98 Percent Duration	1.11	ft^3/s	0.353	3.3	60.3	60.3

Statistic	Value	Unit	PIl	PIu	SE	SEp
99 Percent Duration	0.858	ft^3/s	0.253	2.74	65.1	65.1

Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

August Flow-Duration Statistics Parameters [Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	8.86	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	9.287	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.094	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

August Flow-Duration Statistics Flow Report [Statewide Low Flow WRIR00 4135]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIl	PIu	SE	SEp
August 50 Percent Duration	2.99	ft^3/s	1.28	6.84	33.2	33.2

August Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Bankfull Statistics Parameters [Bankfull Statewide SIR2013 5155]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	8.86	square miles	0.6	329

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
BSLDEM10M	Mean Basin Slope from 10m DEM	14.989	percent	2.2	23.9

Bankfull Statistics Flow Report [Bankfull Statewide SIR2013 5155]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
Bankfull Width	40.4	ft	21.3
Bankfull Depth	1.97	ft	19.8
Bankfull Area	79.1	ft^2	29
Bankfull Streamflow	340	ft^3/s	55

Bankfull Statistics Citations

Bent, G.C., and Waite, A.M.,2013, Equations for estimating bankfull channel geometry and discharge for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2013–5155, 62 p., (http://pubs.usgs.gov/sir/2013/5155/)

Probability Statistics Parameters [Perennial Flow Probability]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	8.86	square miles	0.01	1.99
PCTSNDGRV	Percent Underlain By Sand And Gravel	18.56	percent	0	100
FOREST	Percent Forest	73.86	percent	0	100
MAREGION	Massachusetts Region	1	dimensionless	0	1

Probability Statistics Disclaimers [Perennial Flow Probability]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Probability Statistics Flow Report [Perennial Flow Probability]

Statistic	Value	Unit

Statistic	Value	Unit
Probability Stream Flowing Perennially	0.985	dim

Probability Statistics Citations

Bent, G.C., and Steeves, P.A.,2006, A revised logistic regression equation and an automated procedure for mapping the probability of a stream flowing perennially in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2006–5031, 107 p. (http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR_2006-5031rev.pdf)

Application Version: 4.5.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.1

C-20-004 Hydrology: Peak Flow Computations

Drainage Area using Streamstat (sq.mi)	=	6.66
Main channel length (miles)	=	5.6
10% of channel length (miles)	=	0.6
85% of channel length (miles)	=	4.8
Elevation at 10% of the channel length (ft)	=	813.6483
Elevation at 85% of the channel length (ft)	=	1482.94
Mean channel slope, Sl (ft/mi)	=	159
Mean basin elevation, E (feet)	=	1280
Mean basin slope (%)	=	14.15
Mean Annual Precipitation, P (inches)	=	52.3

Steep Slope Criteria
Only if main channel slope exceeds 50 feet per mile

Gaged Site	**No**
Ungaged Site	**Yes**
Steep	**Yes**
Gaged Stream	**No**

Peak Flow Using Steep Gradient Stream Equation

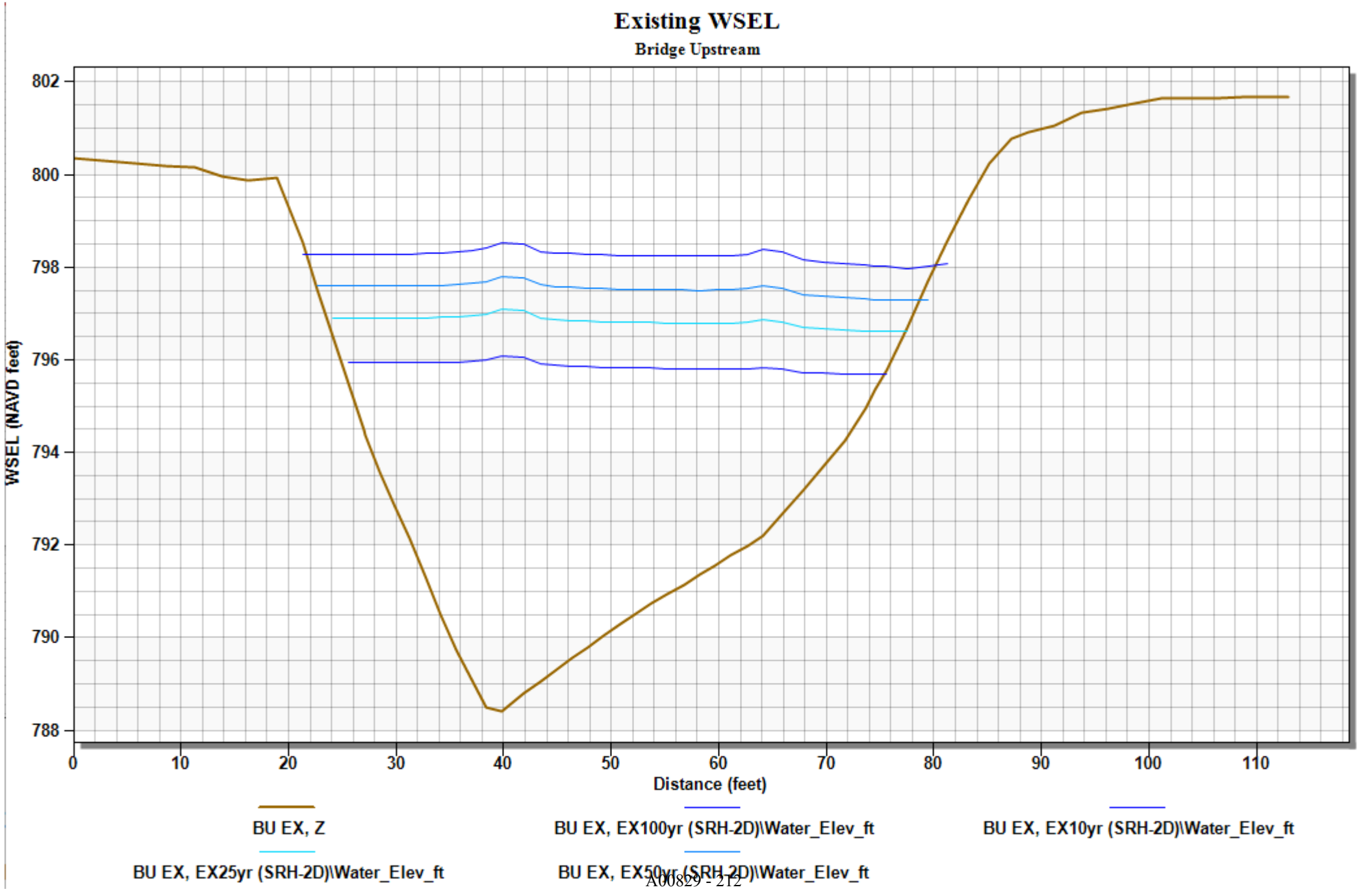
Q_2 (cfs)	Q_5 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)	Q_{500} (cfs)
380	615	826	1111	1331	1564	2309

Steep Gradient Stream Regression Equation for New England

Q_2	=	$0.01601A^{0.889}P^{2.12}$	50%	2-YR
Q_5	=	$0.01965A^{0.889}P^{2.19}$	20%	5-YR
Q_{10}	=	$0.02430A^{0.891}P^{2.21}$	10%	10-YR
Q_{25}	=	$0.03387A^{0.893}P^{2.20}$	4%	25-YR
Q_{50}	=	$0.04372A^{0.895}P^{2.18}$	2%	50-YR
Q_{100}	=	$0.05765A^{0.897}P^{2.15}$	1%	100-YR
Q_{500}	=	$0.111A^{0.903}P^{2.08}$	0.5%	500-YR

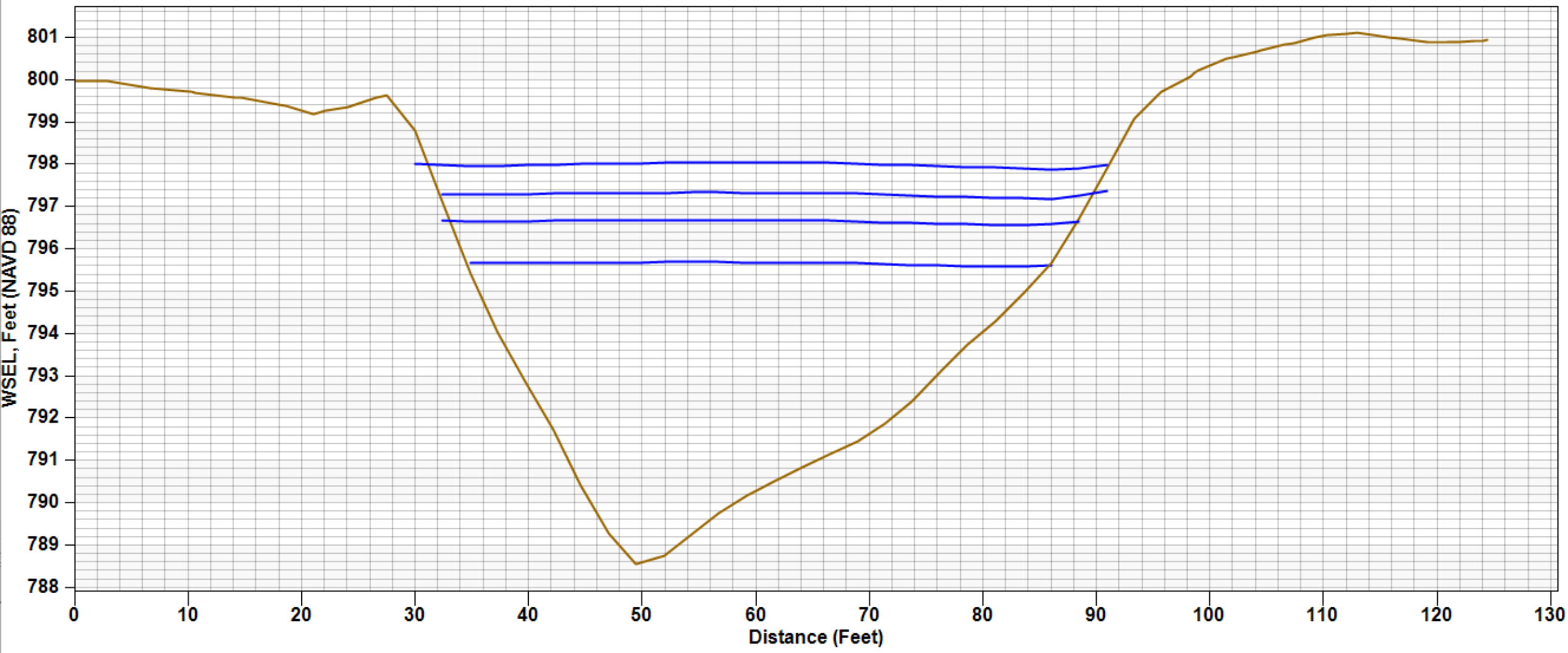
Appendix B. Hydraulic Analysis

1. Existing WSEL
2. Proposed WSEL
3. Existing River Profile
4. Proposed River Profile
5. Existing Condition Analysis Results
6. Proposed Condition Analysis Results

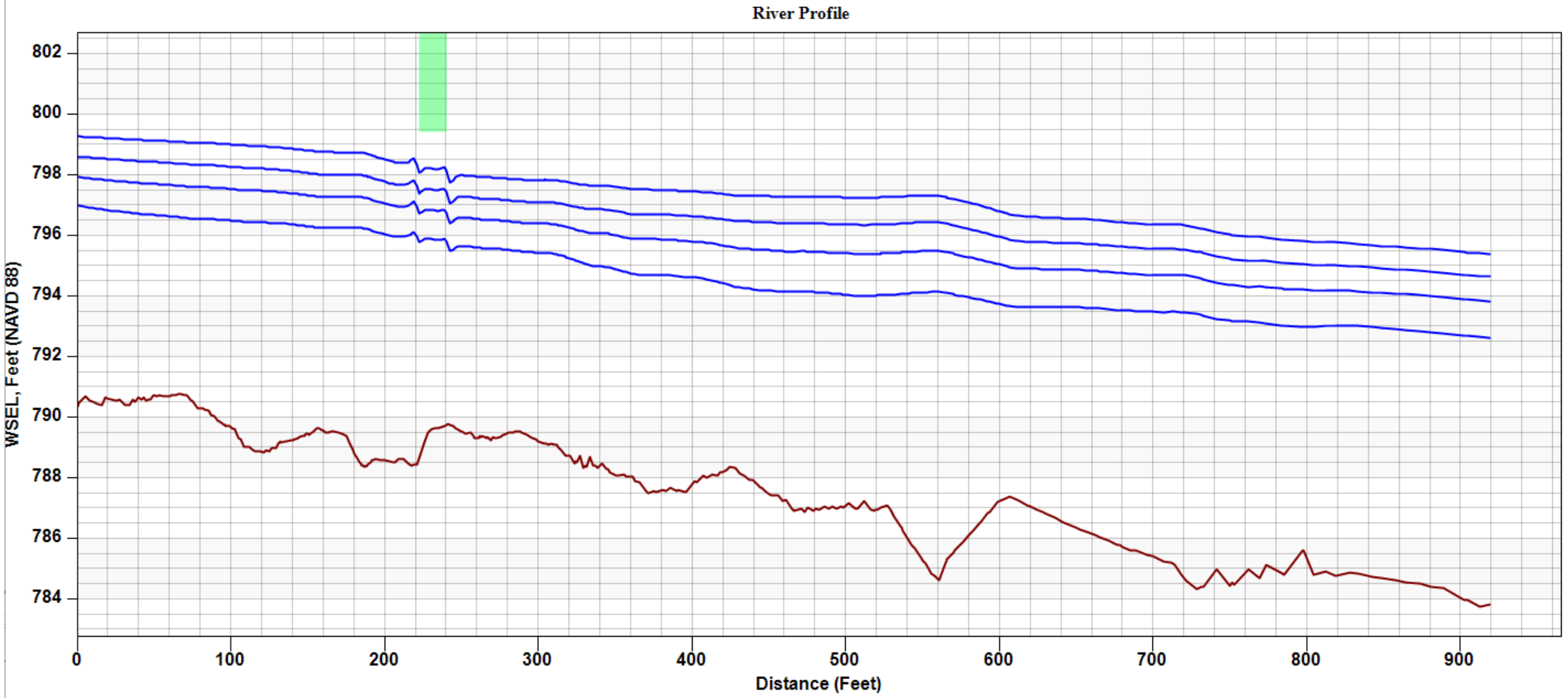

Existing WSEL
Bridge Upstream
WSEL (NAVD feet)
802
800
798
796
794
792
790
788
0
10
20
30
40
50
60
70
80
90
100
110
Distance (feet)
BU EX, Z
BU EX, EX100yr (SRH-2D)\Water_Elev_ft
BU EX, EX10yr (SRH-2D)\Water_Elev_ft
BU EX, EX25yr (SRH-2D)\Water_Elev_ft
BU EX, EX50yr (SRH-2D)\Water_Elev_ft

PR NEDBT WSEL

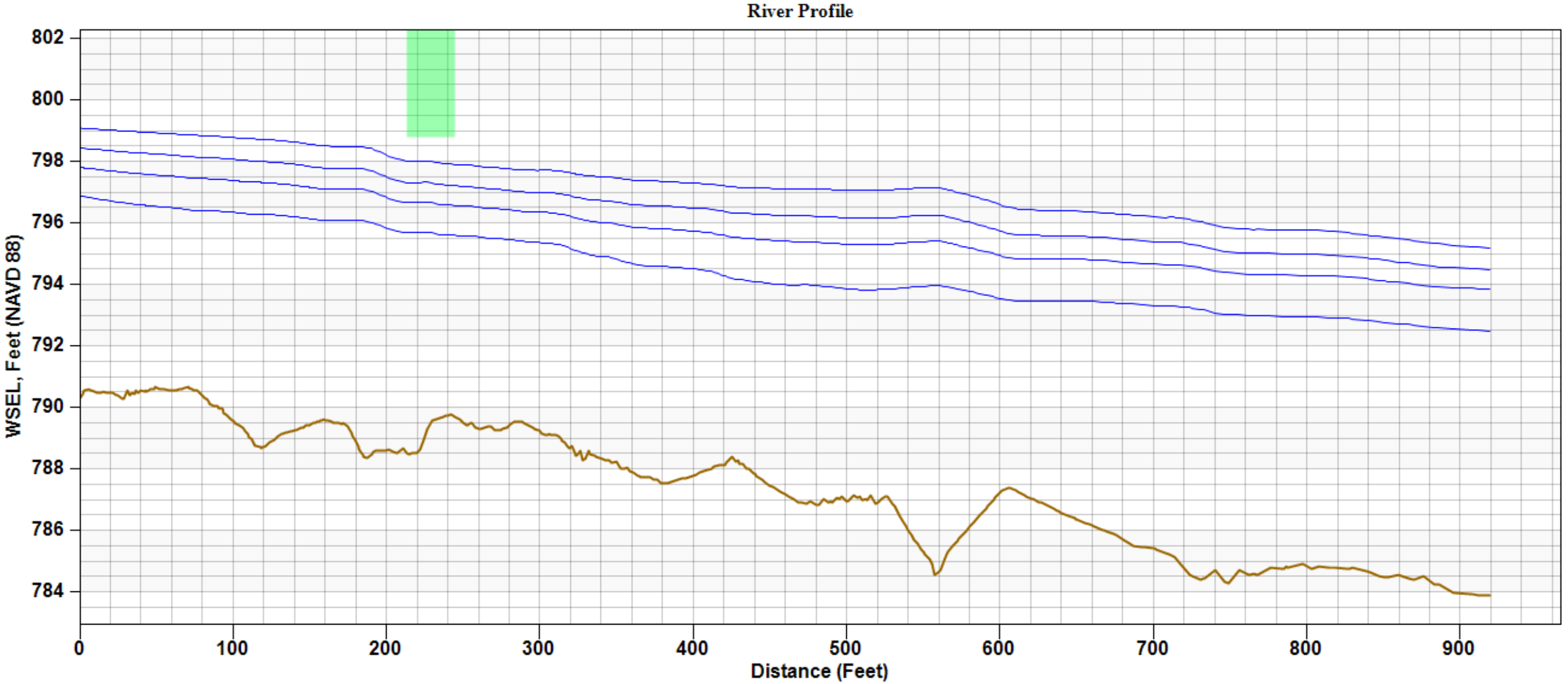
Bridge upstream



Existing WSEL for all flood events

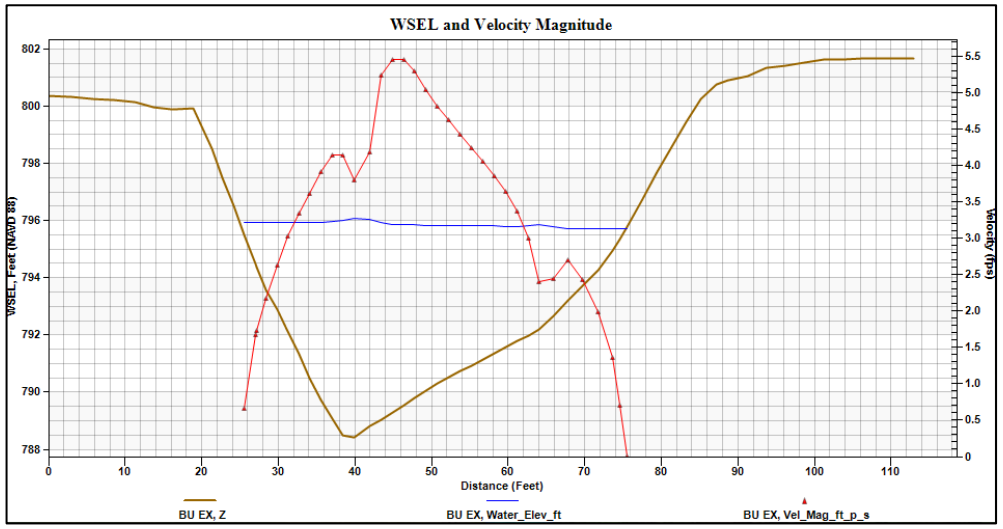


Proposed WSEL for all flood events

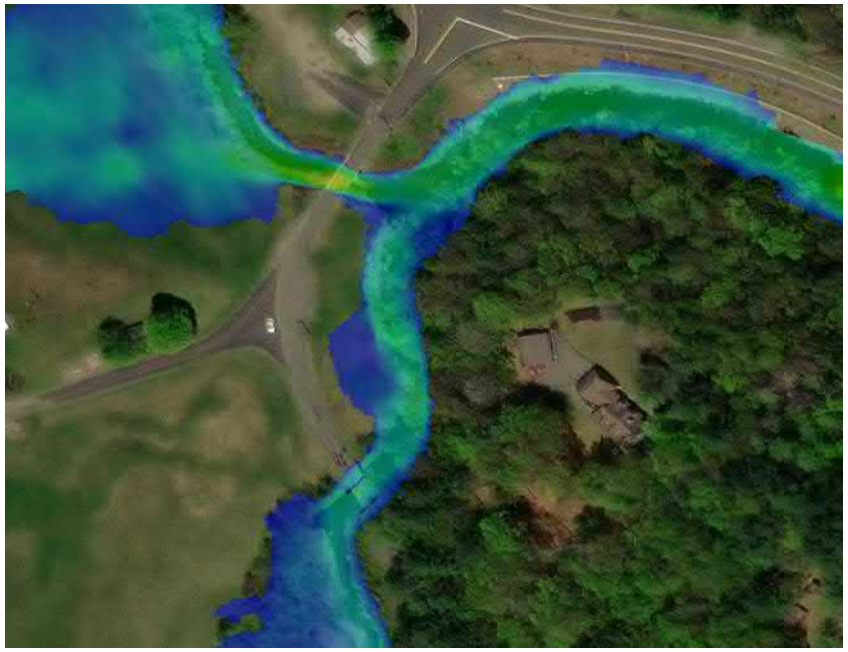


(1) Water Depth (feet)

(3)



(2) Velocity Magnitude (ft/s)



(4) Water Depth (feet) and Velocity Vector at the Bridge (ft/s)

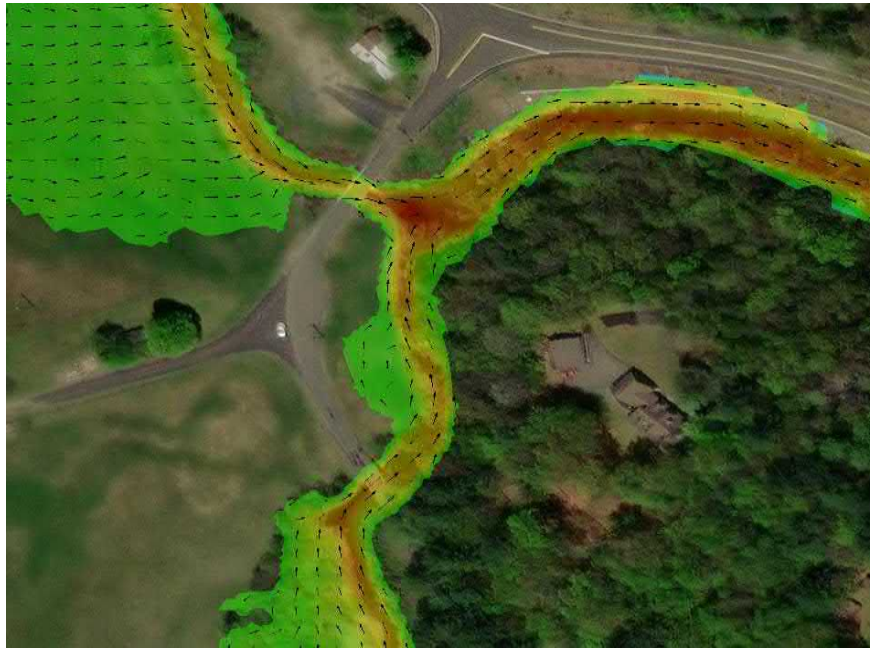
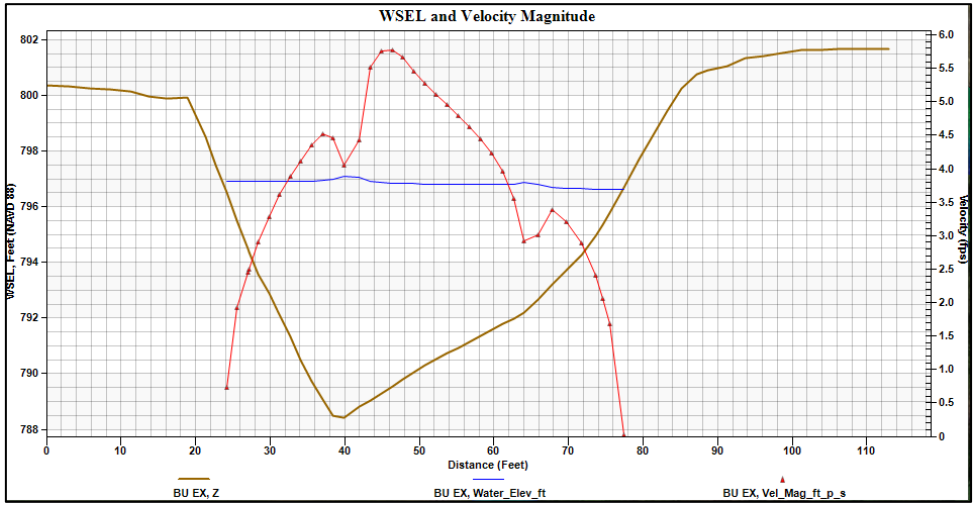


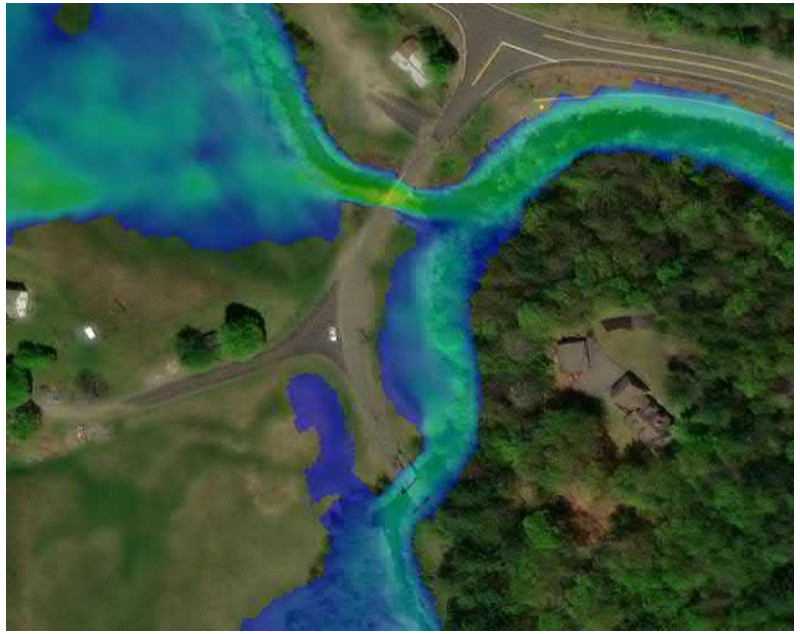
Figure:5 SRH-2D Hydrodynamic Modeling Results: 10-Year Riverine Flood, Existing Condition

(1) Water Depth (feet)

(3)



(2) Velocity Magnitude (ft/s)



(4) Water Depth (feet) and Velocity Vector at the Bridge (ft/s)

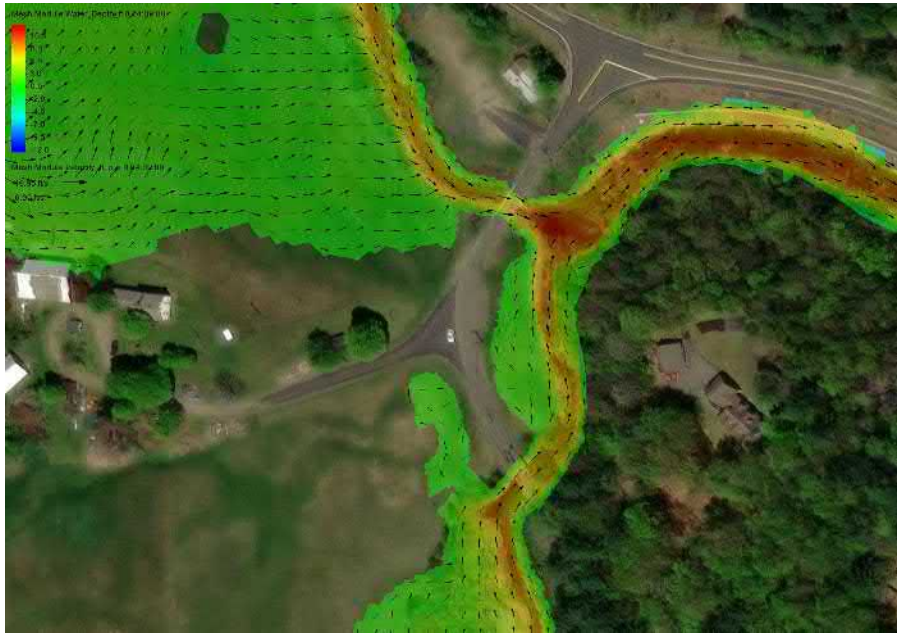
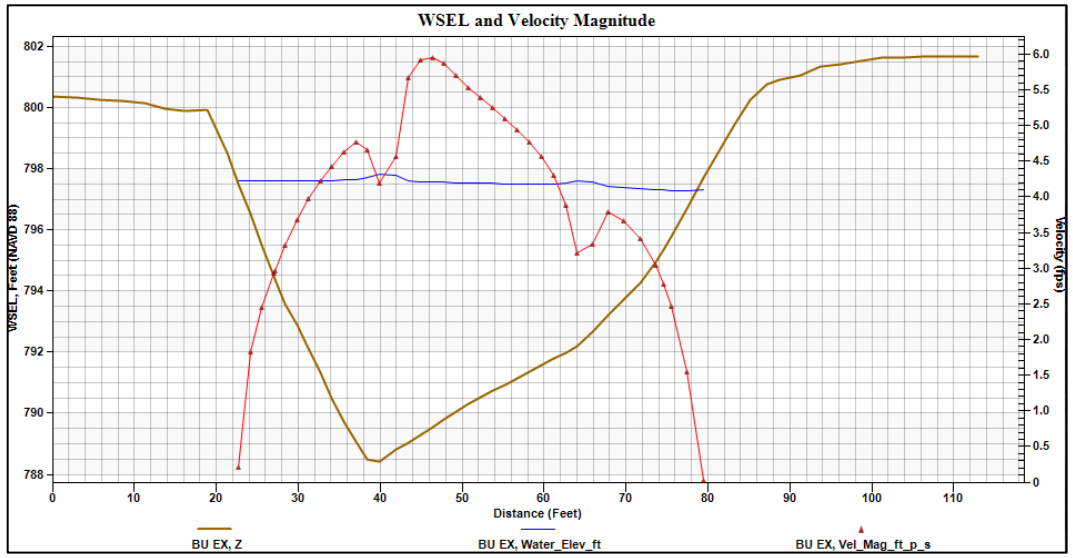


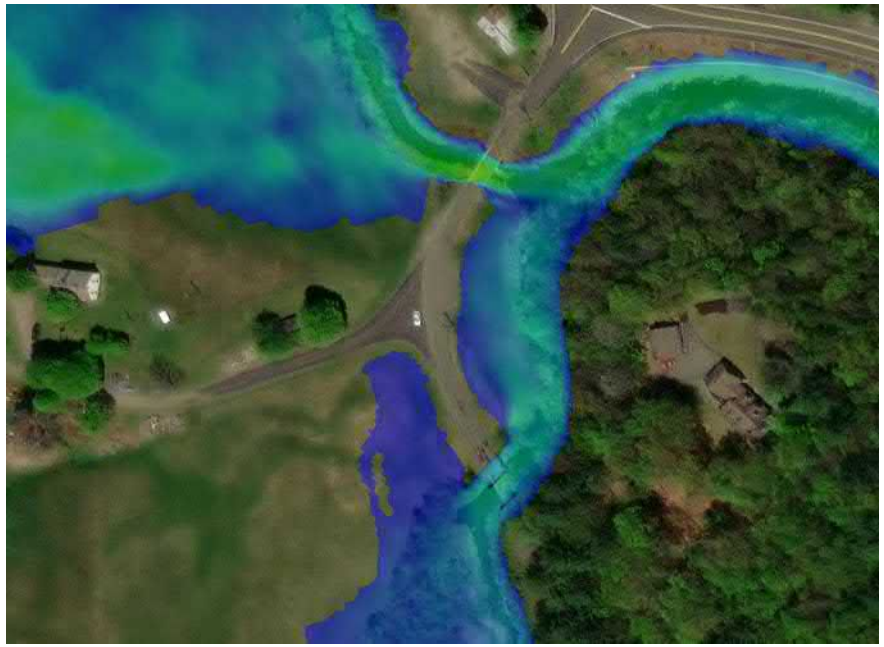
Figure:6 SRH-2D Hydrodynamic Modeling Results: 25-Year Riverine Flood, Existing Condition

(1) Water Depth (feet)

(3)



(2) Velocity Magnitude (ft/s)



(4) Water Depth (feet) and Velocity Vector at the Bridge (ft/s)

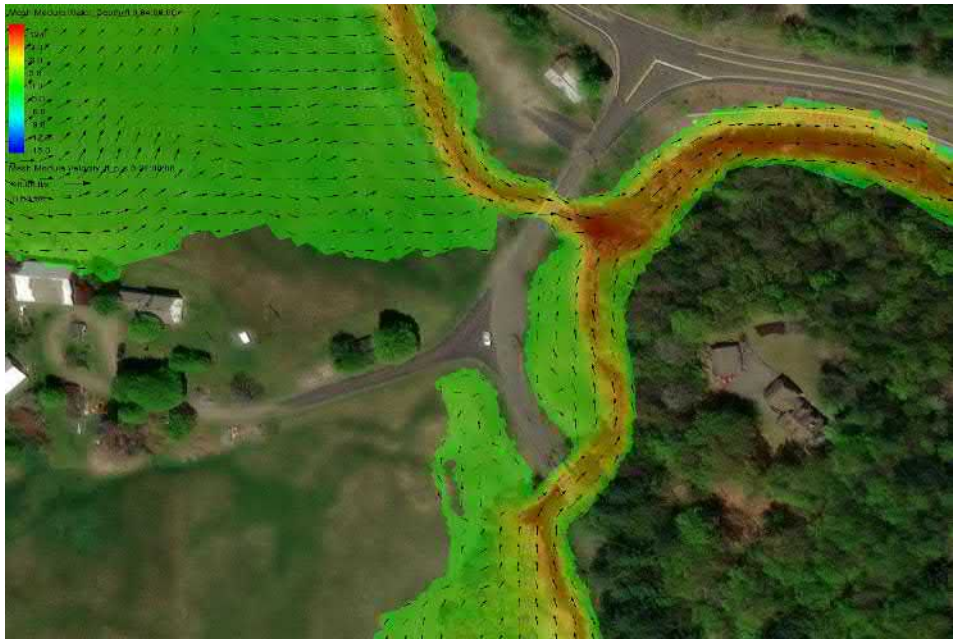
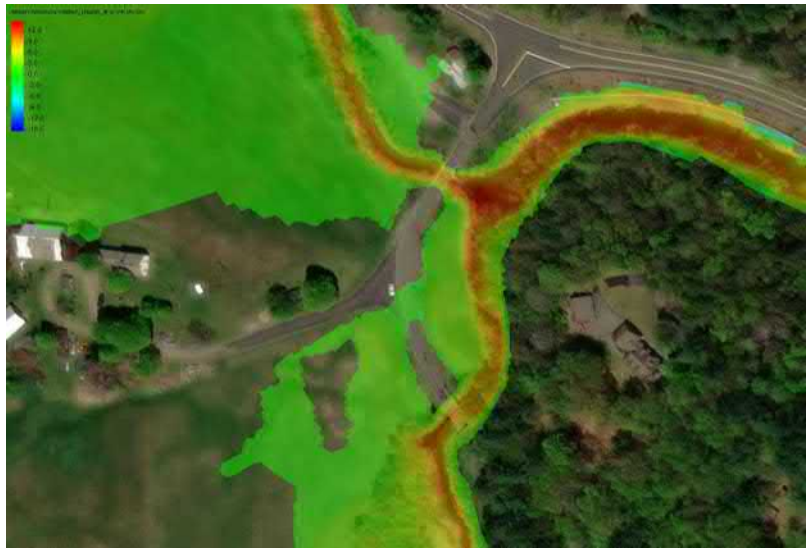
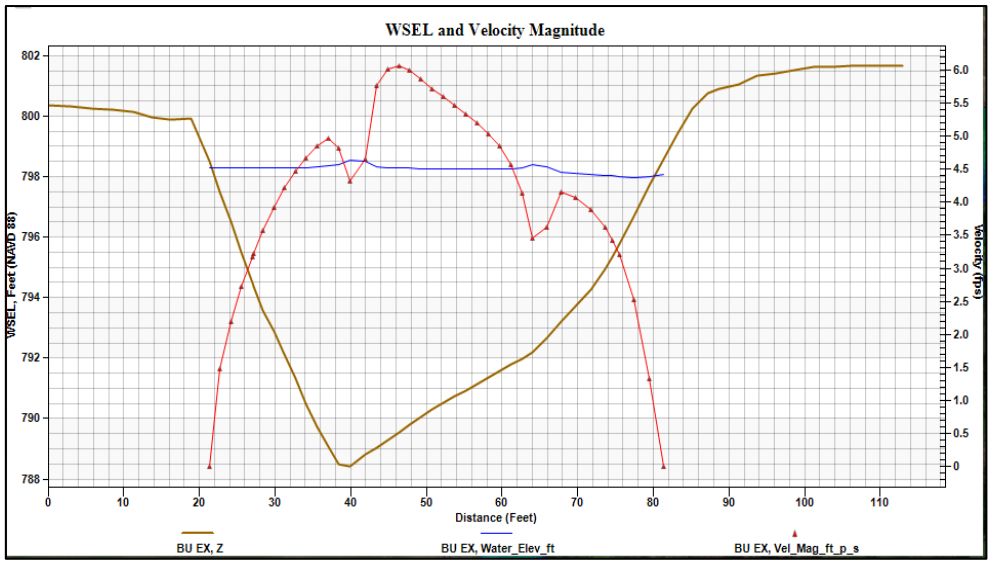


Figure:7 SRH-2D Hydrodynamic Modeling Results: 50-Year Riverine Flood, Existing Condition

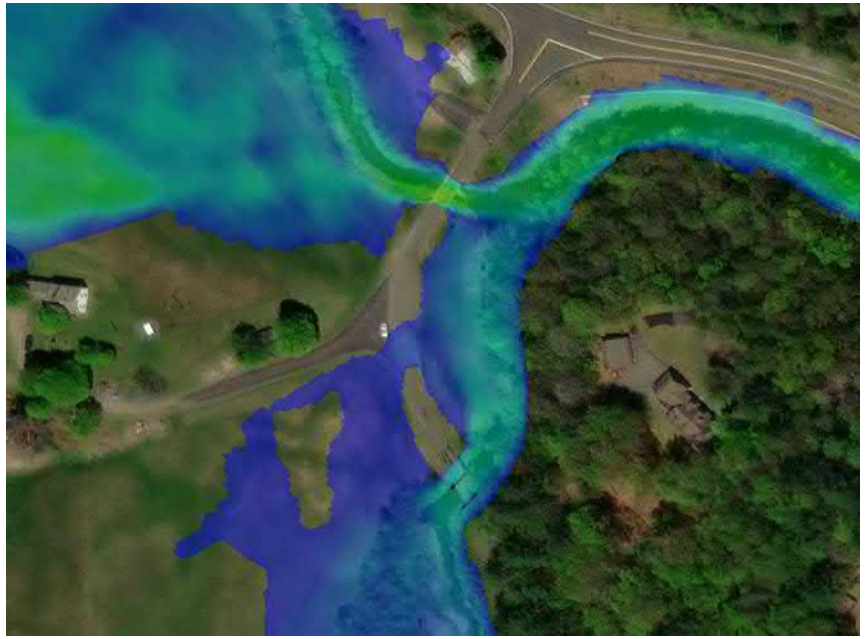
(1) Water Depth (feet)



(3)



(2) Velocity Magnitude (ft/s)



(4) Water Depth (feet) and Velocity Vector at the Bridge (ft/s)

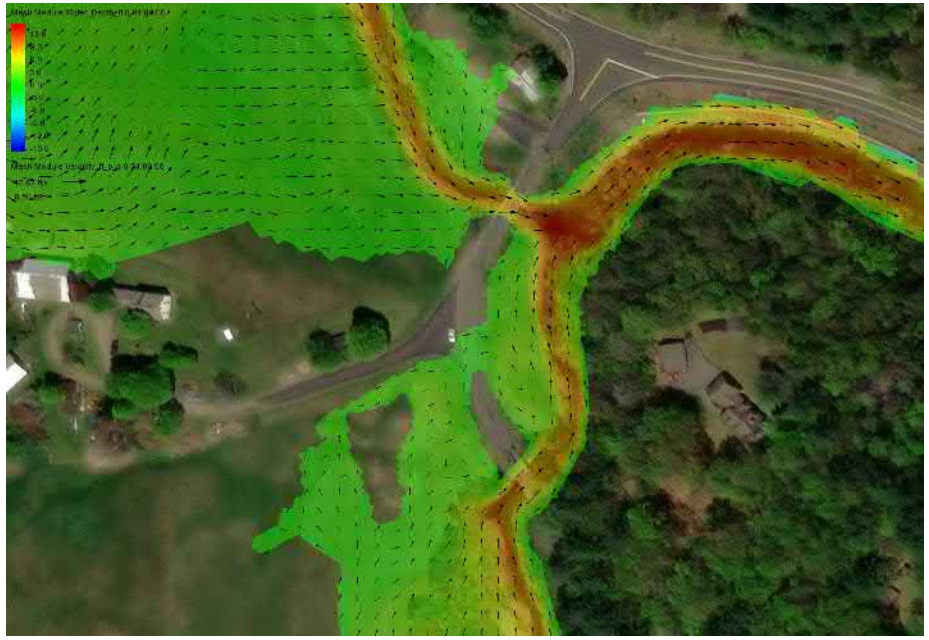
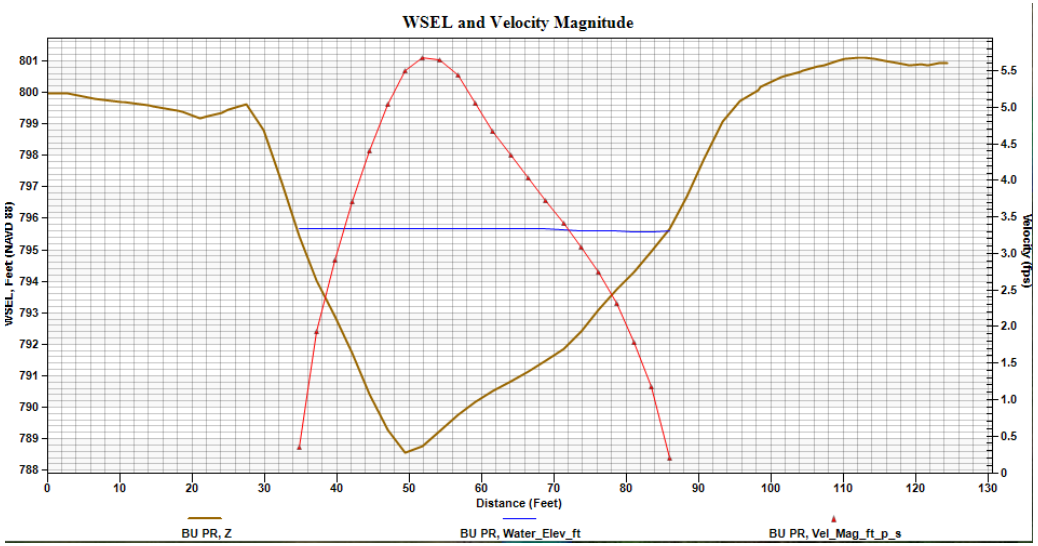


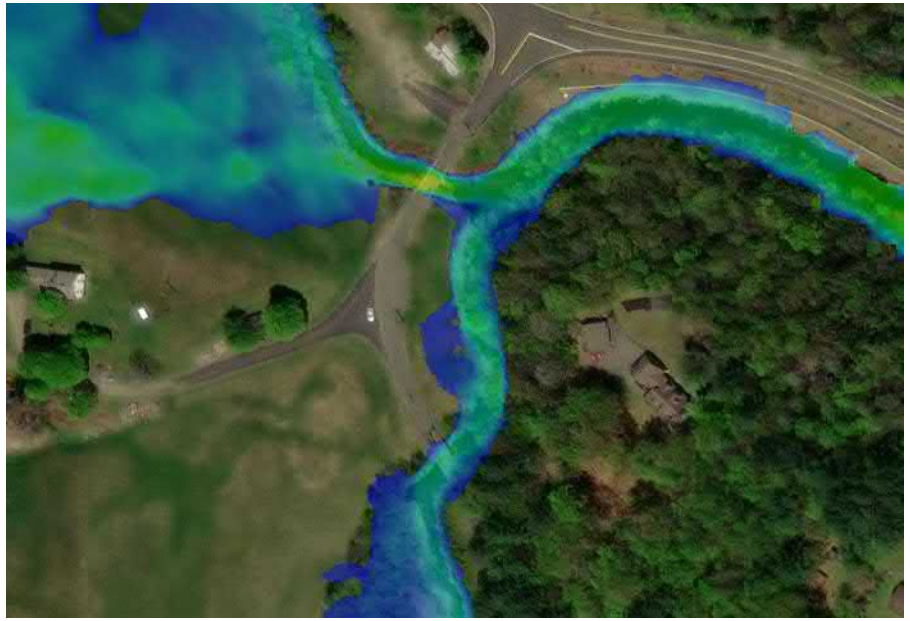
Figure:8 SRH-2D Hydrodynamic Modeling Results: 100-Year Riverine Flood, Existing Condition

(1) Water Depth (feet)

(3)



(2) Velocity Magnitude (ft/s)



(4) Water Depth (feet) and Velocity Vector at the Bridge (ft/s)

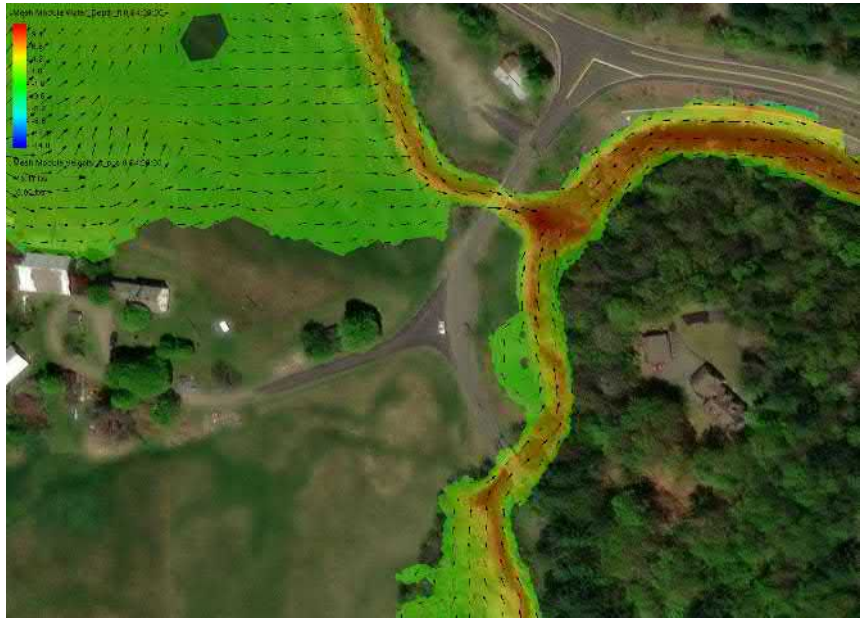
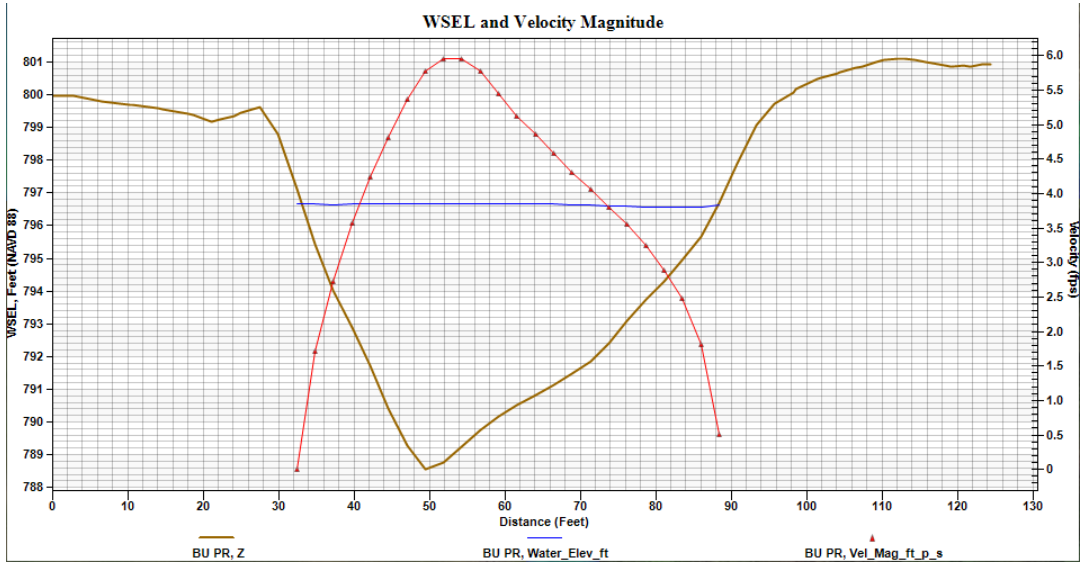


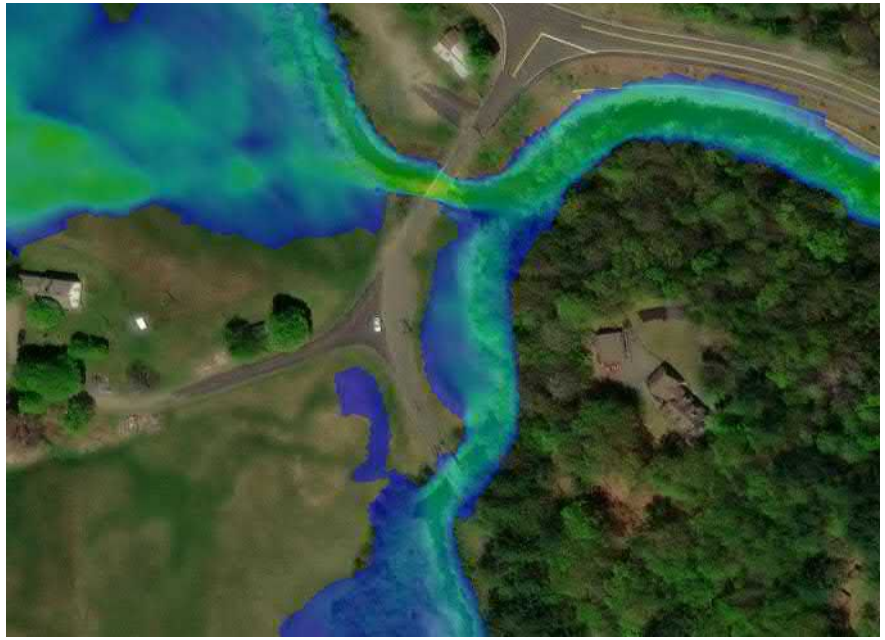
Figure:9 SRH-2D Hydrodynamic Modeling Results: 10-Year Riverine Flood, Proposed Condition

(1) Water Depth (feet)

(3)



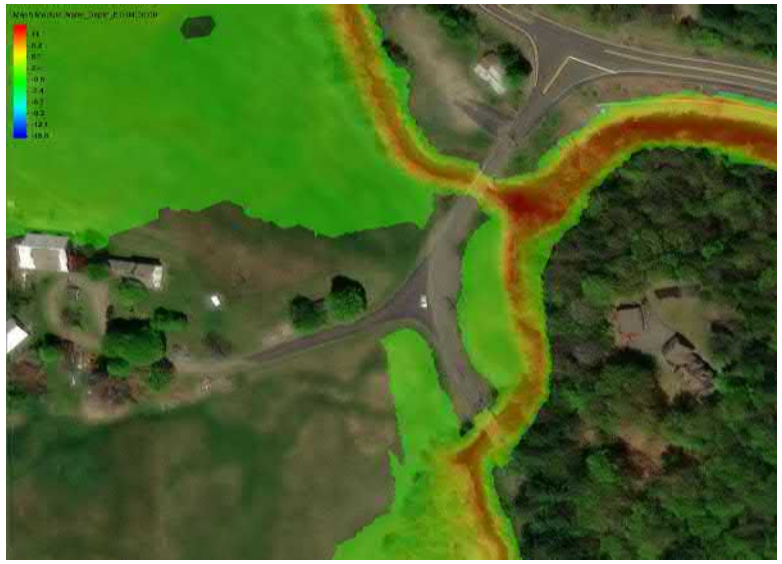
(2) Velocity Magnitude (ft/s)



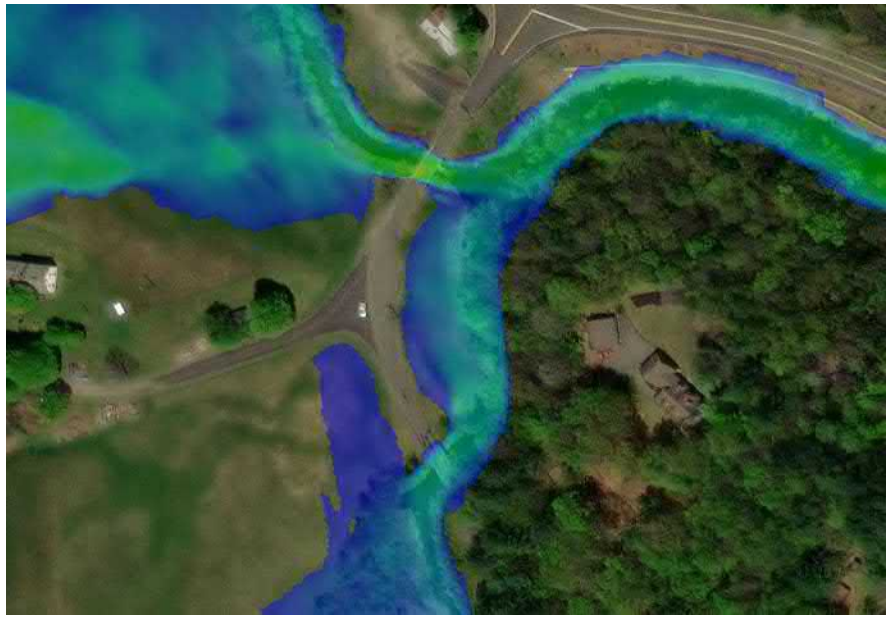
(4) Water Depth (feet) and Velocity Vector at the Bridge (ft/s)

Figure:10 SRH-2D Hydrodynamic Modeling Results: 25-Year Riverine Flood, Proposed Condition

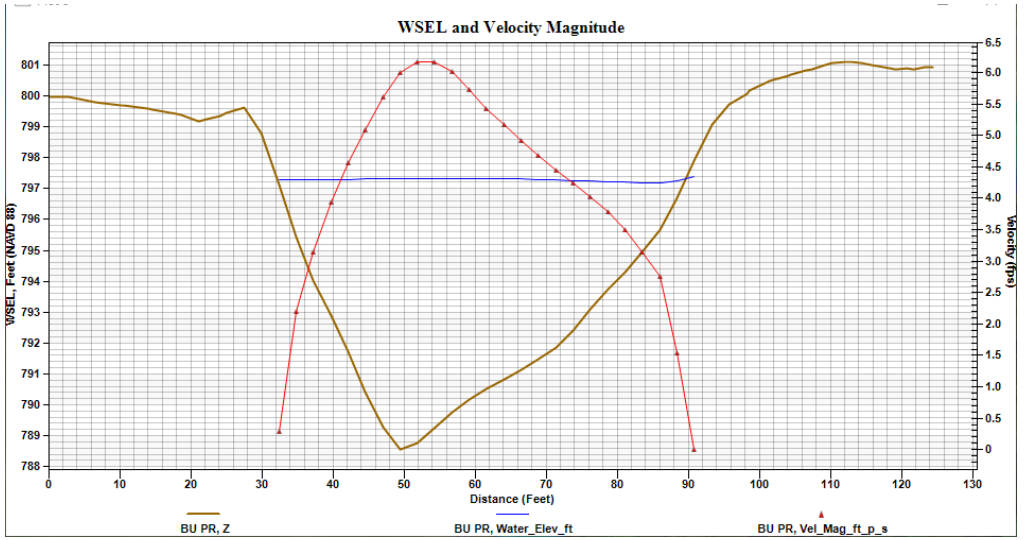
(1) Water Depth (feet)



(2) Velocity Magnitude (ft/s)



(3)

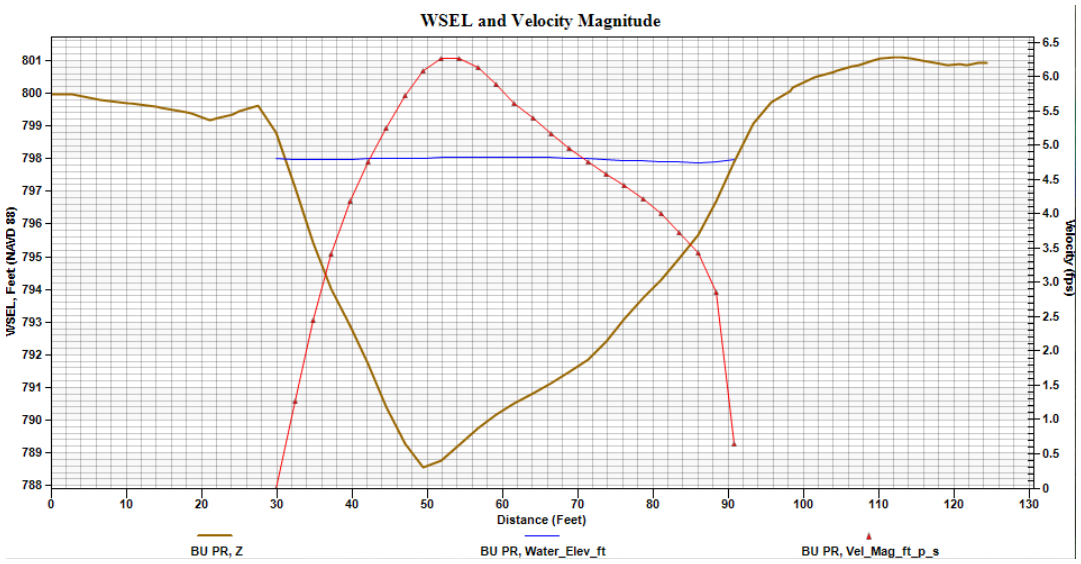


(4) Water Depth (feet) and Velocity Vector at the Bridge (ft/s)

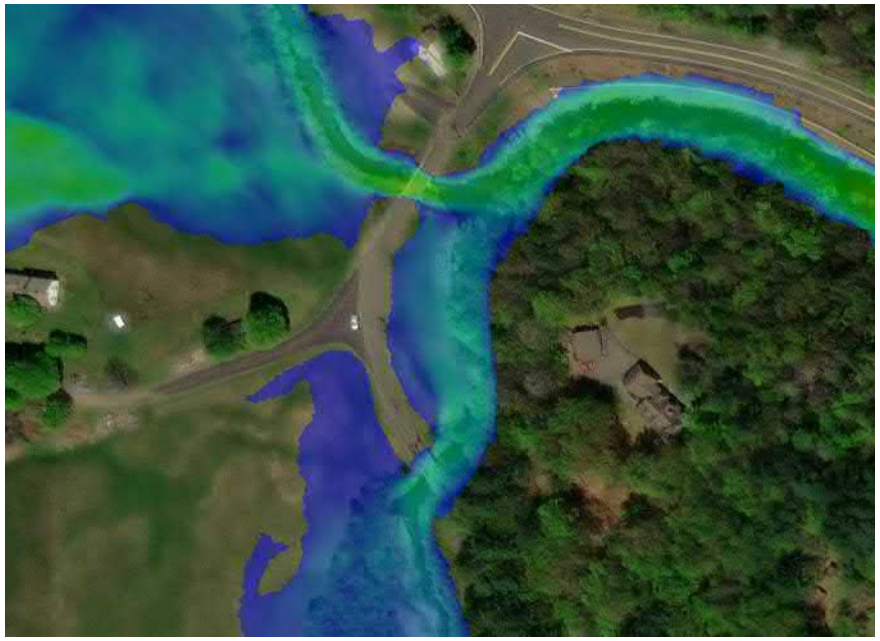
Figure:11 SRH-2D Hydrodynamic Modeling Results: 50-Year Riverine Flood, Proposed Condition

(1) Water Depth (feet)

(3)



(2) Velocity Magnitude (ft/s)



(4) Water Depth (feet) and Velocity Vector at the Bridge (ft/s)

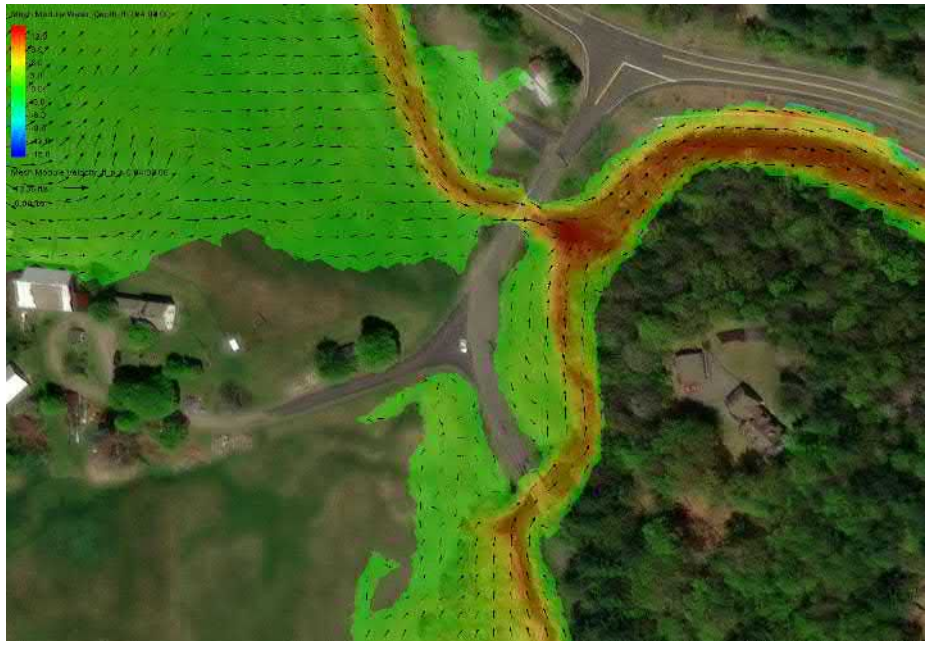


Figure:12 SRH-2D Hydrodynamic Modeling Results: 100-Year Riverine Flood, Proposed Condition

Appendix C. Scour and Countermeasure Design

1. Soil Sample Results
2. Scour Calculations
3. Scour Countermeasure Design

GEI Consultants

Consulting Engineers and Scientists

January 6, 2021
Project 2004115

Mr. Chris Jones, P.E., Senior Associate
BETA Group, Inc.
315 Norwood Park South
Norwood, MA 02062

Dear Mr. Jones:

Re: **Soil Sample Test Results**
North Poland Road Bridge over Poland Brook
Bridge No. C-20-004
Conway, Massachusetts

This letter presents the results of laboratory testing on soil samples collected from the upland banks and channel of Poland Brook near the Poland Brook Road Bridge (MassDOT Bridge No. C-20-004) in Conway, Massachusetts. We understand that these test results will be used in the preparation of a Hydraulic Study Report and a Water Quality Certification for the project to replace the bridge.

One sediment sample (2004115 SS) was collected from the bank of Poland Brook on October 21, 2020 to support the preparation of the Water Quality Certification. Three additional sediment samples (Scour-1, 2, and 3) were collected from the Poland Brook channel and upland bank areas on November 20, 2020 to support the preparation of the Hydraulic Study Report. The sample locations are shown on the attached Fig. 1.

The sample for the Water Quality Certificate was sent to ESS Laboratory in Cranston, RI for testing. Chemical analysis was performed per 314 CMR 9.00. A grain size test was also performed on the sample in general accordance with ASTM D6913. The ESS Laboratory results are summarized in the attached Table 1, and presented in Attachment A.

The three samples for the Hydraulic Study were tested by GEI in our Woburn, Massachusetts laboratory for particle size analyses in accordance with the requirements of section 1.3.3.5 of the MassDOT LRFD Bridge Manual (2020). The results of our tests are presented on the Particle Size Distribution Reports in Attachment B. D_{50} particle sizes for the samples are provided in the Particle Size Distribution Reports.

Please call Steve at 781-264-8905 if you have any questions.

Sincerely,

GEI CONSULTANTS, INC.

Stephen Sarandis
Geotechnical Engineer

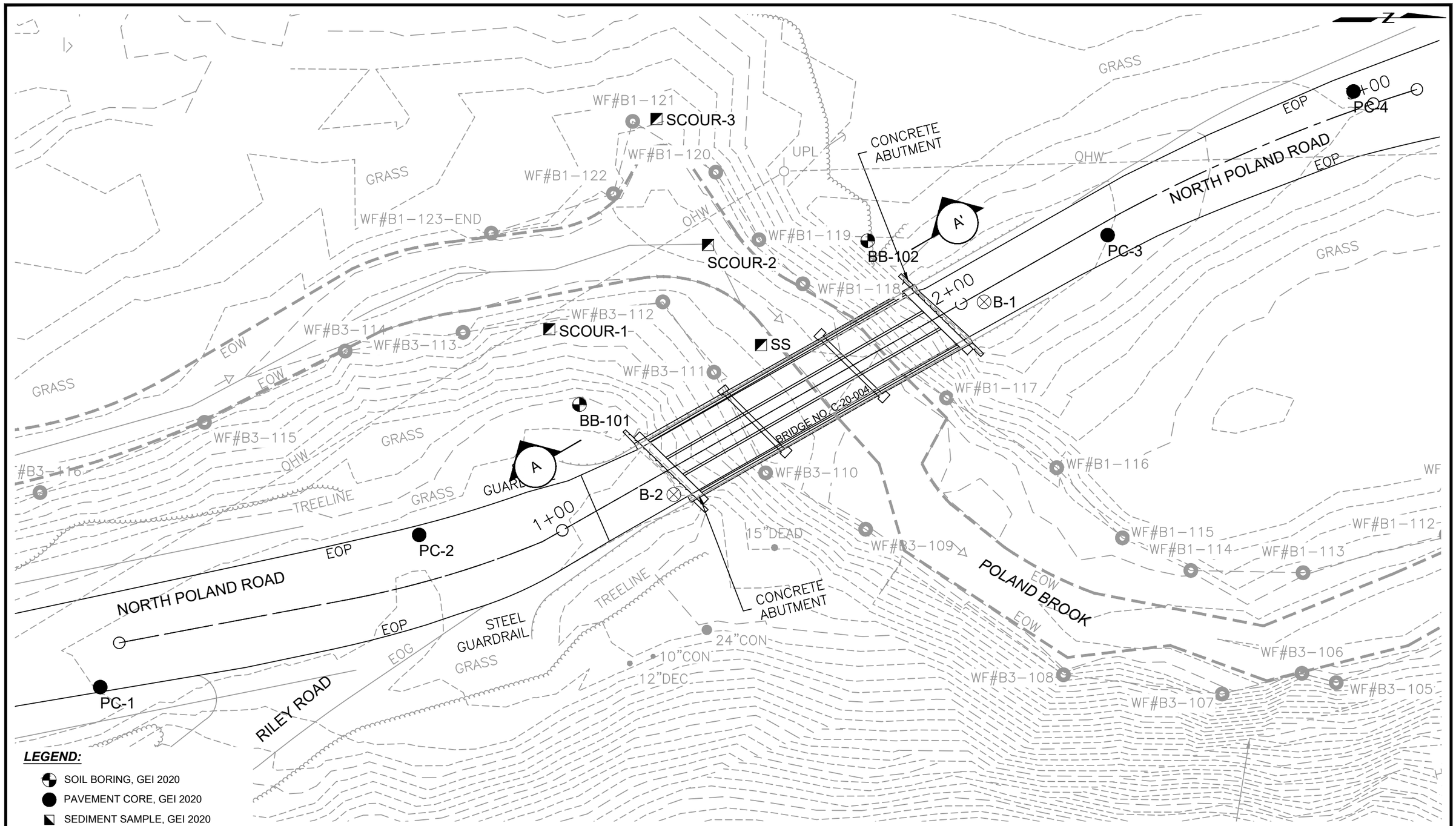
Michael Paster, P.E.
Senior Project Manager

SJS/MP:jam
Enclosures: Fig. 1
Table 1
Attachment A: ESS Chemical Test Results
Attachment B: GEI Particle Size Distribution Reports (3 pages)

B:\Working\BETA GROUP\2004115 North Poland Road Bridge\12_Scour & Water Quality Letter\Letter - 2004115 N. Poland Rd over Poland Brook Scour Eval and WQC.docx

www.geiconsultants.com

GEI Consultants, Inc.
400 Unicorn Park Drive, Woburn, MA 01801
781.721.4000



LEGEND:

- SOIL BORING, GEI 2020
- PAVEMENT CORE, GEI 2020
- SEDIMENT SAMPLE, GEI 2020
- PREVIOUS BORING BY OTHERS
- SUBSURFACE PROFILE LOCATION, SEE FIG. 2

SOURCE:

1. PLAN BASED ON MAP PROVIDED BY BETA ON 10/30/2020.

0 20 40
SCALE, FEET

North Poland Road over North Portland Brook
Bridge No. C-20-004
Conway, Massachusetts

BETA Group, Inc.
Norwood, Massachusetts

GEI Consultants

BORING LOCATION PLAN

Project 2004115 | January 2021 | Fig. 1

\\geiconsulta B:\Working\BETA GROUP\2004115 North Poland Road Bridge\00_CAD\Figures\GT\2004115-04.dwg - 1/4/2021

THIELSCH ENGINEERING
195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:
GEI Consultants
Woburn, MA
PM: Molly Green
Assigned By: Stephen Sarandis
Collected By: Stephen Sarandis

Project Information:
N. Poland Road
MA
ESS Project Number: 20J0797
Summary Page: 1 of 1
Report Date: 10.29.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-K-220

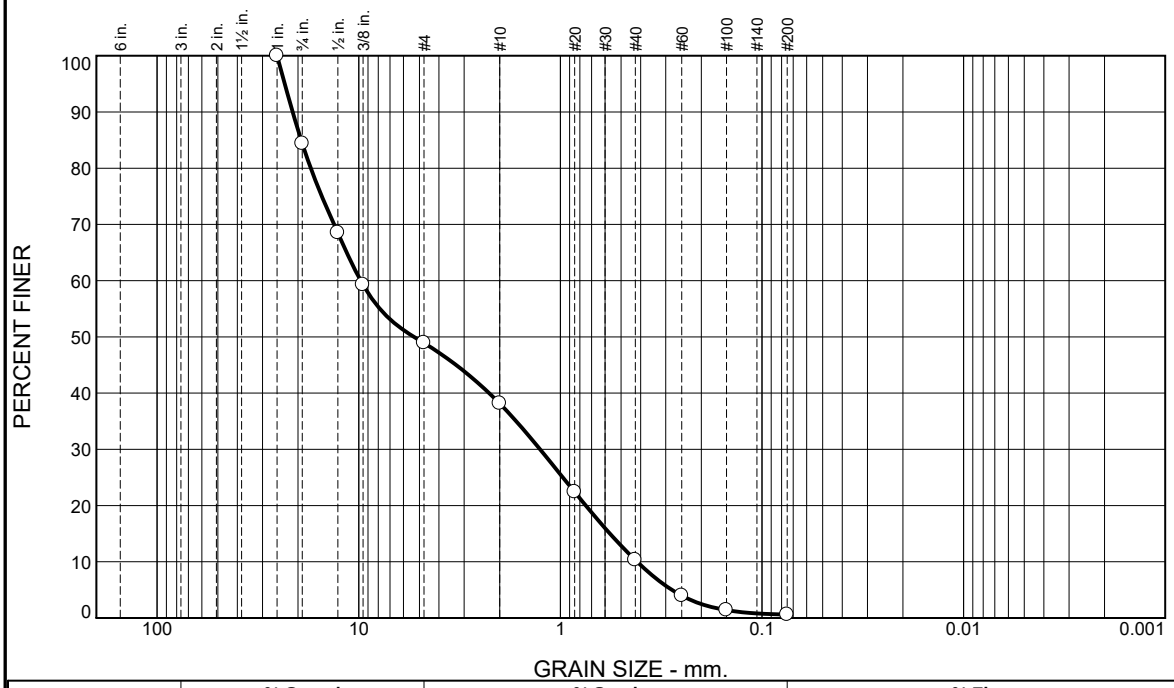
Source	Sample No.	Depth (ft)	Laboratory No.	Identification Tests						Corrosivity Tests								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Resitivity (Mohms-cm)	Sulfate (mg/kg)	Chloride (mg/kg)	Sulfide (mg/kg)	Redox Potential (mv)	pH	Electrical Resist. As Received Ohm-cm @ 60°F	Electrial Resist. Saturated Ohm-cm @ 60°F	
				D2216	D4318		D6913			EPA						G57		
Grab	2004115-SS		20J0797-01	4.5			51.1	48.3	0.6									Dark Brown poorly graded gravel with sand

Date Received: *10.26.2020*

Reviewed By: Sth

Date Reviewed: *10.30.2020*

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.6	35.5	10.7	27.9	9.7	0.6	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	84.4		
0.5"	68.5		
0.375"	59.3		
#4	48.9		
#10	38.2		
#20	22.4		
#40	10.3		
#60	4.0		
#100	1.4		
#200	0.6		

* (no specification provided)

Material Description

Dark Brown poorly graded gravel with sand

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= GP **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 21.2621 D_{85}= 19.2943 D_{60}= 9.7799
D_{50}= 5.3156 D_{30}= 1.2608 D_{15}= 0.5673
D_{10}= 0.4164 C_u= 23.49 C_c= 0.39

Remarks

Date Received: 10.26.2020 **Date Tested:** 10.29.2020

Tested By: JM / RR

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Grab **Date Sampled:** 10.21.2020
Sample Number: 2004115-SS

Thielsch Engineering Inc.

Cranston, RI

Client: GEI Consultants
Project: N. Poland Road
MA
Project No: 20J0797 **Figure** 20J0797-01

Attachment B

GEI Particle Size Distribution Reports (3 pages)

Particle Size Distribution Report

	% Boulders	% +3"	% Gravel			% Sand		% Fines
			Coarse	Medium	Fine	Coarse	Fine	
○	0.0	0.0	7.5	10.4	17.2	25.3	28.0	11.6

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			13.5710	1.3841	0.7475	0.2607	0.1038			

Material Description	USCS	AASHTO
○ Moist, brown, FINE TO COARSE SAND, some fine to coarse gravel, some inorganic silt	SP-SM	

Project No. 2004115 **Client:** BETA Group, Inc.

Project: North Poland Rd. over Poland Brook Bridge Replacement

○ **Source of Sample:** NA **Depth:** Surface **Sample Number:** Scour-1

Remarks:

○ As Received WC = 11.3%

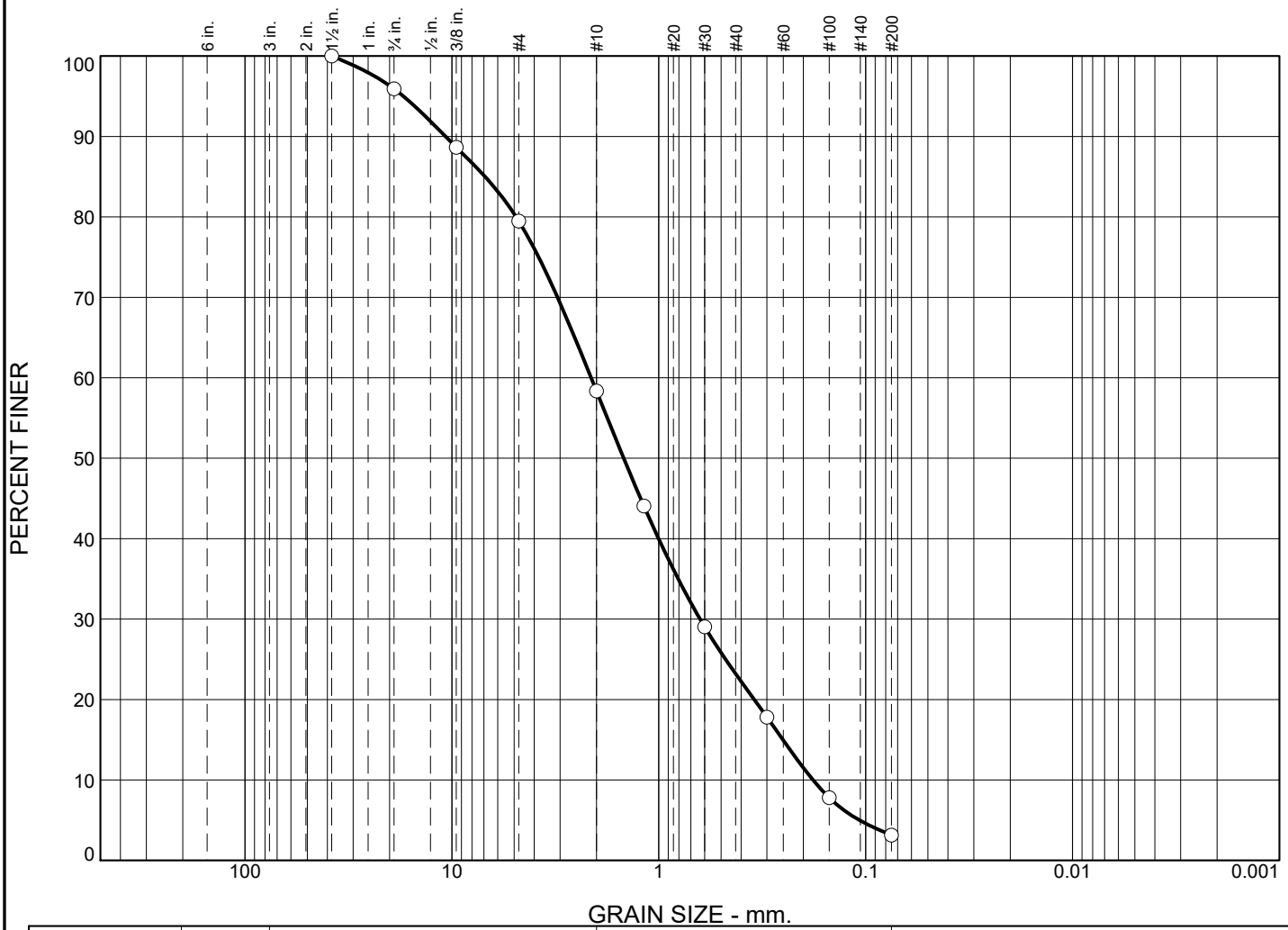
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: EF **Checked By:** WGL

Particle Size Distribution Report



	% Boulders	% +3"	% Gravel			% Sand		% Fines
			Coarse	Medium	Fine	Coarse	Fine	
○	0.0	0.0	2.1	9.2	30.4	35.1	20.1	3.1

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			6.9133	2.1229	1.4773	0.6316	0.2511	0.1797	1.05	11.81

Material Description	USCS	AASHTO
○ Wet, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.	SW	-

Project No. 2004115 **Client:** BETA Group, Inc.

Project: North Poland Rd. over Poland Brook Bridge Replacement

○ **Source of Sample:** NA **Depth:** Surface **Sample Number:** Scour-2

Remarks:

○ As Received WC = 23.0%

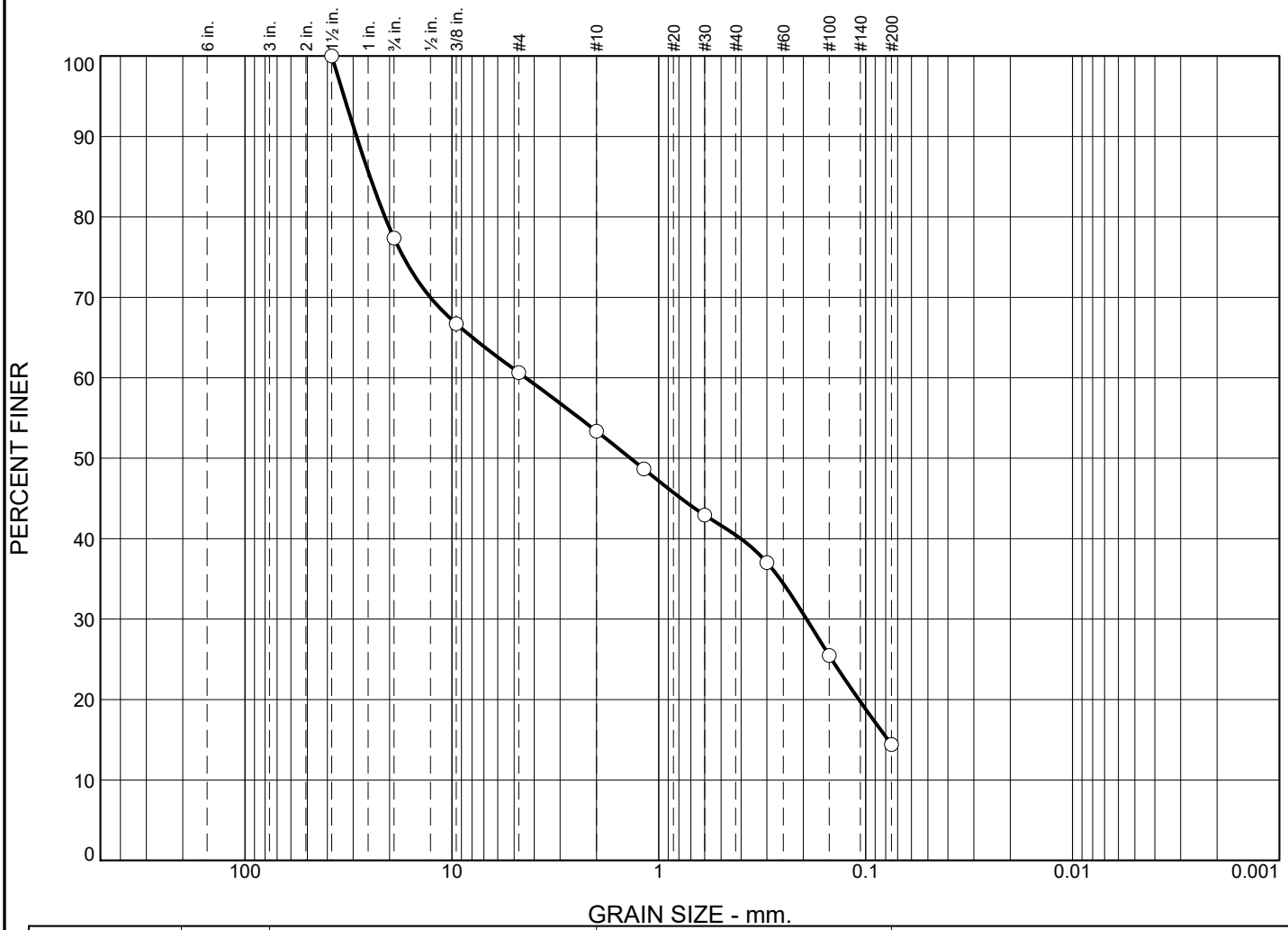
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: EF **Checked By:** WGL

Particle Size Distribution Report



	% Boulders	% +3"	% Gravel			% Sand		% Fines
			Coarse	Medium	Fine	Coarse	Fine	
○	0.0	0.0	14.4	18.9	13.3	12.9	26.1	14.4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			24.8991	4.3933	1.3701	0.1931	0.0780			

Material Description	USCS	AASHTO
○ Moist, brown, FINE TO COARSE GRAVEL, some fine to coarse sand, some inorganic silt	SM	

Project No. 2004115 **Client:** BETA Group, Inc.

Project: North Poland Rd. over Poland Brook Bridge Replacement

○ **Source of Sample:** NA **Depth:** Surface **Sample Number:** Scour-3

Remarks:

○ As Received WC = 21.4%

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: EF **Checked By:** WGL

Scour Analysis Report

Scenario: EX 50yr Scour

Contraction Scour Summary

Contraction & Long-Term Scour is applied method due to greater scour.

Applied Contraction Scour Depth 0.11 ft

Contraction & Long Term Scour is applied method due to greater scour.

Pressure Scour Depth 0.11 ft

Live Bed Contraction Scour Depth 0.11 ft

Applied Contraction Scour Elevation with LTD 0.11 ft

Local Scour at Piers Summary

Pier Name:Pier 1
Computation Method: HEC-18

Pier Scour Depth 7.53 ft

Total Scour at Pier 7.64 ft

Total Scour Elevation at Pier 781.54 ft

Pier Name:Pier 2
Computation Method: HEC-18

Pier Scour Depth 7.53 ft

Total Scour at Pier 7.64 ft

Total Scour Elevation at Pier 781.54 ft

Local Scour at Abutments Summary

Left Abutment
Abutment Scour Method: NCHRP Method

Abutment Scour Depth 4.75 ft

Total Scour at Abutment 4.75 ft

Total Scour Elevation at Abutment 788.70 ft

Right Abutment

Abutment Scour Method: NCHRP Method

Abutment Scour Depth 5.05 ft

Total Scour at Abutment 5.05 ft

Total Scour Elevation at Abutment 788.56 ft

Main Channel Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 5.05 ft

D50: 1.477305 mm

Average Velocity Upstream: 3.91 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 2.48 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0099 ft/ft

Flow in Contracted Section: 1259.60 cfs

Flow Upstream that is Transporting Sediment: 1302.99 cfs

Width in Contracted Section: 57.85 ft

Width Upstream that is Transporting Sediment: 65.95 ft

Depth Prior to Scour in Contracted Section: 5.26 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Results of Live Bed Method

Shear Velocity: 1.27 ft/s

Fall Velocity: 0.53 ft/s

Average Depth in Contracted Section after Scour: 5.37 ft

Scour Depth for Live Bed: 0.11 ft

Scour may be limited by armoring. Compute all methods to check.

Left Bank Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 0.11 ft

D50: 0.000000 mm

Average Velocity Upstream: 0.02 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 0.00 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0099 ft/ft

Flow in Contracted Section: 0.00 cfs

Flow Upstream that is Transporting Sediment: 0.30 cfs

Width in Contracted Section: 1.20 ft

Width Upstream that is Transporting Sediment: 134.87 ft

Depth Prior to Scour in Contracted Section: 0.74 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Right Bank Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 0.86 ft

D50: 0.000000 mm

Average Velocity Upstream: 1.53 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 0.00 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0099 ft/ft

Flow in Contracted Section: 0.00 cfs

Flow Upstream that is Transporting Sediment: 13.87 cfs

Width in Contracted Section: 0.00 ft

Width Upstream that is Transporting Sediment: 10.56 ft

Depth Prior to Scour in Contracted Section: -1.00 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Pier Details

Pier Name: Pier 1

Pier Scour

Computation Type: HEC-18

Input Parameters

Pier Shape: Square Nose

Bed Condition: Clear-Water Scour

Depth Upstream of Pier: 8.78 ft

Velocity Upstream of Pier: 5.69 ft/s

Width of Pier: 1.00 ft

Length of Pier: 21.18 ft

Angle of Attack: 15.74 Degrees

Result Parameters
Froude Number Upstream: 0.34

Correction Factor for Pier Nose Shape (K1): 1.00

Correction Factor of Angle of Attack (K2): 2.55

Pier Length to Pier Width (L/a): 12.00

Correction Factor for Bed Condition (K3): 1.10

Scour Depth: 7.53 ft

Pier Name: Pier 2

Pier Scour
Computation Type: HEC-18

Input Parameters
Pier Shape: Square Nose

Bed Condition: Clear-Water Scour

Depth Upstream of Pier: 8.78 ft

Velocity Upstream of Pier: 5.69 ft/s

Width of Pier: 1.00 ft

Length of Pier: 21.02 ft

Angle of Attack: 15.74 Degrees

Result Parameters
Froude Number Upstream: 0.34

Correction Factor for Pier Nose Shape (K1): 1.00

Correction Factor of Angle of Attack (K2): 2.55

Pier Length to Pier Width (L/a): 12.00

Correction Factor for Bed Condition (K3): 1.10

Scour Depth: 7.53 ft

Left Abutment Details

Abutment Scour

Computation Type: NCHRP

Input Parameters

NCHRP Method

Abutment Type: Vertical-wall abutment

Angle of Embankment to Flow: 114.60 Degrees

Centerline Length of Embankment: 0.00 ft

Projected Length of Embankment: 0.00 ft

Width of Flood Plain: 0.00 ft

Unit Discharge, Upstream in Main Channel (q1): 19.76 cfs

Unit Discharge in the Constricted Area (q2): 21.78 cfs/ft

D50: 1.477305 mm

Upstream Flow Depth: 5.05 ft

Flow Depth Prior to Scour: 4.16 ft

Result Parameters

q2/q1: 1.10

Average Velocity Upstream: 3.91 ft/s

Critical Velocity above which Bed Materal of Size D and Smaller will be Transported: 2.48 ft/s

Scour Condition: Live Bed

Embankment Length/Floodplain Width Ratio: 0.00

Scour Condition: a (Main Channel)

Amplification Factor: 1.62

Flow Depth including Contraction Scour: 5.49 ft

Maximum Flow Depth including Abutment Scour: 8.91 ft

Scour Hole Depth from NCHRP Method: 4.75 ft

Right Abutment Details

Abutment Scour

Computation Type: NCHRP

Input Parameters

NCHRP Method

Abutment Type: Vertical-wall abutment

Angle of Embankment to Flow: 63.71 Degrees

Centerline Length of Embankment: 0.00 ft

Projected Length of Embankment: 0.00 ft

Width of Flood Plain: 0.00 ft

Unit Discharge, Upstream in Main Channel (q1): 19.76 cfs

Unit Discharge in the Constricted Area (q2): 21.78 cfs/ft

D50: 1.477305 mm

Upstream Flow Depth: 5.05 ft

Flow Depth Prior to Scour: 3.86 ft

Result Parameters

q2/q1: 1.10

Average Velocity Upstream: 3.91 ft/s

Critical Velocity above which Bed Materal of Size D and Smaller will be Transported: 2.48 ft/s

Scour Condition: Live Bed

Embankment Length/Floodplain Width Ratio: 0.00

Scour Condition: a (Main Channel)

Amplification Factor: 1.62

Flow Depth including Contraction Scour: 5.49 ft

Maximum Flow Depth including Abutment Scour: 8.91 ft

Scour Hole Depth from NCHRP Method: 5.05 ft

Bridge Scour Summary Table

Parameter	EX50yrSco...	EX100yrSc...	Units	Notes	Plot
Scenario	☑	☑			
Bridge Geometry					☑
Bridge Cross-Section					☑
WSE	☑	☑			☑
Contraction Scour	☑	☑			☑
Applied Contraction Scour Depth	0.11	**0.21**	ft		
Live Bed Contraction Scour Depth	0.11	**0.21**	ft		
Applied Contraction Scour Elevation with LTD	789.07	**788.96**	ft		
Approach Cross-Section					☑
Local Scour at Piers					☑
Plot Pier Scour	☑	☑			☑
Piers					
Pier Name	Pier 1	Pier 1			
Pier Scour Depth	7.53	**7.68**	ft	Computation Method: Pier 1EX50yrSc...	
Total Scour at Pier	7.53	**7.68**	ft		
Total Scour Elevation at Pier	781.54	**781.28**	ft		
Piers					
Pier Name	Pier 2	Pier 2			
Pier Scour Depth	7.53	**7.68**	ft	Computation Method: Pier 2EX50yrSc...	
Total Scour at Pier	7.53	**7.68**	ft		
Total Scour Elevation at Pier	781.54	**781.28**	ft		
Local Scour at Abutments					
Left Abutment					☑
Plot Left Abutment Scour	☑	☑			☑
Abutment Scour Depth	4.75	**5.50**	ft	NCHRP Method: Scour Condition A (in...	
Total Scour at Abutment	4.75	**5.50**	ft		
Total Scour Elevation at Abutment	788.70	**787.93**	ft		
Right Abutment					☑
Plot Right Abutment Scour	☑	☑			☑
Abutment Scour Depth	5.05	**5.76**	ft	NCHRP Method: Scour Condition A (in...	
Total Scour at Abutment	5.05	**5.76**	ft		
Total Scour Elevation at Abutment	788.56	**787.86**	ft		

Scour Analysis Report

Bridge Scour Analysis:C20004

Notes:

Scenario: EX100yrScour

Contraction Scour Summary

Contraction & Long-Term Scour is applied method due to greater scour.

Applied Contraction Scour Depth 0.21 ft

Contraction & Long Term Scour is applied method due to greater scour.

Pressure Scour Depth 0.21 ft

Live Bed Contraction Scour Depth 0.21 ft

Applied Contraction Scour Elevation with LTD 0.21 ft

Local Scour at Piers Summary

Pier Name:Pier 1

Computation Method: HEC-18

Pier Scour Depth 7.68 ft

Total Scour at Pier 7.89 ft

Total Scour Elevation at Pier 781.28 ft

Pier Name:Pier 2

Computation Method: HEC-18

Pier Scour Depth 7.68 ft

Total Scour at Pier 7.89 ft

Total Scour Elevation at Pier 781.28 ft

Local Scour at Abutments Summary

Left Abutment

Abutment Scour Method: NCHRP Method

Abutment Scour Depth 5.50 ft

Total Scour at Abutment 5.50 ft

Total Scour Elevation at Abutment 787.93 ft

Right Abutment

Abutment Scour Method: NCHRP Method

Abutment Scour Depth 5.76 ft

Total Scour at Abutment 5.76 ft

Total Scour Elevation at Abutment 787.86 ft

Main Channel Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 5.79 ft

D50: 1.477366 mm

Average Velocity Upstream: 3.98 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 2.53 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0113 ft/ft

Flow in Contracted Section: 1476.79 cfs

Flow Upstream that is Transporting Sediment: 1519.63 cfs

Width in Contracted Section: 57.80 ft

Width Upstream that is Transporting Sediment: 65.95 ft

Depth Prior to Scour in Contracted Section: 5.98 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Results of Live Bed Method

Shear Velocity: 1.45 ft/s

Fall Velocity: 0.53 ft/s

Average Depth in Contracted Section after Scour: 6.19 ft

Scour Depth for Live Bed: 0.21 ft

Scour may be limited by armoring. Compute all methods to check.

Left Bank Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 0.76 ft

D50: 0.000000 mm

Average Velocity Upstream: 0.16 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 0.00 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0113 ft/ft

Flow in Contracted Section: 2.61 cfs

Flow Upstream that is Transporting Sediment: 19.36 cfs

Width in Contracted Section: 163.16 ft

Width Upstream that is Transporting Sediment: 158.99 ft

Depth Prior to Scour in Contracted Section: 0.03 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Right Bank Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 0.71 ft

D50: 0.000000 mm

Average Velocity Upstream: 1.28 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 0.00 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0113 ft/ft

Flow in Contracted Section: 0.01 cfs

Flow Upstream that is Transporting Sediment: 42.45 cfs

Width in Contracted Section: 0.00 ft

Width Upstream that is Transporting Sediment: 47.01 ft

Depth Prior to Scour in Contracted Section: 1.00 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Pier Details

Pier Name: Pier 1

Pier Scour

Computation Type: HEC-18

Input Parameters

Pier Shape: Square Nose

Bed Condition: Clear-Water Scour

Depth Upstream of Pier: 9.51 ft

Velocity Upstream of Pier: 5.74 ft/s

Width of Pier: 1.00 ft

Length of Pier: 21.18 ft

Angle of Attack: 15.90 Degrees

Result Parameters
Froude Number Upstream: 0.33

Correction Factor for Pier Nose Shape (K1): 1.00

Correction Factor of Angle of Attack (K2): 2.56

Pier Length to Pier Width (L/a): 12.00

Correction Factor for Bed Condition (K3): 1.10

Scour Depth: 7.68 ft

Pier Name: Pier 2

Pier Scour
Computation Type: HEC-18

Input Parameters
Pier Shape: Square Nose

Bed Condition: Clear-Water Scour

Depth Upstream of Pier: 9.51 ft

Velocity Upstream of Pier: 5.74 ft/s

Width of Pier: 1.00 ft

Length of Pier: 21.02 ft

Angle of Attack: 15.90 Degrees

Result Parameters
Froude Number Upstream: 0.33

Correction Factor for Pier Nose Shape (K1): 1.00

Correction Factor of Angle of Attack (K2): 2.56

Pier Length to Pier Width (L/a): 12.00

Correction Factor for Bed Condition (K3): 1.10

Scour Depth: 7.68 ft

Left Abutment Details

Abutment Scour

Computation Type: NCHRP

Input Parameters

NCHRP Method

Abutment Type: Vertical-wall abutment

Angle of Embankment to Flow: 114.76 Degrees

Centerline Length of Embankment: 0.00 ft

Projected Length of Embankment: 0.00 ft

Width of Flood Plain: 0.00 ft

Unit Discharge, Upstream in Main Channel (q1): 23.04 cfs

Unit Discharge in the Constricted Area (q2): 25.55 cfs/ft

D50: 1.477366 mm

Upstream Flow Depth: 5.79 ft

Flow Depth Prior to Scour: 4.86 ft

Result Parameters

q2/q1: 1.11

Average Velocity Upstream: 3.98 ft/s

Critical Velocity above which Bed Materal of Size D and Smaller will be Transported: 2.53 ft/s

Scour Condition: Live Bed

Embankment Length/Floodplain Width Ratio: 0.00

Scour Condition: a (Main Channel)

Amplification Factor: 1.64

Flow Depth including Contraction Scour: 6.33 ft

Maximum Flow Depth including Abutment Scour: 10.35 ft

Scour Hole Depth from NCHRP Method: 5.50 ft

Right Abutment Details

Abutment Scour

Computation Type: NCHRP

Input Parameters

NCHRP Method

Abutment Type: Vertical-wall abutment

Angle of Embankment to Flow: 63.55 Degrees

Centerline Length of Embankment: 0.00 ft

Projected Length of Embankment: 0.00 ft

Width of Flood Plain: 0.00 ft

Unit Discharge, Upstream in Main Channel (q1): 23.04 cfs

Unit Discharge in the Constricted Area (q2): 25.55 cfs/ft

D50: 1.477366 mm

Upstream Flow Depth: 5.79 ft

Flow Depth Prior to Scour: 4.59 ft

Result Parameters

q2/q1: 1.11

Average Velocity Upstream: 3.98 ft/s

Critical Velocity above which Bed Materal of Size D and Smaller will be Transported: 2.53 ft/s

Scour Condition: Live Bed

Embankment Length/Floodplain Width Ratio: 0.00

Scour Condition: a (Main Channel)

Amplification Factor: 1.64

Flow Depth including Contraction Scour: 6.33 ft

Maximum Flow Depth including Abutment Scour: 10.35 ft

Scour Hole Depth from NCHRP Method: 5.76 ft

Hydraulic Analysis Report

Bridge Scour Analysis: Bridge Scour Analysis

Notes:

Scenario: PRnedbtSEP2022 50yr (SRH-2D)

Contraction Scour Summary

Contraction & Long Term Scour is applied method due to greater scour.

Applied Contraction Scour Elevation with LTD -0.13 ft

Local Scour at Abutments Summary

Left Abutment

Abutment Scour Method: NCHRP Method

Abutment Scour Depth 2.05 ft

Total Scour at Abutment 2.05 ft

Total Scour Elevation at Abutment 787.45 ft

Right Abutment

Abutment Scour Method: NCHRP Method

Abutment Scour Depth 1.48 ft

Total Scour at Abutment 1.48 ft

Total Scour Elevation at Abutment 787.45 ft

Main Channel Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 4.97 ft

D50: 1.477305 mm

Average Velocity Upstream: 4.15 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 2.47 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0095 ft/ft

Flow in Contracted Section: 1328.21 cfs

Flow Upstream that is Transporting Sediment: 1297.32 cfs

Width in Contracted Section: 60.61 ft

Width Upstream that is Transporting Sediment: 62.85 ft

Depth Prior to Scour in Contracted Section: 5.33 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Results of Live Bed Method

Shear Velocity: 1.23 ft/s

Fall Velocity: 0.53 ft/s

Average Depth in Contracted Section after Scour: 5.20 ft

Scour Depth for Live Bed: -0.13 ft

Scour may be limited by armoring. Compute all methods to check.

Left Bank Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 0.08 ft

D50: 0.000000 mm

Average Velocity Upstream: 0.00 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 0.00 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0095 ft/ft

Flow in Contracted Section: 9.17 cfs

Flow Upstream that is Transporting Sediment: 0.02 cfs

Width in Contracted Section: 5.74 ft

Width Upstream that is Transporting Sediment: 133.86 ft

Depth Prior to Scour in Contracted Section: 1.90 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Right Bank Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 0.77 ft

D50: 0.000000 mm

Average Velocity Upstream: 1.57 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 0.00 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0095 ft/ft

Flow in Contracted Section: 3.14 cfs

Flow Upstream that is Transporting Sediment: 16.30 cfs

Width in Contracted Section: 4.64 ft

Width Upstream that is Transporting Sediment: 13.43 ft

Depth Prior to Scour in Contracted Section: 1.15 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Left Abutment Details

Abutment Scour

Computation Type: NCHRP

Input Parameters

NCHRP Method

Abutment Type: Vertical-wall abutment

Angle of Embankment to Flow: 114.48 Degrees

Centerline Length of Embankment: 0.00 ft

Projected Length of Embankment: 0.00 ft

Width of Flood Plain: 0.00 ft

Unit Discharge, Upstream in Main Channel (q1): 20.64 cfs

Unit Discharge in the Constricted Area (q2): 21.10 cfs/ft

D50: 1.477305 mm

Upstream Flow Depth: 4.97 ft

Flow Depth Prior to Scour: 4.66 ft

Result Parameters

q2/q1: 1.02

Average Velocity Upstream: 4.15 ft/s

Critical Velocity above which Bed Materal of Size D and Smaller will be Transported: 2.47 ft/s

Scour Condition: Live Bed

Embankment Length/Floodplain Width Ratio: 0.00

Scour Condition: a (Main Channel)

Amplification Factor: 1.32

Flow Depth including Contraction Scour: 5.07 ft

Maximum Flow Depth including Abutment Scour: 6.70 ft

Scour Hole Depth from NCHRP Method: 2.05 ft

Right Abutment Details

Abutment Scour

Computation Type: NCHRP

Input Parameters

NCHRP Method

Abutment Type: Vertical-wall abutment

Angle of Embankment to Flow: 64.02 Degrees

Centerline Length of Embankment: 0.00 ft

Projected Length of Embankment: 0.00 ft

Width of Flood Plain: 0.00 ft

Unit Discharge, Upstream in Main Channel (q1): 20.64 cfs

Unit Discharge in the Constricted Area (q2): 21.10 cfs/ft

D50: 1.477305 mm

Upstream Flow Depth: 4.97 ft

Flow Depth Prior to Scour: 5.23 ft

Result Parameters

q2/q1: 1.02

Average Velocity Upstream: 4.15 ft/s

Critical Velocity above which Bed Materal of Size D and Smaller will be Transported: 2.47 ft/s

Scour Condition: Live Bed

Embankment Length/Floodplain Width Ratio: 0.00

Scour Condition: a (Main Channel)

Amplification Factor: 1.32

Flow Depth including Contraction Scour: 5.07 ft

Maximum Flow Depth including Abutment Scour: 6.70 ft

Scour Hole Depth from NCHRP Method: 1.48 ft

1.48 ft

Hydraulic Analysis Report

Scenario: PRnedbtSEP2022100yr (SRH-2D)

Contraction Scour Summary

Contraction & Long Term Scour is applied method due to greater scour.

Applied Contraction Scour Elevation with LTD -0.04 ft

Local Scour at Abutments Summary

Left Abutment

Abutment Scour Method: NCHRP Method

Abutment Scour Depth 2.58 ft

Total Scour at Abutment 2.58 ft

Total Scour Elevation at Abutment 786.94 ft

Right Abutment

Abutment Scour Method: NCHRP Method

Abutment Scour Depth 2.00 ft

Total Scour at Abutment 2.00 ft

Total Scour Elevation at Abutment 786.94 ft

Main Channel Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 5.69 ft

D50: 1.477305 mm

Average Velocity Upstream: 4.24 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 2.53 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0100 ft/ft

Flow in Contracted Section: 1561.29 cfs

Flow Upstream that is Transporting Sediment: 1515.92 cfs

Width in Contracted Section: 60.49 ft

Width Upstream that is Transporting Sediment: 62.85 ft

Depth Prior to Scour in Contracted Section: 6.03 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Results of Live Bed Method

Shear Velocity: 1.36 ft/s

Fall Velocity: 0.53 ft/s

Average Depth in Contracted Section after Scour: 5.99 ft

Scour Depth for Live Bed: -0.04 ft

Scour may be limited by armoring. Compute all methods to check.

Left Bank Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 0.56 ft

D50: 0.000000 mm

Average Velocity Upstream: 0.10 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 0.00 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0100 ft/ft

Flow in Contracted Section: 13.82 cfs

Flow Upstream that is Transporting Sediment: 8.48 cfs

Width in Contracted Section: 5.74 ft

Width Upstream that is Transporting Sediment: 152.18 ft

Depth Prior to Scour in Contracted Section: 2.59 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Right Bank Contraction Scour

Computation Type: Clear-Water or Live-Bed Scour

Input Parameters

Average Depth Upstream of Contraction: 0.57 ft

D50: 0.000000 mm

Average Velocity Upstream: 1.63 ft/s

Results of Scour Condition

Critical velocity above which bed material of size D and smaller will be transported: 0.00 ft/s

Contraction Scour Condition: Live-Bed

Live Bed and/or Clear Water Input Parameters

Temperature of Water: 60.00 ºF

Slope of Energy Grade Line at Approach Section: 0.0100 ft/ft

Flow in Contracted Section: 6.90 cfs

Flow Upstream that is Transporting Sediment: 45.42 cfs

Width in Contracted Section: 4.64 ft

Width Upstream that is Transporting Sediment: 48.83 ft

Depth Prior to Scour in Contracted Section: 1.89 ft

Unit Weight of Water: 62.40 lb/ft^3

Unit Weight of Sediment: 165.00 lb/ft^3

Left Abutment Details

Abutment Scour

Computation Type: NCHRP

Input Parameters

NCHRP Method

Abutment Type: Vertical-wall abutment

Angle of Embankment to Flow: 114.88 Degrees

Centerline Length of Embankment: 0.00 ft

Projected Length of Embankment: 0.00 ft

Width of Flood Plain: 0.00 ft

Unit Discharge, Upstream in Main Channel (q1): 24.12 cfs

Unit Discharge in the Constricted Area (q2): 24.80 cfs/ft

D50: 1.477305 mm

Upstream Flow Depth: 5.69 ft

Flow Depth Prior to Scour: 5.35 ft

Result Parameters

q2/q1: 1.03

Average Velocity Upstream: 4.24 ft/s

Critical Velocity above which Bed Materal of Size D and Smaller will be Transported: 2.53 ft/s

Scour Condition: Live Bed

Embankment Length/Floodplain Width Ratio: 0.00

Scour Condition: a (Main Channel)

Amplification Factor: 1.36

Flow Depth including Contraction Scour: 5.83 ft

Maximum Flow Depth including Abutment Scour: 7.93 ft

Scour Hole Depth from NCHRP Method: 2.58 ft

Right Abutment Details

Abutment Scour

Computation Type: NCHRP

Input Parameters

NCHRP Method

Abutment Type: Vertical-wall abutment

Angle of Embankment to Flow: 63.62 Degrees

Centerline Length of Embankment: 0.00 ft

Projected Length of Embankment: 0.00 ft

Width of Flood Plain: 0.00 ft

Unit Discharge, Upstream in Main Channel (q1): 24.12 cfs

Unit Discharge in the Constricted Area (q2): 24.80 cfs/ft

D50: 1.477305 mm

Upstream Flow Depth: 5.69 ft

Flow Depth Prior to Scour: 5.93 ft

Result Parameters

q2/q1: 1.03

Average Velocity Upstream: 4.24 ft/s

Critical Velocity above which Bed Materal of Size D and Smaller will be Transported: 2.53 ft/s

Scour Condition: Live Bed

Embankment Length/Floodplain Width Ratio: 0.00

Scour Condition: a (Main Channel)

Amplification Factor: 1.36

Flow Depth including Contraction Scour: 5.83 ft

Maximum Flow Depth including Abutment Scour: 7.93 ft

Scour Hole Depth from NCHRP Method: 2.00 ft

massDOT Highway Division

Town: Conway
Bridge No.: C-20-004
North Poland Rd Over Poland Brook
Project No.: 609082

Riprap Sizing at Bridge Abutments for 1% Flood Event for all Proposed Alternatives

HEC-23 Volume II - Design Guideline 14 - Sizing Rock Riprap at Bridge Abutments

$$\frac{D_{50}}{y} = \left(\frac{K}{Ss - 1}\right)\left[\frac{V^2}{gy}\right]$$ *for Froude number ≤ 0.8* ref: Eq. 14.1

$$\frac{D_{50}}{y} = \left(\frac{K}{S_s - 1}\right)\left[\frac{V^2}{gy}\right]^{0.14}$$ *for Froude number > 0.8* ref: Eq. 14.2

Determine Set Back Ratio

$d_{50} = 0.692(V_{des})^2/(S_g - 1)2g$	ref: Eq. 11.1
Set back length (ft) =	0.00
Avg channel flow depth (ft) =	5.69
SBR =	0.00

SBR is < 5; hence, Velcocity based on the contracted area through bridge

Determine Riprap Size (Eq. 14.1 or 14.2)

Type of Abutment =	Vertical
Riprap rock type (select Angular or Rounded) =	Angular
Average velocity in the contracted section (ft/s), V =	6.09
Specific gravity of the sediment, Sg =	2.65
Gravitational acceleration (ft/s^2), g =	32.2
Average flow depth in the contracted section (ft), y =	6.03
Froude Number	0.44
K	1.02
Median stone diamter D_{50} (ft) =	0.71
D_{50} in inches	8.5
Recommended D_{50} (inches) =	9.00
Recommended D_{50} (ft) =	0.8
Recommended D_{100} (inches) =	18.0
Recommended D_{100} (ft) =	1.50

Recommended Riprap Extents

Thalweg Elevation	787.80
Check Scour Flood Elevation	798.04
Y_0	10.2
$2Y_0$	20.5
Thickness of riprap (1.5* D_{50} or D_{100}), inches	18
Thickness of riprap (1.5* D_{50} or D_{100}), feet	1.5
Long term degradation depth, feet	0.00
Constraction scour depth, feet	0.00
Top of riprap elevation (Depth below thalweg), feet	787.8
Pressure flow condition	No
Min Extend of rip rap from toe into channel, feet	10.24
Extend of rip rap u/s and d/s, feet	25.0

DOCUMENT A00831

ARMY CORPS OF ENGINEERS

Self-Verification Notification (SVN)

And

General Permits for the Commonwealth of Massachusetts

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U.S. Army Corps of Engineers (USACE)

SELF-VERIFICATION NOTIFICATION (SVN)

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332.

Principal Purpose This information will be used in evaluating activities under Self-Verification procedures within Massachusetts.

Routine Uses Routine uses will include: (1) Documenting compliance with the terms and conditions of the General Permit (GP) for activities that may require authorization pursuant to one or more of USACE's Regulatory authorities. (2) Records may be referred to other Federal, State, and local agencies for evaluation and enforcement purposes.

Disclosure Failure to fully comply and abide by the GP terms and conditions prior to commencing work and after completion project may result in formal enforcement action, up to and including monetary penalties and/or legal action, pursuant to 33 CFR Part 326.

Instructions The permittee must complete ALL required sections of this document before commencing USACE-regulated activities. A copy of this completed SVN must be kept on site during construction and be made available for review by USACE and other Federal, State, & Local regulatory authorities at any time. Within 30 days of initiating project construction, the permittee shall submit the completed SVN to USACE. The SVN shall be submitted to USACE as **ONE signed document** that includes project plans and documentation that supports each field (e.g., emails, letters, description, phone calls, surveys). Electronic submissions to the following address are strongly preferred: cenae-r-ma-sv@usace.army.mil. The email subject line shall contain the following: GP #, SVN, City/Town, and date submitted.

(ITEMS 1 THRU 3 TO BE FILLED BY USACE)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED

APPLICANT AND AGENT INFORMATION

4. APPLICANT'S NAME	7. AGENT'S ADDRESS:
First - Courtney Middle - Last - Walker	First - Laura Middle - Last - Krause
Company - MassDOT - Highway Division	Company - BETA Group, Inc.
E-mail Address - courtney.l.walker@dot.state.ma.us	E-mail Address - lkrause@beta-inc.com
5. APPLICANT'S ADDRESS:	8. AGENT'S ADDRESS:
Address- 10 Park Plaza, Room 7360	Address- 89 Shrewsbury Street, Suite 300
City - Boston State - MA Zip - 02116 Country - USA	City - Worcester State - MA Zip - 0160 Country - U
6. APPLICANT'S PHONE NOs. w/AREA CODE	9. AGENTS PHONE NOs. w/AREA CODE
a. Residence b. Business c. Fax	a. Residence b. Business c. Fax
857-262-0757	7742581230

NAME, LOCATION, AND DESCRIPTION OF PROJECT SITE

10. PROJECT NAME OR TITLE
Bridge Replacement, C-20-004, North Poland Road over Poland Brook

11. FILE NUMBER(S) OF PREVIOUS USACE ACTIONS ON THE SITE (if applicable)	12. NAME OF WATERBODY
	Poland Brook
13. PROJECT COORDINATES (in decimal degrees)	14. PROJECT STREET ADDRESS (if applicable)
Latitude: ◦N Longitude: ◦W	Address North Poland Road
42.51181 -72.74345	City - Conway State - MA Zip - 01341

ACTIVITY TYPE, PROJECT IMPACTS, AVOIDANCE & MINIMIZATION

15. GENERAL PERMIT ACTIVITIES (CHECK ALL THAT APPLY)

1 ☐	6 ☐	11 ☐	16 ☐	21 ☐
2 ☐	7 ☐	12 ☐	17 ☐	22 ☐
3 ☐	8 ☐	13 ☐	18 ☐	23 ☑
4 ☐	9 ☐	14 ☐	19 ☐	24 ☐
5 ☐	10 ☐	15 ☐	20 ☐	25 ☐

16. SUMMARY OF PROJECT IMPACTS (*see instructions*)

Area (square feet)	Length (linear feet)	Volume (cubic yards)	Duration
185 (WOTUS)		34 (WOTUS)	Permanent
687 (WOTUS)			Temporary
	84 (Bank)		Temporary
45 (WOTUS)			Restoration

17. PROJECT PLANS (BY CHECKING THE BOXES BELOW, YOU CERTIFY THESE ITEMS ARE COMPLETE) (*see instructions*)

- [x] a. Plans shall at least contain the following: Vicinity Map, Plan View, and Typical Cross Section View of the proposed activity.
- [x] b. All direct, indirect and secondary impacts from USACE regulated activities are shown on the project plans.
- [x] c. The size of the impact area for each activity (acre, square feet, linear feet) are shown on the project plans.
- [x] d. For discharges of fill material (§404), the volume of fill material is identified on the project plans.
- [x] e. The duration of each impact, permanent or temporary (X days), is identified on the project plans.
- [ ] f. Do activities with permanent impacts result in the loss of waters? If so, this is identified on the project plans.
- [x] g. All aquatic resources in the vicinity of the USACE regulated activities are delineated on the project plans.

18. AVOIDANCE & MINIMIZATION (BY CHECKING THE BOXES BELOW, YOU CERTIFY THESE CRITERIA ARE MET) (*see instructions*)

- [x] a. The project has been designed to avoid and minimize impacts to aquatic resources.
- [x] b. The footprint of activities in waters of the U.S. has been reduced to only what is necessary to achieve the overall project purpose.
- [x] c. All practicable measures have been taken to avoid and minimize impacts to aquatic resources through construction techniques and site access (e.g., Best Management Practices, Time of Year Restrictions).
- [x] d. All temporary impacts from USACE regulated activities will be restored upon completion of construction and the project area will be returned to pre-construction contours and conditions.

COMPLIANCE WITH FEDERAL REGULATIONS & SUPPLEMENTAL INFORMATION

19. DUE DILIGENCE (*see instructions*)

Complete the entries below to document compliance with the following Federal requirements. Construction may NOT begin if a PCN is/may be required, and you must contact USACE to determine permitting requirements. Documentation that demonstrates how the activity complies with each field below shall be submitted to the USACE as noted in the instructions block. See each General Condition (GC) in the GP for how to comply with each requirement.

a. State Historic Preservation Officer	Another Federal agency made a no effect determination.
b. Massachusetts BUAR	Per Appendix A, BUAR was notified and they did not respond with concerns within 30 days.
c. Tribal Historic Preservation Officers	The Tribe(s) were notified and they didn't respond with concerns within 30 days.
d. Endangered Species Act - NOAA	The activity is not located within the ESA-listed Species Range.
e. Endangered Species Act - USFWS	NLAA determination reached through the Northeast Species D-Key (PCN Required).
f. Northern Long Eared Bat (ESA)	NLAA determination reached with the Rangewide D-Key. See Instructions below.*
g. Essential Fish Habitat	The project footprint does not contain EFH (see EFH definition in the MA GP).
h. Wild & Scenic Rivers	There are no WSR's within 0.25 miles of the project area.
i. 401 Water Quality Certification 401	The activity qualifies under the general 401 WQC for the 2023 MA GPs.
	401 WQC/OOC File Number: 24-WW11-0033-APP OOC issued: 401 issued:
j. Section 408 Permission	Not Required per GC 15a-f, no Federal Projects are within the project vicinity.
k. Coastal Zone	The project is not located within the coastal zone.
l. Construction Mats	N/A, the activity does not require the installation of construction mats.
m.Time of Year Restrictions	N/A, the project is not located in a waterbody that has TOY restrictions.
n. Vernal Pools	Per GC 28, the project is not located in a vernal pool.
o. Sediment & Erosion Controls	Per GC 25, the activity uses BMPs to avoid/minimize sedimentation & erosion.
p. Stream/Wetland Crossings	The activity complies with all applicable terms in GC 31.

20. AQUACULTURE ACTIVITIES - GP 18 (*see instructions*)

- [ ] a. If required, an Aquaculture Certification from the Massachusetts Division of Marine Fisheries was obtained prior to commencing work.
- [ ] b. Coordination with the U.S. Coast Guard pursuant to Private Aids to Navigation has occurred prior to commencing work.
- [ ] c. If required, a MEPA Certificate was obtained from the Massachusetts Environmental Protection Agency prior to commencing work. Select Option
- [ ] d. The prospective permittee contacted local authorities (e.g. harbormaster, select board, shellfish constable) for authorization of their facility prior to commencing work.

21. ADDITIONAL INFORMATION/ATTACHMENTS (*see instructions*)

- [x] a. The project plans are enclosed in this SVN submittal (see block 17).
- [x] b. The activity IS NOT funded through the Bipartisan Infrastructure Bill (also known as the Infrastructure Investment and Jobs Act).
- [x] c. All required state, local and federal approvals were acquired prior to starting construction in USACE jurisdiction.
- [x] d. After construction of the activity is completed, a complete Certificate of Compliance will be submitted to USACE.

22. IS THERE ANOTHER LEAD FEDERAL AGENCY:

[x] YES [ ] NO Federal Highway Administration

23. STATEMENT OF AUTHORIZATION *(see instructions)*

I certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Courtney Walker Digitally signed by Courtney Walker Date: 2024.04.03 11:01:03 -04'00'	4/3/24	Laura Krause	4/3/24
SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

24. SIGNATURES *(see instructions)*

I hereby certify that the information in this Self-Verification Notification is complete and accurate. As the applicant or their duly authorized agent, I certify the activity was completed in accordance with the terms and conditions of the GP. This includes all applicable terms, general conditions, and activity-specific GP criteria. I agree to allow the duly authorized representatives of the Corps of Engineers Regulatory Program and other regulatory or advisory agencies to enter upon the premises of the project site at reasonable times to evaluate inspect and photograph site conditions. This consent to enter the property is superior to, takes precedence over, and waives any communication to the contrary. For example, if the property is posted as “no trespassing” this consent specifically supersedes and waives that prohibition and grants permission to enter the property despite such posting.

Courtney Walker Digitally signed by Courtney Walker Date: 2024.04.03 11:01:25 -04'00'	4/3/24	Laura Krause	4/3/24
SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Instructions for Preparing a
Department of the Army
General Permit (GP) Self-Verification

Blocks 1 through 3. To be completed by the Corps of Engineers.

Block 4. Applicant' Name. Enter the name and the e-mail address of the responsible party or parties. If the responsible party is an agency, company, corporation, or other organization, indicate the name of the organization and responsible officer and title. If more than one party is associated with the self-verification, please attach a sheet of paper with the necessary information marked Block 4.

Block 5. Address of Applicant. Please provide the full address of the party or parties responsible for the self-verification. If more space is needed, attach an extra sheet of paper marked Block 5.

Block 6. Applicant Telephone Number(s). Please provide the telephone number where you can usually be reached during normal business hours.

Blocks 7 through 9. To be completed, if you choose to have an agent.

Block 7. Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer, consultant, or any other person or organization. Note: An agent is not required.

Blocks 8 and 9. Agent's Address and Telephone Number. Please provide the complete mailing address of the agent, along with the telephone number where they can be reached during normal business hours.

Block 10. Proposed General Permit Activity Name or Title. Please provide a name identifying the proposed GP activity, e.g., Windward Marina, Rolling Hills Subdivision, or Smith Commercial Center.

Block 11. File Number(s) of Previous USACE Actions on the Site Please provide any known USACE file number. If the activity does not have a known USACE file number, you may state N/A.

Block 12. Name of Waterbody. Please provide the name (if it has a name) of any stream, lake, marsh, or other waterway to be directly impacted by the GP activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 13. Proposed Activity Coordinates. Please enter the latitude and longitude of where the proposed GP activity is located. Indicate whether the project location provided is the center of the project or whether the project location is provided as the latitude and longitude for each of the "corners" of the project area. If there are multiple sites, please list the latitude and longitude of each site (center or corners) on a separate sheet of paper and mark as Block 13.

Block 14. Proposed Activity Street Address. If the proposed activity is located at a site having a street address (not a box number), enter it in Block 14.

Block 15. General Permit Activity Type. Please select all GP activity types that apply to the proposed activity. A list of GP activity types can be found in Section III of the GP.

Block 16. Summary of Project Impacts. Please provide ALL proposed impacts, both temporary and permanent in duration, that are located in Waters of the United States. The area of impact shall be provided in square feet (SF). When applicable, impacts that result in conversion of stream bank or shoreline must also be identified in linear feet (LF). Dredging or the discharge of dredged or fill material shall also include the volume, cubic yards (CY), of material removed from or placed into Waters of the U.S. If more entries are required, please attach a table matching the desired format in Block 16.

Block 17. Project Plans. Please verify that items a-g are included in the project plans. Three types of illustrations are necessary to properly depict the proposed work. These illustrations or drawings are identified as a Vicinity Map, a Plan View (Aerial view) and a Cross Section Map. For linear projects (e.g. roads, subsurface utility lines, etc.) gradient drawings (longitudinal profile) should also be included. Plans must accurately depict the existing conditions and all aspects of the proposed activity located in waters of the U.S. Please submit one copy of all drawings formatted to print on 8½ x 11 inch or 11 x 17 inch plain white paper. Use the fewest number of sheets necessary for your drawings or illustrations. Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view, or cross section). While illustrations need not be certified engineering sheets; they should be clear, accurate, contain all necessary information, and depict all proposed work. Each submission must also include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current wetland delineation manual and regional supplement published by USACE.

Block 18. Avoidance & Minimization. Please verify that items a-d have been implemented for the proposed activity.

Block 19. Due Diligence. Please complete all the fields and submit documentation to USACE to demonstrate compliance with the above requirements. This Documentation may include emails, letters, meeting notes, phone call log, project narrative, project plans, a species list from the NOAA Section 7 Mapper, a completed copy of the IPAC determination keys, etc. Documentation should be limited to what is necessary to demonstrate how the proposed activity meets each requirement. Refer to the MA GP, Appendix A, for specific guidance on the identification of previously identified historic properties and previously unidentified historic properties. Endangered Species: *The applicant must be designated as the non-federal representative for the purposes of Section 7 consultation to select the Rangewide D-Key options. Otherwise, the applicant shall select the following option when IPAC indicates the NLEB is present: "The activity IS located within the NLEB Species Range (PCN Required)."

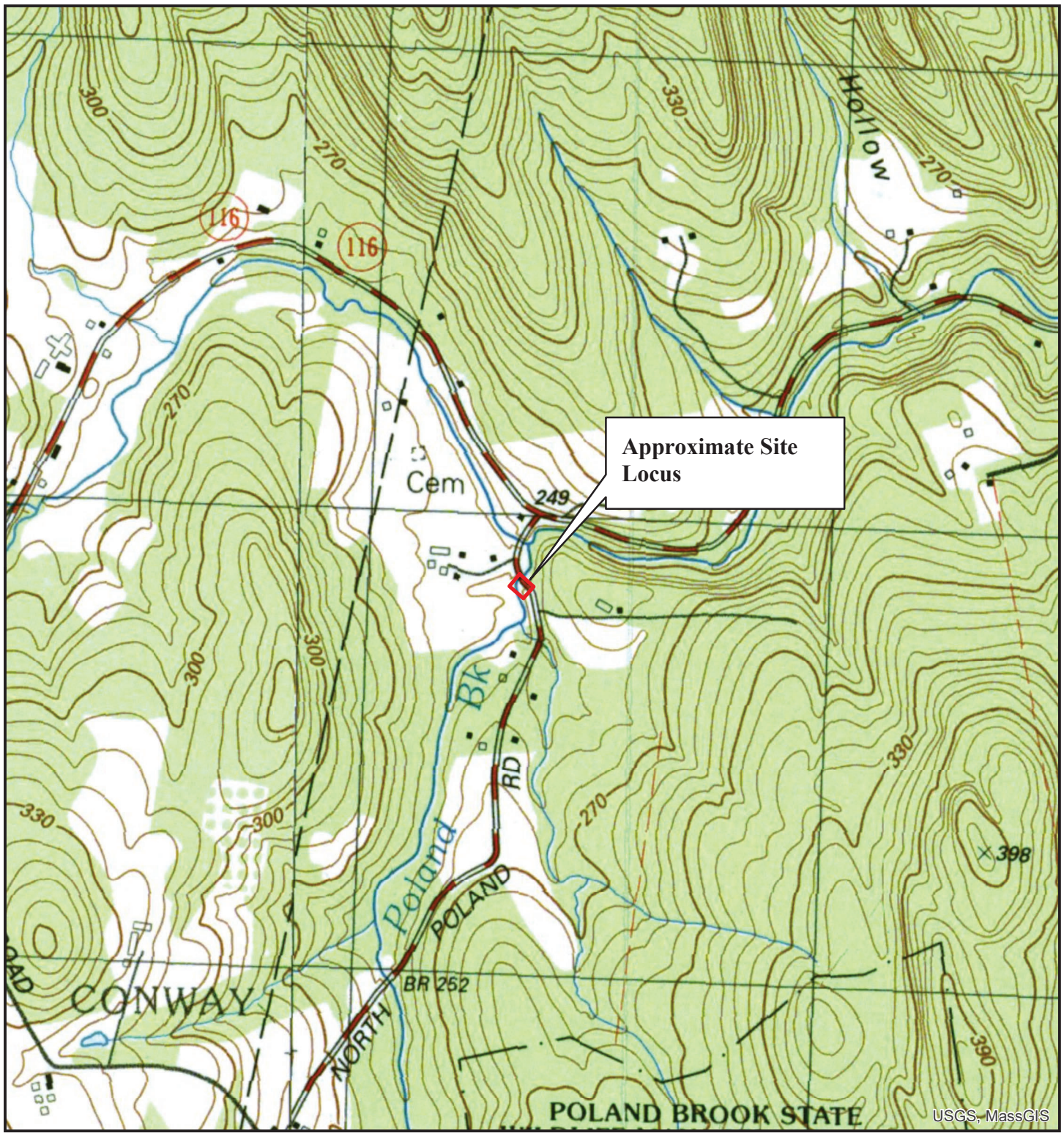
Block 20. Aquaculture Activities. Please verify that items a-d have been obtained or completed prior to commencing work in waters of the U.S.

Block 21. Additional Information/Attachments. Please verify that items a-d have been completed prior to commencing work in waters of the U.S.

Block 22. Lead Federal Agency. Please identify if there is another lead federal agency involved with the proposed activity. Enter the lead federal agency name (e.g., the Federal Emergency Management Agency, FEMA) and the agency's designated person of contact for the activity.

Block 23. Statement of Authorization. The applicant shall sign this section for all activities. If an agent is to be employed, the agent shall sign this section.

Block 24. Signatures. The SVN must be signed by the person proposing to undertake the GP activity, and if applicable, the authorized party (agent) that prepared the SVN. The signature of the person proposing to undertake the GP activity shall be an affirmation that the party submitting the SVN possesses the requisite property rights to undertake the GP activity.



BETA
IMPROVING COMMUNITIES TOGETHER

N
W E
S

0 1,000 2,000 Feet

1 inch = 1,000 feet

Figure 1
Site Locus
North Poland Road Bridge Over Poland Brook
Conway, MA

Data Source: MassGIS USGS Topographic Quadrangle Images (2001)

BETA
IMPROVING COMMUNITIES TOGETHER

N
W E
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0 1,000 2,000 Feet

1 inch = 1,000 feet

Figure 2
Site Locus - Aerial
North Poland Road Bridge Over Poland Brook
Conway, MA

Data Source: MassGIS USGS Topographic Quadrangle Images (2001)

Figure 3
Environmental Resources Map
North Poland Road Bridge
Over Poland Brook
Conway, MA

Wetland Resources Legend

- MassDEP Hydrologic Feature
- Marsh/Bog
- Wooded marsh
- Open Water
- NFHL 100 Year Flood Zone
- Area of Critical Environmental Concern (ACEC)
- DFW Coldwater Fisheries
- Outstanding Resource Water
- Zone A
- Zone B
- Zone C
- MassDEP IWPA
- MassDEP Zone I
- MassDEP Zone II

Mapped Habitat Legend

- NHESP Potential Vernal Pool
- NHESP Certified Vernal Pool
- NHESP Priority Habitat of Rare Species
- NHESP Estimated Habitats of Rare Wildlife

N
W E
S

0 100 200 Feet

1 inch = 100 feet

Data Source: MassGIS USGS Color Ortho Imagery (2014), MassDEP Wetlands (1:12000) (2009), NHESP Potential Vernal Pools (2000), NHESP Certified Vernal Pools, NHESP Priority Habitats of Rare Species (2008), NHESP Estimated Habitats of Rare Species (2008), Areas of Critical Environmental Concern (2009), FEMA National Flood Hazard Layer (2014),

BETA
IMPROVING COMMUNITIES TOGETHER

Figure 4.

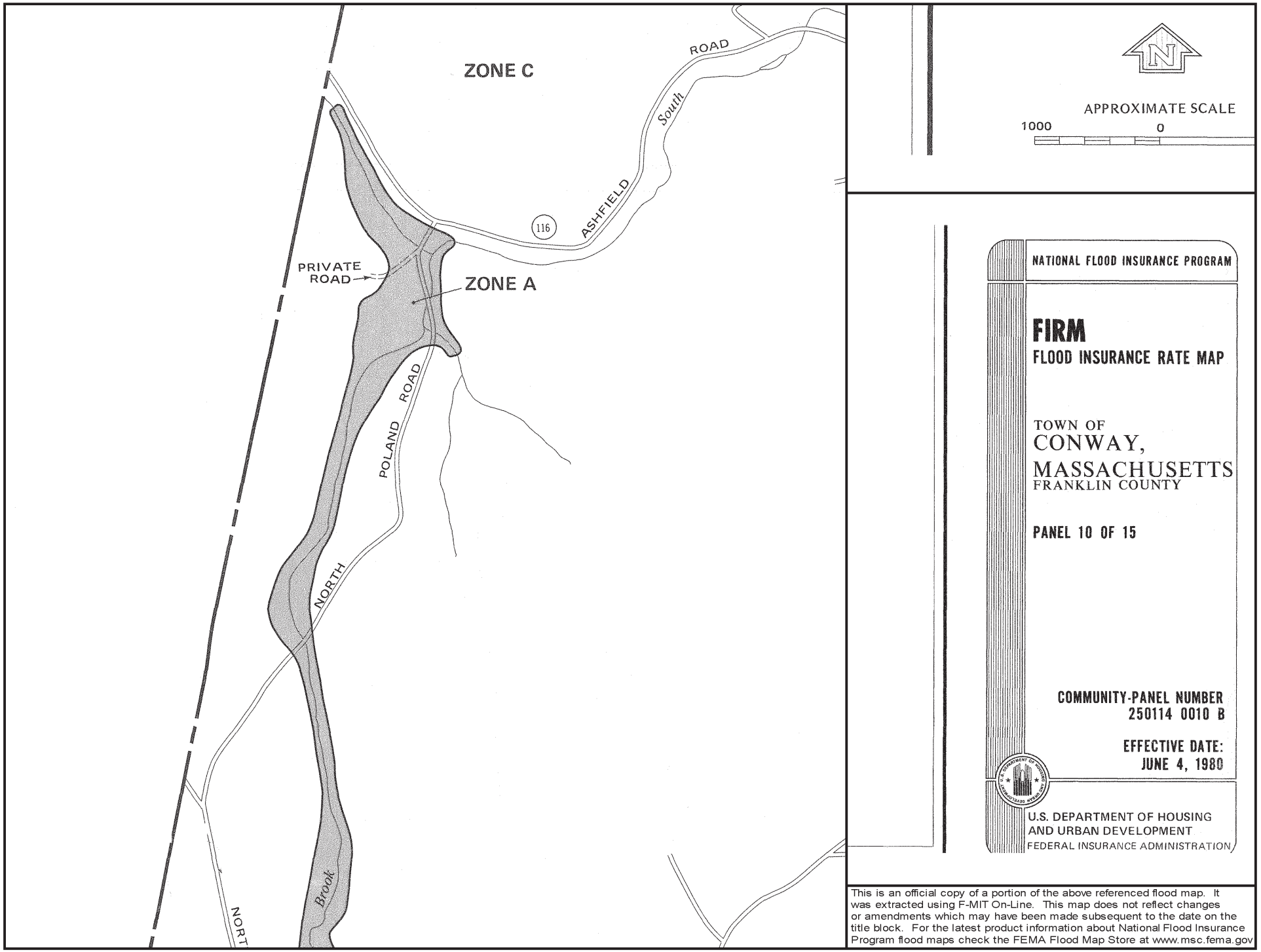
ZONE C
ROAD
South
ASHFIELD
116
PRIVATE
ROAD
ZONE A
POLAND ROAD
NORTH
Brook
NORT
N
APPROXIMATE SCALE
1000
0
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
TOWN OF
CONWAY,
MASSACHUSETTS
FRANKLIN COUNTY
PANEL 10 OF 15
COMMUNITY-PANEL NUMBER
250114 0010 B
EFFECTIVE DATE:
JUNE 4, 1980
U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Photo 1

View of vegetation within the Streambed of Poland Brook, downstream of the North Poland Road Bridge—facing northeast.

Photo 2

View of the armored Stream Bank adjacent to the northerly bridge abutment—facing west.

PHOTOGRAPHIC DOCUMENTATION

North Poland Road Bridge Over Poland Brook

Conway, Massachusetts

Photographs Documented 11.06.2020

Photo 3

View of riffling within Poland Brook, downstream of the bridge—facing southwest.

Photo 4

View of the undercut northerly pier—facing northeast.

PHOTOGRAPHIC DOCUMENTATION
North Poland Road Bridge Over Poland Brook
Conway, Massachusetts
Photographs Documented 11.06.2020

Photo 5

View of the bridge taken from North Poland Road—facing north.

Photo 6

View of North Poland Road conditions—facing south.

PHOTOGRAPHIC DOCUMENTATION

North Poland Road Bridge Over Poland Brook

Conway, Massachusetts

Photographs Documented 11.06.2020

Photo 7

View of deposition caused by an eddy-like feature downstream of the bridge—facing east.

Photo 8

View of an upstream meander that bows outward—facing west.

PHOTOGRAPHIC DOCUMENTATION

North Poland Road Bridge Over Poland Brook

Conway, Massachusetts

Photographs Documented 11.06.2020

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: June 01, 2023
Project code: 2023-0052649
Project Name: 609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK

Subject: Concurrence verification letter for the '609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK' project under the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (NLEB).

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated June 01, 2023 to verify that the **609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK** (Proposed Action) may rely on the concurrence provided in the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures, and may affect, but is not likely to adversely affect (NLAA) the endangered Indiana bat (*Myotis sodalis*) and/or the endangered northern long-eared bat (*Myotis septentrionalis*). Consultation with the Service pursuant to section 7(a)(2) of ESA (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*.) is required.

The Service has 14 calendar days to notify the lead Federal action agency or designated non-federal representative if we determine that the Proposed Action does not meet the criteria for a NLAA determination under the PBO. If we do not notify the lead Federal action agency or designated non-federal representative within that timeframe, you may proceed with the Proposed Action under the terms of the NLAA concurrence provided in the PBO. This verification period allows Service Field Offices to apply local knowledge to implementation of the PBO, as we may identify a small subset of actions having impacts that were unanticipated. In such instances,

Service Field Offices may request additional information that is necessary to verify inclusion of the proposed action under the PBO.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities: If your initial bridge/culvert or structure assessment documented signs of bat use or occupancy, or an assessment failed to detect Indiana bats and/or NLEBs, yet are later detected prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office within 2 working days of any potential take. In these instances, potential incidental take of Indiana bats and/or NLEBs is covered under the Incidental Take Statement in the 2018 FHWA, FRA, FTA PBO (provided that the take is reported to the Service).

If the Proposed Action is modified, or new information reveals that it may affect the Indiana bat and/or northern long-eared bat in a manner or to an extent not considered in the PBO, further review to conclude the requirements of ESA Section 7(a)(2) may be required.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities:
If your initial bridge/culvert or structure assessments failed to detect Indiana bats and/or NLEB use or occupancy, yet bats are later detected prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office within 2 working days of the incident. In these instances, potential incidental take of Indiana bats and/or NLEBs may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species, and/or any designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please contact this Service Office.

The following species may occur in your project area and **are not** covered by this determination:

- Monarch Butterfly *Danaus plexippus* Candidate

PROJECT DESCRIPTION

The following project name and description was collected in IPaC as part of the endangered species review process.

NAME

609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK

DESCRIPTION

609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK

This municipally owned one-lane bridge is a stringer/multi-beam or girder type structure built in 1940. It has a length of 70 feet and a curb-to-curb width of 14 feet. The bridge is structurally deficient. MassDOT’s Bridge Database indicates an ADT of 800 vpd with 6% trucks. The proposed project calls for complete replacement of this structure.

Monarch Butterfly: Candidate Species only, no conservation measures at this time.

DETERMINATION KEY RESULT

Based on your answers provided, this project(s) may affect, but is not likely to adversely affect the endangered Indiana bat and/or the endangered northern long-eared bat, therefore, consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required. However, also based on your answers provided, this project may rely on the concurrence provided in the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

QUALIFICATION INTERVIEW

1. Is the project within the range of the Indiana bat[1]?

   [1] See Indiana bat species profile

   Automatically answered
   No

2. Is the project within the range of the northern long-eared bat[1]?

   [1] See northern long-eared bat species profile

   Automatically answered
   Yes

3. Which Federal Agency is the lead for the action?

   A) Federal Highway Administration (FHWA)

4. Are *all* project activities limited to non-construction[1] activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

   [1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

   No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces[1]?

   [1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

   No

6. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum[1]?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

7. Is the project located **within** a karst area?

   Yes

8. Will the project include *any* type of activity that could impact a **known** hibernaculum[1], or impact a karst feature (e.g., sinkhole, losing stream, or spring) that could result in effects to a **known** hibernaculum?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

9. Is there *any* suitable[1] summer habitat for Indiana Bat or NLEB **within** the project action area[2]? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   [2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the User's Guide for the Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat.

   Yes

10. Will the project remove *any* suitable summer habitat[1] and/or remove/trim any existing trees **within** suitable summer habitat?

    [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

    Yes

11. Will the project clear more than 20 acres of suitable habitat per 5-mile section of road/rail?

    No

12. Have presence/probable absence (P/A) summer surveys[1][2] been conducted[3][4] **within** the suitable habitat located within your project action area?

    [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

    [2] Presence/probable absence summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate distance from hibernacula) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

    [3] For projects within the range of either the Indiana bat or NLEB in which suitable habitat is present, and no bat surveys have been conducted, the transportation agency will assume presence of the appropriate species. This assumption of presence should be based upon the presence of suitable habitat and the capability of bats to occupy it because of their mobility.

    [4] Negative presence/probable absence survey results obtained using the summer survey guidance are valid for a minimum of two years from the completion of the survey unless new information (e.g., other nearby surveys) suggest otherwise.

    Yes

    SUBMITTED DOCUMENTS

    - *609082_Conway_Report_compiled.pdf https://ipac.ecosphere.fws.gov/project/QCZMHQDBXZCJLIWJIWL7TW6ICY/projectDocuments/123265399*

13. Did the presence/probable absence (P/A) summer surveys detect Indiana bats and/or NLEB[1]?

    [1] P/A summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate home range) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

    No

14. Were the P/A summer surveys conducted **within** the fall swarming/spring emergence range of a documented Indiana bat hibernaculum[1]?

    [1] Contact the local Service Field Office for appropriate distance from hibernacula.

    No

15. Does the project include activities **within documented NLEB habitat**[1][2]?

    [1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

    [2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

    No

16. Will the removal or trimming of habitat or trees occur **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors?

    Yes

17. What time of year will the removal or trimming of habitat or trees **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors occur?

    C) During both the active and inactive seasons

18. Will *any* tree trimming or removal occur **within** 100 feet of existing road/rail surfaces?

    Yes

19. Will *any* tree trimming or removal occur **between** 100-300 feet of existing road/rail surfaces?

    No

20. Are *all* trees that are being removed clearly demarcated?

    Yes

21. Will the removal of habitat or the removal/trimming of trees involve the use of **temporary** lighting?

    Yes

22. Will the removal of habitat or the removal/trimming of trees include installing new or replacing existing **permanent** lighting?

    No

23. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?

    No

24. Does the project include slash pile burning?

    No

25. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?

    Yes

26. Is there *any* suitable habitat[1] for Indiana bat or NLEB **within** 1,000 feet of the bridge? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

    [1] See the Service's current summer survey guidance for our current definitions of suitable habitat.

    Yes

27. Has a bridge assessment[1] been conducted **within** the last 24 months[2] to determine if the bridge is being used by bats?

    [1] See User Guide Appendix D for bridge/structure assessment guidance

    [2] Assessments must be completed no more than 2 years prior to conducting any work below the deck surface on all bridges that meet the physical characteristics described in the Programmatic Consultation, regardless of whether assessments have been conducted in the past. Due to the transitory nature of bat use, a negative result in one year does not guarantee that bats will not use that bridge/structure in subsequent years.

    Yes

    SUBMITTED DOCUMENTS

    - *609082_Conway_Report_compiled.pdf https://ipac.ecosphere.fws.gov/project/QCZMHQDBXZCJLIWJIWL7TW6ICY/projectDocuments/123265399*

28. Did the bridge assessment detect *any* signs of Indiana bats and/or NLEBs roosting in/under the bridge (bats, guano, etc.)[1]?

    [1] If bridge assessment detects signs of *any* species of bats, coordination with the local FWS office is needed to identify potential threatened or endangered bat species. Additional studies may be undertaken to try to identify which bat species may be utilizing the bridge prior to allowing *any* work to proceed.

    Note: There is a small chance bridge assessments for bat occupancy do not detect bats. Should a small number of bats be observed roosting on a bridge just prior to or during construction, such that take is likely to occur or does occur in the form of harassment, injury or death, the PBO requires the action agency to report the take. Report all unanticipated take within 2 working days of the incident to the USFWS. Construction activities may continue without delay provided the take is reported to the USFWS and is limited to 5 bats per project.

    No

29. Will the bridge removal, replacement, and/or maintenance activities include installing new or replacing existing **permanent** lighting?

    No

30. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)

    No

31. Will the project involve the use of *any* **temporary** lighting in addition to the lighting already indicated for habitat removal (including the removal or trimming of trees), or bridge/structure removal, replacement or maintenance activities?

    Yes

32. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **temporary** lighting (other than the lighting already indicated for habitat removal (including the removal or trimming of trees) or bridge/structure removal, replacement or maintenance activities) will be used?

    Yes

33. Will the project install new or replace existing **permanent** lighting?

    No

34. Does the project include percussives or other activities (**not including tree removal/ trimming or bridge/structure work**) that will increase noise levels above existing traffic/ background levels?

    Yes

35. Will the activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the active season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

36. Will *any* activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the inactive season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

37. Are *all* project activities that are **not associated with** habitat removal, tree removal/ trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives, limited to actions that DO NOT cause any additional stressors to the bat species?

    Examples: lining roadways, unlighted signage , rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.

    Yes

38. Will the project raise the road profile **above the tree canopy**?

    No

39. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the active season within undocumented habitat.

40. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) and/or increase noise levels above existing traffic/background levels consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the inactive season

41. Is the location of this project consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because no bats were detected during presence/probable absence surveys conducted during the summer survey season and outside of the fall swarming/spring emergence periods. Additionally, all activities were at least 0.5 miles from any hibernaculum.

42. Is the bridge removal, replacement, or maintenance activities portion of this project consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the bridge has been assessed using the criteria documented in the BA and no signs of bats were detected

43. **General AMM 1**
    Will the project ensure *all* operators, employees, and contractors working in areas of known or presumed bat habitat are aware of *all* FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable Avoidance and Minimization Measures?

    Yes

44. **Hibernacula AMM 1**
    Will the project ensure that on-site personnel will use best management practices[1], secondary containment measures, or other standard spill prevention and countermeasures to avoid impacts to possible hibernacula?

    [1] Coordinate with the appropriate Service Field Office on recommended best management practices for karst in your state.

    Yes

45. **Hibernacula AMM 1**
    Will the project ensure that, where practicable, a 300 foot buffer will be employed to separate fueling areas and other major containment risk activities from caves, sinkholes, losing streams, and springs in karst topography?

    Yes

PROJECT QUESTIONNAIRE

1. Have you made a No Effect determination for *all* other species indicated on the FWS IPaC generated species list?

   N/A

2. Have you made a May Affect determination for *any* other species on the FWS IPaC generated species list?

   N/A

3. How many acres[1] of trees are proposed for removal between 0-100 feet of the existing road/rail surface?

   [1] If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   0.5

4. Please describe the proposed bridge work:

   The proposed project will be the replacement of the existing North Poland Road bridge (Bridge No. C-20-004) over the Poland Brook. Included in the work will be full depth construction approximately 100 feet from the proposed bridge along both approaches, as well as milling and overlay another 100 feet. The existing bridge is being widened from 14-feet to 24-feet, and the roadway approaches are being widened from 19-feet and 22-feet to 24-feet. The existing structure is a single lane that allows two-way traffic and the existing roadway approaches have two travel lanes. The proposed cross section will be two 10-foot travel lanes and two 2-foot shoulders.

5. Please state the timing of all proposed bridge work:

   Fall 2024 - Fall 2025

6. Please enter the date of the bridge assessment:

   July 12, 2022

AVOIDANCE AND MINIMIZATION MEASURES (AMMS)

This determination key result includes the committment to implement the following Avoidance and Minimization Measures (AMMs):

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

HIBERNACULA AMM 1

For projects located within karst areas, on-site personnel will use best management practices, secondary containment measures, or other standard spill prevention and countermeasures to avoid impacts to possible hibernacula. Where practicable, a 300 foot buffer will be employed to separate fueling areas and other major containment risk activities from caves, sinkholes, losing streams, and springs in karst topography.

DETERMINATION KEY DESCRIPTION: FHWA, FRA, FTA PROGRAMMATIC CONSULTATION FOR TRANSPORTATION PROJECTS AFFECTING NLEB OR INDIANA BAT

This key was last updated in IPaC on April 13, 2023. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which may require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the endangered **northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

IPAC USER CONTACT INFORMATION

Agency: Massachusetts Department of Transportation
Name: Hana Isihara
Address: 10 Park Plaza
City: Boston
State: MA
Zip: 02116
Email hana.l.isihara@dot.state.ma.us
Phone: 6178964454

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Highway Administration

MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

September 14, 2023

Julia Hoogeboom
Massachusetts Department of Transportation - Highway Division, Environmental Services
10 park plaza
Boston, MA 02116

RE: Applicant: Julia Hoogeboom
Project Location: NORTH POLAND ROAD OVER POLAND BROOK
Project Description: 609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK
NHESP File No.: 23-8600

Dear Applicant:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the "Division") received the MESA Project Review Checklist and supporting documentation for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

The MESA is administered by the Division, and prohibits the Take of state-listed species. The Take of state-listed species is defined as "in reference to animals…harm…kill…disrupt the nesting, breeding, feeding or migratory activity…and in reference to plants…collect, pick, kill, transplant, cut or process…Disruption of nesting, breeding, feeding, or migratory activity may result from, but is not limited to, the modification, degradation, or destruction of Habitat" of state-listed species (321 CMR 10.02).

The Division has determined that this Project, as currently proposed, will occur **within** the actual habitat of the following species:

Scientific Name	Common Name	Taxonomic Group	State Status
Glyptemys insculpta	Wood Turtle	Reptile	Special Concern
Catostomus catostomus	Longnose Sucker	Fish	Special Concern

These species and their habitats are protected in accordance with the MESA.

Based on the information provided and the information contained in our database, the Division finds that a

portion of this project, as currently proposed, **must be conditioned** to avoid a prohibited Take of state-listed species (321 CMR 10.18(2)(a)). **To avoid a prohibited Take of state-listed species, the conditions attached to this letter must be met.**

Provided the attached conditions are fully implemented and there are no changes to the project plans, this project will not result in a Take of state-listed species. We note that all work is subject to the anti-segmentation provisions (321 CMR 10.16) of the MESA. This determination is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Melany Cheeseman, Endangered Species Review Assistant, at Melany.Cheeseman@mass.gov, (508) 389-6357.

Sincerely,

Everose Schlüter, Ph.D.
Assistant Director

cc: David Paulson, Massachusetts Department of Transportation
Julia Hoogeboom, Massachusetts Department of Transportation

Attachment: List of Conditions

List of Conditions

Applicant: Julia Hoogeboom
Project Location: NORTH POLAND ROAD OVER POLAND BROOK
Project Description: 609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK
NHESP File No.: 23-8600
Heritage Hub Form ID: RC-65297
Approved Plan: Plan and Profile of North Poland Road
Plan date: 7/21/23 Revised Date: N/A

To avoid a prohibited Take of state-listed species, the following condition(s) must be met:

1. **Turtle Protection Plan:** Prior to the start of work (including vegetation clearing or soil disturbance), the Applicant shall submit Wood Turtle Protection Plan to the Division for review and written approval. Said Plan shall detail procedures for protecting state-listed turtles during construction, and be prepared and implemented by a qualified, Division-approved wildlife biologist. The Division is available for consultation on Plan development and can provide contact information for qualified biologists. The Division-approved Plan shall be implemented as written; any proposed changes to the Plan must be submitted to the Division for review and written approval prior to implementation of said changes. Please note that protective measures for state-listed turtles are required for any construction activities occurring between April 15 and October 15 of any year unless otherwise approved by the Division. By December 31st of any year in which work occurs, the qualified biologist shall submit: a) a summary report to the Division detailing project status and compliance with the Plan; and b) any observations of state-listed turtles at https://www.mass.gov/how-to/report-rare-species-vernal-pool-observations.
2. **Fisheries Protection:** In order to avoid impacts to state-listed fishes, no in water work shall occur during the period of April 1 - July 31.

MASSWILDLIFE

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FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

11/3/2023

Project: MassDOT Bridge Replacement North Poland Road – Poland Brook, Conway, MA

The proposed project will seek to replace the existing bridge over Poland Brook on North Poland Road in Conway. Poland Brook is a Coldwater Fish Resource that supports a wild, naturally-reproducing population of Eastern Brook Trout, as well as Longnose Sucker and Slimy Sculpin. Replacement of the North Poland Road Bridge is unlikely to have any substantial benefit to stream habitat, water temperatures, or fish passage. However, because of the relatively minor and localized expected impact of instream construction activities and the already planned timeframe for construction (late-March through July/August), MassWildlife supports this project and offers no additional Time of Year Restrictions other than what is already in place for Longnose Sucker under MESA requirements.

Thank you and please contact me if you have any questions

Adam Kautza
Coldwater Fisheries Project Leader
Massachusetts Division of Fisheries and Wildlife (MassWildlife)
1 Rabbit Hill Road, Westborough, MA 01581

950 CMR: OFFICE OF THE SECRETARY OF THE COMMONWEALTH

APPENDIX A
MASSACHUSETTS HISTORICAL COMMISSION
220 MORRISSEY BOULEVARD
BOSTON, MASS. 02125
617-727-8470, FAX: 617-727-5128

PROJECT NOTIFICATION FORM

Project Name:	Replacement of Bridge C-20-004 (MassDOT #609082)
Location /Address:	North Poland Road over Poland Brook
City/Town:	Conway
Project Proponent	
Name:	Massachusetts Department of Transportation
Address:	10 Park Plaza
City/Town/Zip/Telephone:	Boston, MA 02116 / T: 207-590-4999

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name	**Type of License or funding (specify)**
FHWA (Lead Federal agency)	Federal Aid funding
US Army Corps of Engineers	Section 404 permit

Project Description (narrative):

The Massachusetts Department of Transportation (MassDOT) proposes to replace Bridge C-20-004, which carries North Poland Road over Poland Brook in Conway. Bridge C-20-004, constructed in 1940, consists of a three-span steel stringer superstructure supported on reinforced concrete piers and stub abutments. The bridge has galvanized steel W-beam railings. The bridge was closed in November 2022 due to severe section loss and crushing evident at several beam ends during inspection of the bridge. Subsequently, the superstructure was removed and a temporary Acrow panel structure was installed on the existing abutments in order to restore service.

The proposed work will include full replacement of the bridge on existing alignment with a structure 10' wider than existing. The proposed bridge and approach roadway cross-section will include two 10'-wide travel lanes with 2'-wide shoulders and no sidewalks. The proposed new bridge will consist of a single-span prestressed, precast concrete New England Deck Bulb Tee beam superstructure supported by precast reinforced concrete abutments and wingwalls on precast concrete pile footings. The bridge will have painted steel S3-TL4 railings with pickets. The proposed abutments will be built behind the existing abutments, increasing the length of the structure by about 10'. The streambanks adjacent to the abutments will be graded and riprap will be placed to augment existing slope armoring. The road will be closed for the duration of construction and traffic will be detoured, to the south along Main Poland Road and to the east along State Route 116 (Ashfield Road).

Roadway reconstruction along the bridge approaches will extend approximately 200' to the south and 230' to the north of the bridge, encompassing a total project length of 505 feet. Work will include full-depth pavement reconstruction along the existing bridge approaches; minor roadway widening along the bridge approaches, to provide a consistent 24' cross-section; installation of granite curb along the bridge and

approaches; grading roadside slopes along the bridge approaches; in-kind replacement of guardrail along the bridge approaches, with installation of new sections along the approaches, as needed; installation of temporary erosion and sedimentation controls, and related work. One new catch basin will be installed to the north of the bridge to capture runoff from coming down grade from the north. The catch basin will outlet to three leaching basins with vegetated swale overflow in the vicinity of Station 14+70-90, Left.

Overhead utility lines within the project area currently cross North Poland Road along an alignment directly above Bridge C-20-004. The utility lines will temporarily be relocated toward the west side of the roadway during construction, with two temporary utility poles set one to either side of the driveway leading to the residence at 42 North Poland Road. Once construction is complete, the utility lines will be permanently moved to an alignment immediately east of the bridge, within 10'-15'of the structure. This will require two new utility poles, set within the existing County Road Layout.

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.

Bridge C-20-004 will be replaced. The bridge was closed in November 2022 and the superstructure was removed in February 2023. A temporary Acrow panel structure was installed on the existing abutments in order to restore service.

The bridge was reviewed by Kurt Jergensen, Historic Bridge Specialist, and determined to be ineligible for listing in the National Register. Before its removal, the bridge was a typical mid-20th century steel stringer design with no architectural character and standard engineering details.

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation

N/A

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

Bridge C-20-004 will be replaced on the same alignment with a structure 10' wider than existing. The approach roadway cross-section will be widened to provide a consistent cross-section, typically by about 8', matching back to the existing roadway width within the project limits.

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.

Review of the National Register of Historic Places revealed that the project area of potential effect (APE) is adjacent to the South River Area (CNW.B). Running from Burkeville village westerly to the Ashfield town line, the South River Area is described as containing some of the oldest houses in the town in an agricultural setting. Most of the inventoried properties in this Area are located along State Route 116, following the South River, and are separated by large expanses of forested and open space as well as non-historic properties constructed during the 20th century. In the opinion of CRU staff, the area lacks the necessary coherence and integrity to form a historic district that would be eligible for listing in the National Register.

While most of the inventoried properties within the South River Area are located along Route 116, one inventoried property is adjacent to the project area: the Joel G. Rice House at 42 North Poland Road (CNW.52). This circa 1880 vernacular five-bay, two-story, center hall clapboarded farmhouse is located to the northwest of Bridge C-20-004. The main house is set well back from North Poland Road and its outbuildings include a sugar house, cottage, milk house and two barns. The property is reported to have been in continuous operation as a farm since the time of Conway's settlement in the mid eighteenth century.
The Rice House and Farm is noteworthy as a farm complex that has been in use from the early settlement of Conway, but the property appears to lack the architectural distinction and historical associations necessary to

be eligible for individual listing in the National Register.

A review of the MHC's archaeological maps in MACRIS revealed no recorded pre-Contact or historic archaeological sites within the project's direct APE. There are few pre-Contact archaeological sites recorded within Conway, with most sites in the greater vicinity recorded along the Connecticut River and Deerfield River over four miles to the north and east of the APE. The nearest recorded pre-Contact sites include: 19-FR-447 (Berger 2303-01 Site), a flake scatter site located approximately 2.12 miles to the northeast of the bridge; 19-FR-496 (Pfersick Road Site), a flake scatter site located approximately 1.9 miles to the north; and 19-FR-492 (Bear River Findspot #1), a findspot located approximately 2.0 miles to the northwest. Although undisturbed areas near Poland Brook and South River may be sensitive for pre-Contact archaeological resources, it is the opinion of the MassDOT Archaeologist that low sensitivity can be ascribed to the project's direct area of potential effect based on the impacts of past roadway, bridge, and utility construction and unfavorable environmental conditions (slope).

The 1940 bridge plans indicate the current bridge was constructed westerly of the earlier timber stringer bridge. The proposed leaching basins and vegetated drainage swale will be located within and adjacent to the earlier bridge and roadway approach alignment. A construction laydown area for storage of materials and vehicles may also be located to the northeast of the bridge crossing in the vicinity of the proposed drainage structures, as necessary. Overhead utilities and a buried hydrant water line are also located in the vicinity of the proposed leaching basins. The current roadway approaches to the bridge were constructed on 5 to 7 feet of fill to elevate the crossing over the steep slopes along Poland Brook. The proposed bridge abutments will be constructed within the roadway fill behind the existing abutments.

A site visit by the MassDOT Archaeologist on August 24, 2022 confirmed that the staging area and infiltration basin will be located in an area with low sensitivity. This area may have been plowed in the past but now currently contains mowed vegetation. Soil coring revealed compact silty fill associated with the leveling and use of the area as a staging area for the buried water line work and for previous rip-rap work along the South River and Poland Brook.

What is the total acreage of the project area?

Woodland		acres	Productive Resources:		
Wetland		acres	Agriculture	<1	acres
Floodplain	<1	acres	Forestry		acres
Open Space		acres	Mining/Extraction		acres
Developed		acres	Total Project Acreage	<2	acres

What is the acreage of the proposed new construction? <1 acres

What is the present land use of the project area?

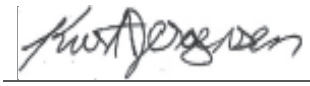
The Project area is situated amid hayfield to the north and west, and woodland to the south. A modern residence sits at the top of a steep wooded hill to the southeast of Bridge C-20-004.

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

950 CMR: OFFICE OF THE SECRETARY OF THE COMMONWEALTH

APPENDIX A (continued)

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of person submitting this form:  **Date:** 8/11/2023

Name: Kurt Jergensen

Address: 10 Park Plaza

City/Town/Zip: Boston, MA 02116

Telephone: 207-590-4999

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St. 1988, c. 254.

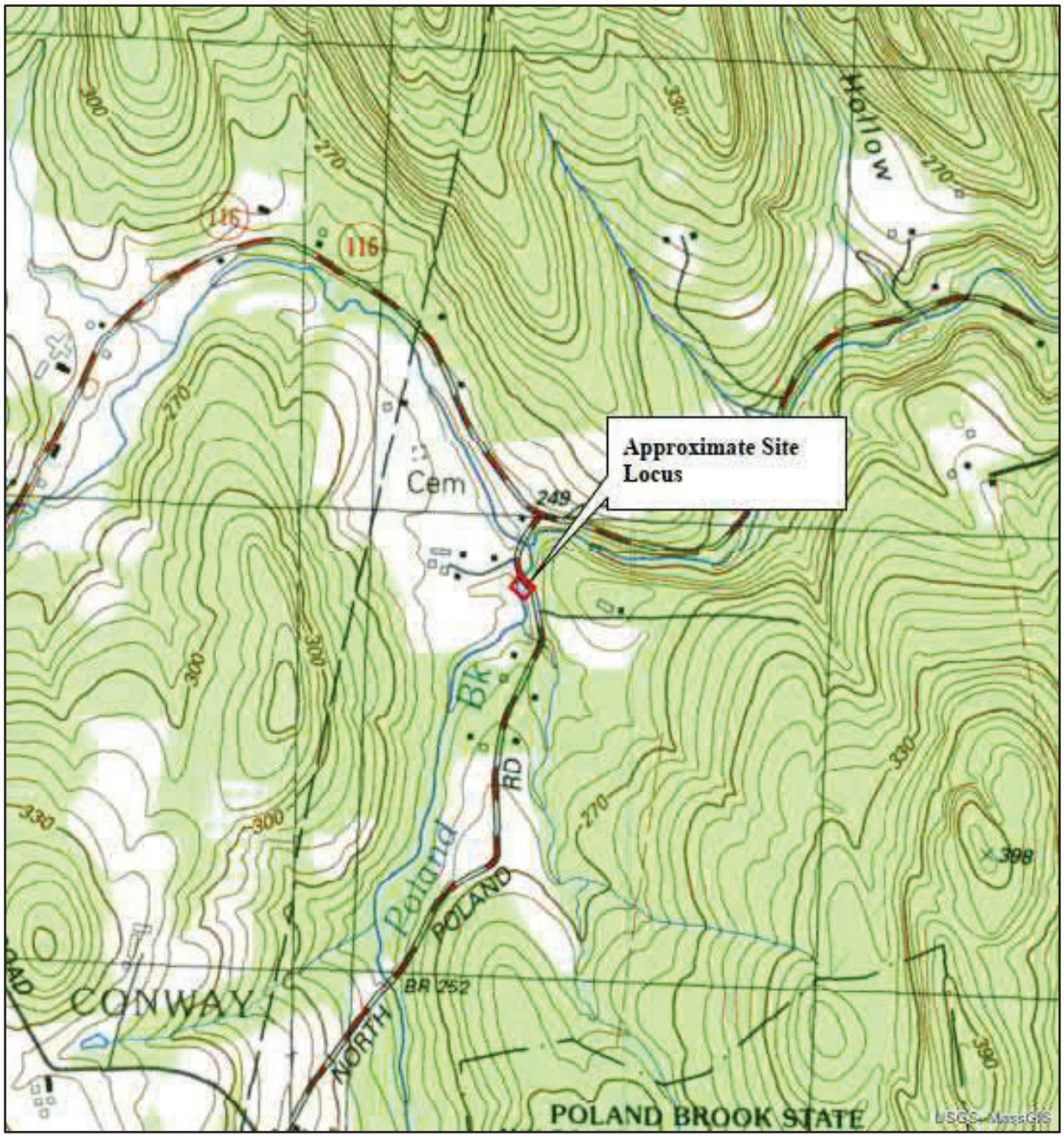


Figure 1. Project Location

Jergensen, Kurt E. (DOT)

From: Microsoft Outlook
To: Bettina Washington; tcrm2@wampanoagtribe-nsn.gov
Sent: Friday, August 11, 2023 4:46 PM
Subject: Relayed: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Delivery to these recipients or groups is complete, but no delivery notification was sent by the destination server:

Bettina Washington (thpo@wampanoagtribe-nsn.gov)

tcrm2@wampanoagtribe-nsn.gov (tcrm2@wampanoagtribe-nsn.gov)

Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Conway, Bridge
C-20-004 replac...

Jergensen, Kurt E. (DOT)

From: Jergensen, Kurt E. (DOT)
Sent: Friday, August 11, 2023 4:46 PM
To: Bettina Washington
Cc: tcrm2@wampanoagtribe-nsn.gov; Harwood, Jameson (DOT)
Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)
Attachments: Locus map.pdf; 75% Highway Submission Plans.pdf; 1st Structural Plans Bridge C-20-004.pdf; Conway PNF.pdf

Tracking:

Recipient	Delivery
Bettina Washington tcrm2@wampanoagtribe-nsn.gov	
Harwood, Jameson (DOT)	Delivered: 8/11/2023 4:46 PM

Dear Ms. Washington,

MassDOT is submitting the enclosed information regarding the above-noted project to the Wampanoag Tribe of Gay Head (Aquinnah) to meet the Section 106 consultation requirements of the US Army Corps of Engineers. Please submit any written comments or concerns regarding historic or archaeological properties that may be affected by this project to Carrie Lavallee, P.E., Chief Engineer, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA 02116-3973, Attn: Jameson Harwood.

You also may send comments, questions, or requests for more information by email to Jameson.Harwood@state.ma.us.

Thank you very much.

Kurt Jergensen
Historic Bridge Specialist
Environmental Services
MassDOT, Highway Division
Ten Park Plaza, Boston, MA 02116
Cell: 207-590-4999

Jergensen, Kurt E. (DOT)

From: Jergensen, Kurt E. (DOT)
Sent: Friday, August 11, 2023 4:47 PM
To: David Weeden
Cc: 106Review@mwtribe-nsn.gov; Harwood, Jameson (DOT)
Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)
Attachments: Locus map.pdf; 75% Highway Submission Plans.pdf; 1st Structural Plans Bridge C-20-004.pdf; Conway PNF.pdf

Dear Mr. Weeden,

MassDOT is submitting the enclosed information regarding the above-noted project to the Mashpee Wampanoag Tribe to meet the Section 106 consultation requirements of the US Army Corps of Engineers. Please submit any written comments or concerns regarding historic or archaeological properties that may be affected by this project to Carrie Lavallee, P.E., Chief Engineer, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA 02116-3973, Attn: Jameson Harwood.

You also may send comments, questions, or requests for more information by email to Jameson.Harwood@state.ma.us.

Thank you very much.

Kurt Jergensen
Historic Bridge Specialist
Environmental Services
MassDOT, Highway Division
Ten Park Plaza, Boston, MA 02116
Cell: 207-590-4999

Jergensen, Kurt E. (DOT)

From: Microsoft Outlook
To: thpo
Sent: Friday, August 11, 2023 4:50 PM
Subject: Relayed: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Delivery to these recipients or groups is complete, but no delivery notification was sent by the destination server:

thpo (thpo@mohican-nsn.gov)

Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Conway, Bridge C-20-004 replac...

Jergensen, Kurt E. (DOT)

From: Jergensen, Kurt E. (DOT)
Sent: Friday, August 11, 2023 4:50 PM
To: thpo
Cc: Harwood, Jameson (DOT)
Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)
Attachments: Locus map.pdf; 75% Highway Submission Plans.pdf; 1st Structural Plans Bridge C-20-004.pdf; Conway PNF.pdf

Tracking:

Recipient	Delivery
thpo	
Harwood, Jameson (DOT)	Delivered: 8/11/2023 4:50 PM

Dear Dr. Bendremer,

MassDOT is submitting the enclosed information regarding the above-noted project to the Stockbridge-Munsee Band of Mohicans to meet the Section 106 consultation requirements of the US Army Corps of Engineers. Please submit any written comments or concerns regarding historic or archaeological properties that may be affected by this project to Carrie Lavallee, P.E., Chief Engineer, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA 02116-3973, Attn: Jameson Harwood.

You also may send comments, questions, or requests for more information by email to Jameson.Harwood@state.ma.us.

Thank you very much.

Kurt Jergensen
Historic Bridge Specialist
Environmental Services
MassDOT, Highway Division
Ten Park Plaza, Boston, MA 02116
Cell: 207-590-4999

Jergensen, Kurt E. (DOT)

From: Microsoft Outlook
To: Robinson, David S (EEA)
Sent: Friday, August 11, 2023 4:51 PM
Subject: Delivered: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Your message has been delivered to the following recipients:

Robinson, David S (EEA) (David.S.Robinson@mass.gov)

Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)

Conway, Bridge
C-20-004 replac...

Jergensen, Kurt E. (DOT)

From: Jergensen, Kurt E. (DOT)
Sent: Friday, August 11, 2023 4:51 PM
To: Robinson, David S (EEA)
Cc: Harwood, Jameson (DOT)
Subject: Conway, Bridge C-20-004 replacement (MassDOT #609082)
Attachments: Locus map.pdf; 75% Highway Submission Plans.pdf; 1st Structural Plans Bridge C-20-004.pdf; Conway PNF.pdf

Tracking:

Recipient	Delivery
Robinson, David S (EEA)	Delivered: 8/11/2023 4:51 PM
Harwood, Jameson (DOT)	Delivered: 8/11/2023 4:51 PM

Dear Mr. Robinson,

MassDOT is submitting the enclosed information regarding the above-noted project to the Board of Underwater Archaeological Resources to meet the Section 106 consultation requirements of the US Army Corps of Engineers. Please submit any written comments or concerns regarding historic or archaeological properties that may be affected by this project to Carrie Lavallee, P.E., Chief Engineer, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA 02116-3973, Attn: Jameson Harwood.

You also may send comments, questions, or requests for more information by email to Jameson.Harwood@state.ma.us.

Thank you very much.

Kurt Jergensen
Historic Bridge Specialist
Environmental Services
MassDOT, Highway Division
Ten Park Plaza, Boston, MA 02116
Cell: 207-590-4999

CULTURAL RESOURCES PROJECT RECORD

City/Town: Conway

Project # 609082

Date Cleared 8/7/2023

Project Name: Bridge Replacement, C-20-004, North Poland Road over Poland Brook

Date Filed 8/7/2023

Finding Under Review ☐

FHWA to MHC

Project Type: Bridge Replacement

Review: Section 106 (PA)

Finding: Stip VB - No historic properties affected

Early Coord. Letter Sent: ☑

Comment Received: ☐ MHC ☑ LHC

Reviewer: KJ

Consultant

Comments: PNF to THPOs and BUAR, 8/7/23.

Determination based on: ☑ Scope of Work ☑ Plans ☑ Inventory ☑ Site Visit ☐ Archaeological Survey

Attach appropriate documentation for checked items

Projects Requiring No Massachusetts SHPO Review

Programmatic Agreement, Appendix 1 (check all that apply) :

☐ 1) Interstate bridge or roadway projects
☐ 2) Resurfacing, repair existing roadways
* ☐ 3) Reconstruction on existing roadway
* ☐ 4) Roadway geometrics, intersections
* ☐ 5) Curbs and sidewalks
☐ 6) Pavement markings, rumble strips, etc
☐ 7) Curbs, sidewalks (MAAB, ADA)
* ☐ 8) Removal of trees
☐ 9) Landscaping
☐ 10) Utilities
☐ 11) Railroad crossing
☐ 12) Stream stabilization and restoration
☐ 13) Wetland mitigation area
* ☐ 14) Bridge (NR "Not Eligible" or "Conditionally Not Eligible")
* ☐ 15) Bridge (concrete slab post 1900, steel stringer)
☐ 16) Bridge (less than 20' span)
* ☐ 17) Highway safety improvement
☐ 18) Drainage system element
* ☐ 19) Traffic signal, safety improvement
* ☐ 20) Intelligent Transportation System project
☐ 21) Rest area, maintenance facility
* ☐ 22) Bicycle, pedestrian lane, path or facility
☐ 23) Lighting system
☐ 24) Sign
☐ 25) Hazardous waste
☐ 26) Highway fencing
☐ 27) Emergency repair
☐ 28) Erosion control
☐ 29) Noise barrier

* National Register eligibility evaluation required

-OR-

No Historic Properties Affected
Programmatic Agreement Stipulation V.B. (check one):

☑ No NR listed or -eligible properties within Area of Potential Effect
☐ No effect on National Register listed or -eligible properties

Reviewer's Initials: KJ JMH

CULTURAL RESOURCES PROJECT RECORD

Summary of MassDOT Highway Division Finding
(Appendix 1 and Section V.B. Projects only)

The Massachusetts Department of Transportation (MassDOT) proposes to replace Bridge C-20-004, which carries North Poland Road over Poland Brook in Conway. Bridge C-20-004, constructed in 1940, consists of a three-span steel stringer superstructure supported on reinforced concrete piers and stub abutments. The bridge has galvanized steel W-beam railings. The bridge was closed in November 2022 due to severe section loss and crushing evident at several beam ends during inspection of the bridge. Subsequently, the superstructure was removed and a temporary Acrow panel structure was installed on the existing abutments in order to restore service.

The proposed work will include full replacement of the bridge on existing alignment with a structure 10' wider than existing. The proposed bridge and approach roadway cross-section will include two 10'-wide travel lanes with 2'-wide shoulders and no sidewalks. The proposed new bridge will consist of a single-span prestressed, precast concrete New England Deck Bulb Tee beam superstructure supported by precast reinforced concrete abutments and wingwalls on precast concrete pile footings. The bridge will have painted steel S3-TL4 railings with pickets. The proposed abutments will be built behind the existing abutments, increasing the length of the structure by about 10'. The streambanks adjacent to the abutments will be graded and riprap will be placed to augment existing slope armoring. The road will be closed for the duration of construction and traffic will be detoured, to the south along Main Poland Road and to the east along State Route 116 (Ashfield Road).

Roadway reconstruction along the bridge approaches will extend approximately 200' to the south and 230' to the north of the bridge, encompassing a total project length of 505 feet. Work will include full-depth pavement reconstruction along the existing bridge approaches; minor roadway widening along the bridge approaches, to provide a consistent 24' cross-section; installation of granite curb along the bridge and approaches; grading roadside slopes along the bridge approaches; in-kind replacement of guardrail along the bridge approaches, with installation of new sections along the approaches, as needed; installation of temporary erosion and sedimentation controls, and related work. One new catch basin will be installed to the north of the bridge to capture runoff from coming down grade from the north. The catch basin will outlet to three leaching basins with vegetated swale overflow in the vicinity of Station 14+70-90, Left.

Overhead utility lines within the project area currently cross North Poland Road along an alignment directly above Bridge C-20-004. The utility lines will temporarily be relocated toward the west side of the roadway during construction, with two temporary utility poles set one to either side of the driveway leading to the residence at 42 North Poland Road. Once construction is complete, the utility lines will be permanently moved to an alignment immediately east of the bridge, within 10'-15'of the structure. This will require two new utility poles, set within the existing County Road Layout.

Review of the National Register of Historic Places revealed that the project area of potential effect (APE) is adjacent to the South River Area (CNW.B). Running from Burkeville village westerly to the Ashfield town line, the South River Area is described as containing some of the oldest houses in the town in an agricultural setting. Most of the inventoried properties in this Area are located along State Route 116, following the South River, and are separated by large expanses of forested and open space as well as non-historic properties constructed during the 20th century. In the opinion of CRU staff, the area lacks the necessary coherence and integrity to form a historic district that would be eligible for listing in the National Register.

While most of the inventoried properties within the South River Area are located along Route 116, one inventoried property is adjacent to the project area: the Joel G. Rice House at 42 North Poland Road (CNW.52). This circa 1880 vernacular five-bay, two-story, center hall clapboarded farmhouse is located to the northwest of Bridge C-20-004. The main house is set well back from North Poland Road and its outbuildings include a sugar house, cottage, milk house and two barns. The property is reported to have been in continuous operation as a farm since the time of Conway's settlement in the mid eighteenth century. The Rice House and Farm is noteworthy as a farm complex that has been in use from the early settlement of Conway, but the property appears to lack the architectural distinction and historical associations necessary to be eligible for individual listing in the National Register.

Bridge C-20-004 was reviewed by Kurt Jergensen, Historic Bridge Specialist, and determined to be ineligible for listing in the National Register. Before its removal, the bridge was a typical mid-20th century steel stringer design with no architectural character and standard engineering details.

Reviewer's Initials: _____

CULTURAL RESOURCES PROJECT RECORD

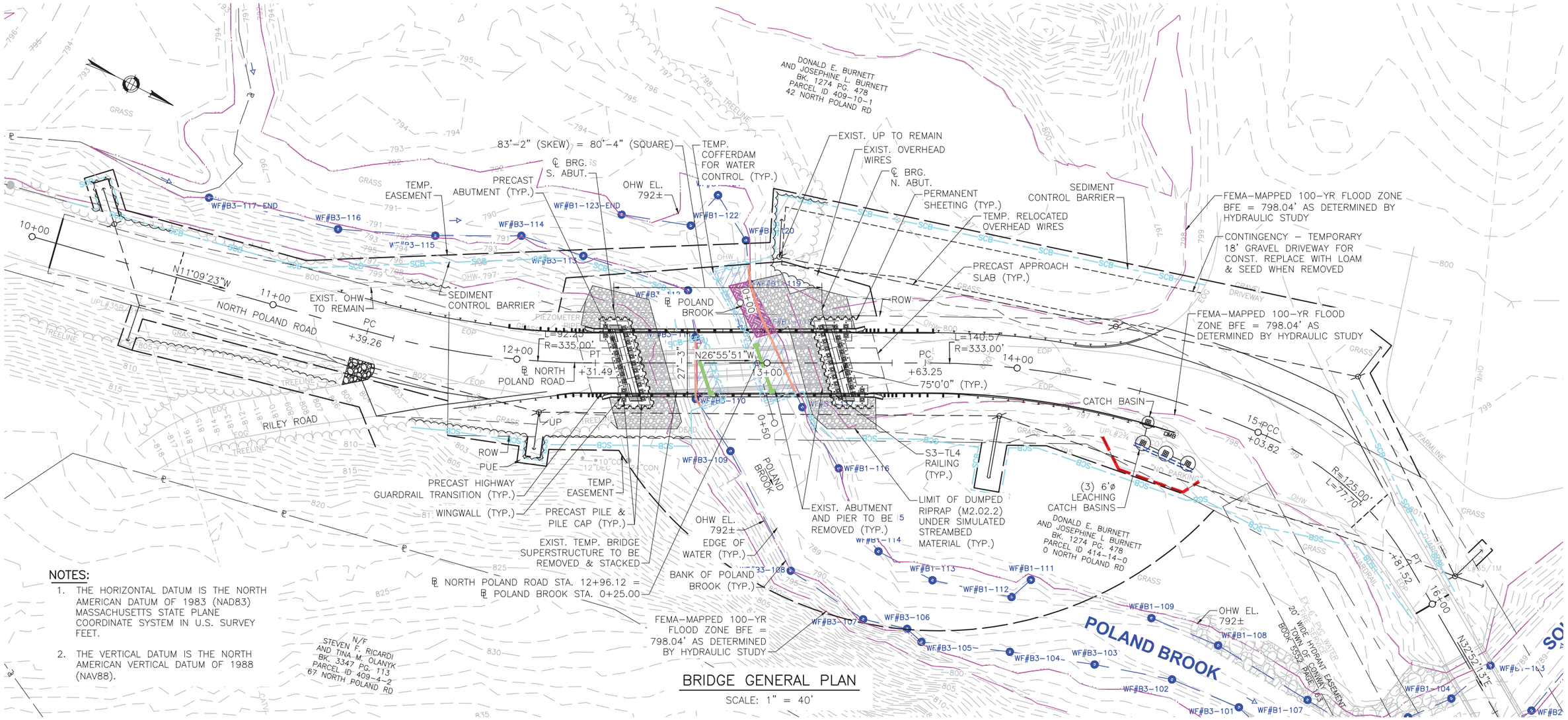
A review of the MHC's archaeological maps in MACRIS revealed no recorded pre-Contact or historic archaeological sites within the project's direct APE. There are few pre-Contact archaeological sites recorded within Conway, with most sites in the greater vicinity recorded along the Connecticut River and Deerfield River over four miles to the north and east of the APE. The nearest recorded pre-Contact sites include: 19-FR-447 (Berger 2303-01 Site), a flake scatter site located approximately 2.12 miles to the northeast of the bridge; 19-FR-496 (Pfersick Road Site), a flake scatter site located approximately 1.9 miles to the north; and 19-FR-492 (Bear River Findspot #1), a findspot located approximately 2.0 miles to the northwest. Although undisturbed areas near Poland Brook and South River may be sensitive for pre-Contact archaeological resources, it is the opinion of the MassDOT Archaeologist that low sensitivity can be ascribed to the project's direct area of potential effect based on the impacts of past roadway, bridge, and utility construction and unfavorable environmental conditions (slope).

The 1940 bridge plans indicate the current bridge was constructed westerly of the earlier timber stringer bridge. The proposed leaching basins and vegetated drainage swale will be located within and adjacent to the earlier bridge and roadway approach alignment. A construction laydown area for storage of materials and vehicles may also be located to the northeast of the bridge crossing in the vicinity of the proposed drainage structures, as necessary. Overhead utilities and a buried hydrant water line are also located in the vicinity of the proposed leaching basins. The current roadway approaches to the bridge were constructed on 5 to 7 feet of fill to elevate the crossing over the steep slopes along Poland Brook. The proposed bridge abutments will be constructed within the roadway fill behind the existing abutments.

A site visit by the MassDOT Archaeologist on August 24, 2022 confirmed that the staging area and leaching basins will be located in an area with low sensitivity. This area may have been plowed in the past but now currently contains mowed vegetation. Soil coring revealed compact silty fill associated with the leveling and use of the area as a staging area for the buried water line work and for previous rip-rap work along the South River and Poland Brook.

Based on the nature and location of the proposed work, with no National Registe-listed or -eligible resources present within or adjacent to the project area, the project meets the exemption requirements under Stipulation V.B of the Section 106 Programmatic Agreement and no further review of the proposed project is necessary.

Reviewer's Initials: _____



NOTES:

1. THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983 (NAD83) MASSACHUSETTS STATE PLANE COORDINATE SYSTEM IN U.S. SURVEY FEET.
2. THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88).

BRIDGE GENERAL PLAN

SCALE: 1" = 40'

0 40 80 120 160

SCALE: 1" = 40'

SHEET 1 OF 5

SECTION 401/SECTION 404
PERMIT APPLICATION
CONWAY, MASSACHUSETTS
NORTH POLAND ROAD OVER POLAND BROOK
BRIDGE C-20-004
OCTOBER, 2023

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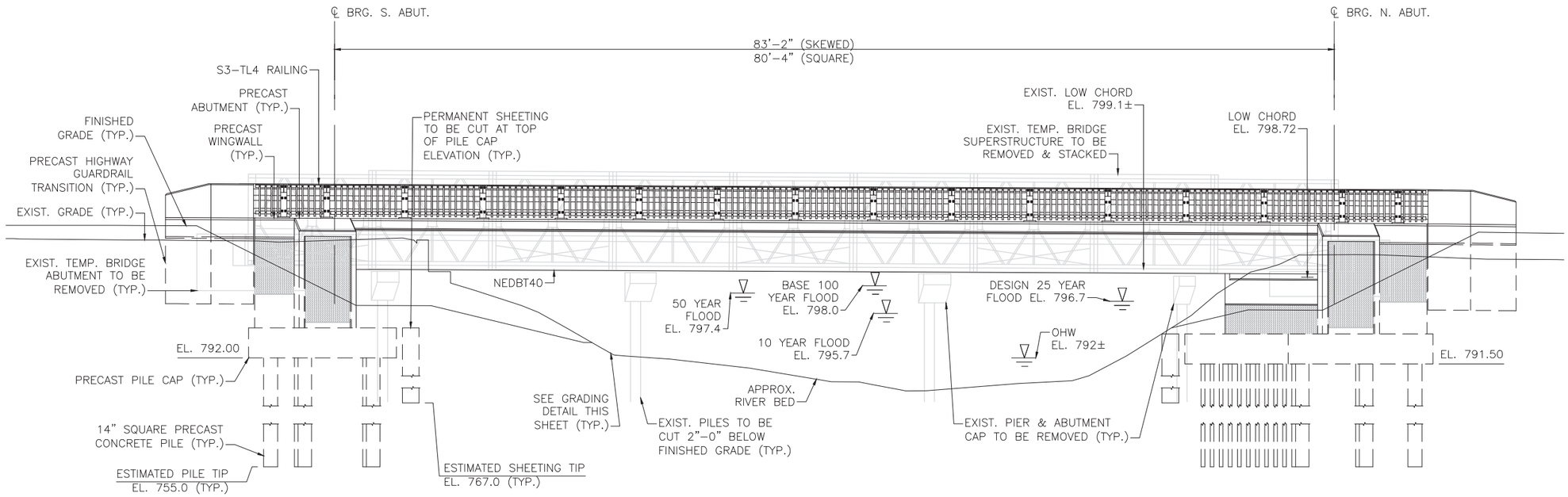
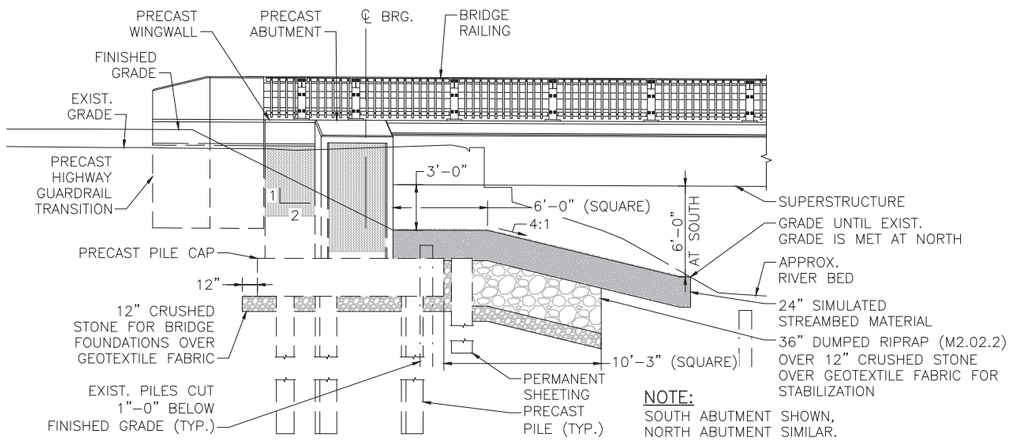


BRIDGE GENERAL ELEVATION

SCALE: 1" = 10'



NOTE:
SOUTH ABUTMENT SHOWN,
NORTH ABUTMENT SIMILAR.

TYPICAL GRADING DETAILS AT ABUTMENTS & WINGWALLS

SCALE: 1" = 10'

NOTES:

1. THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983 (NAD83) MASSACHUSETTS STATE PLANE COORDINATE SYSTEM IN U.S. SURVEY FEET.
2. THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88).

0 10 20 30 40

SCALE: 1" = 10'

SHEET 2 OF 5

SECTION 401/SECTION 404
PERMIT APPLICATION
CONWAY, MASSACHUSETTS
NORTH POLAND ROAD OVER POLAND BROOK
BRIDGE C–20–004
OCTOBER, 2023

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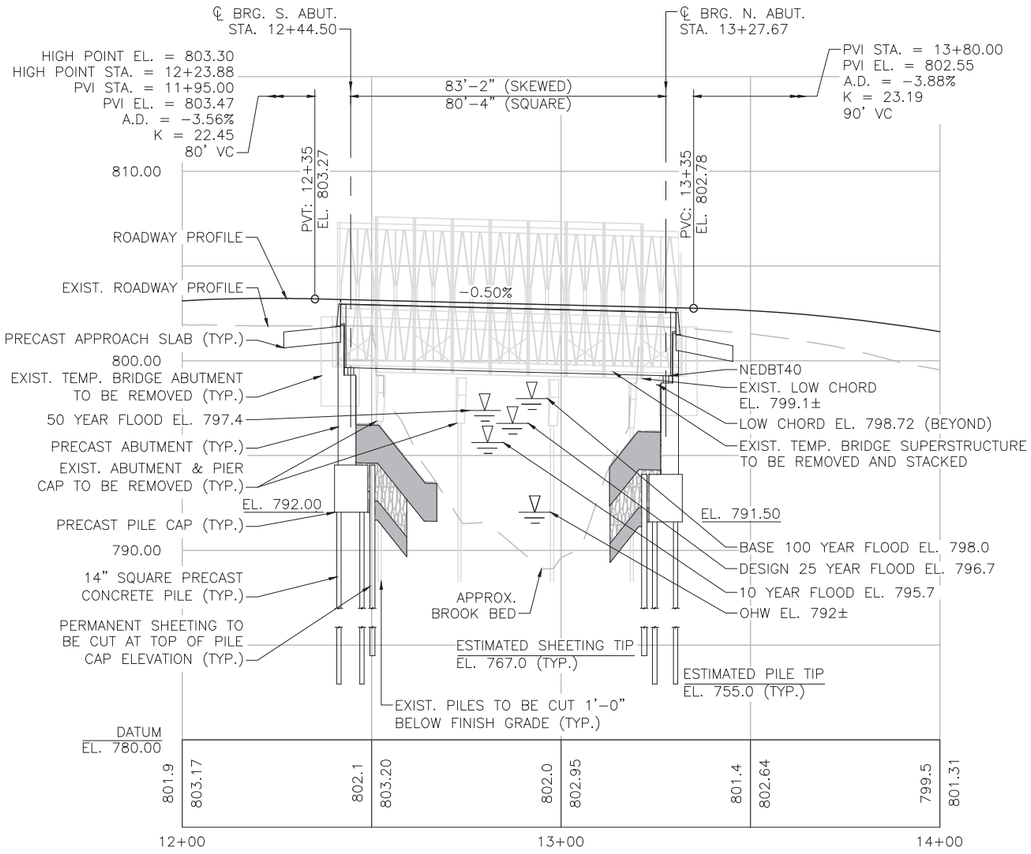
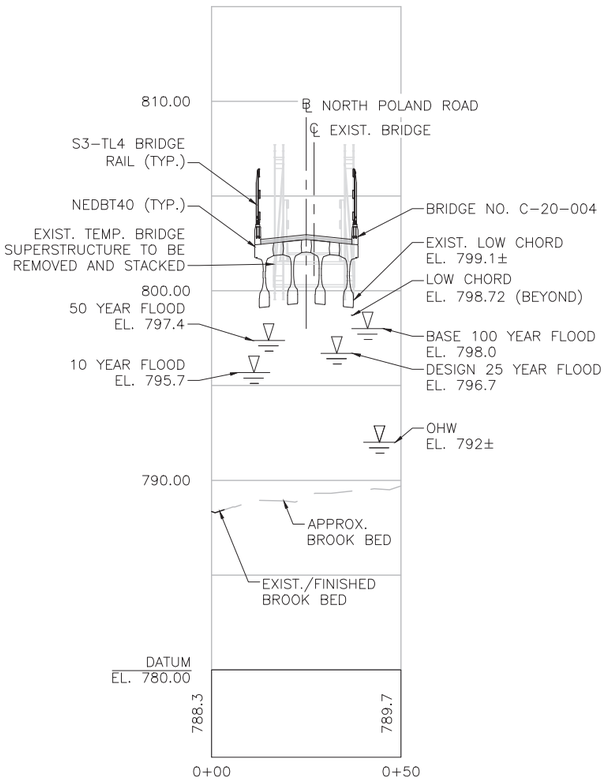


NORTH POLAND ROAD PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1/8" = 1'−0"



POLAND BROOK PROFILE

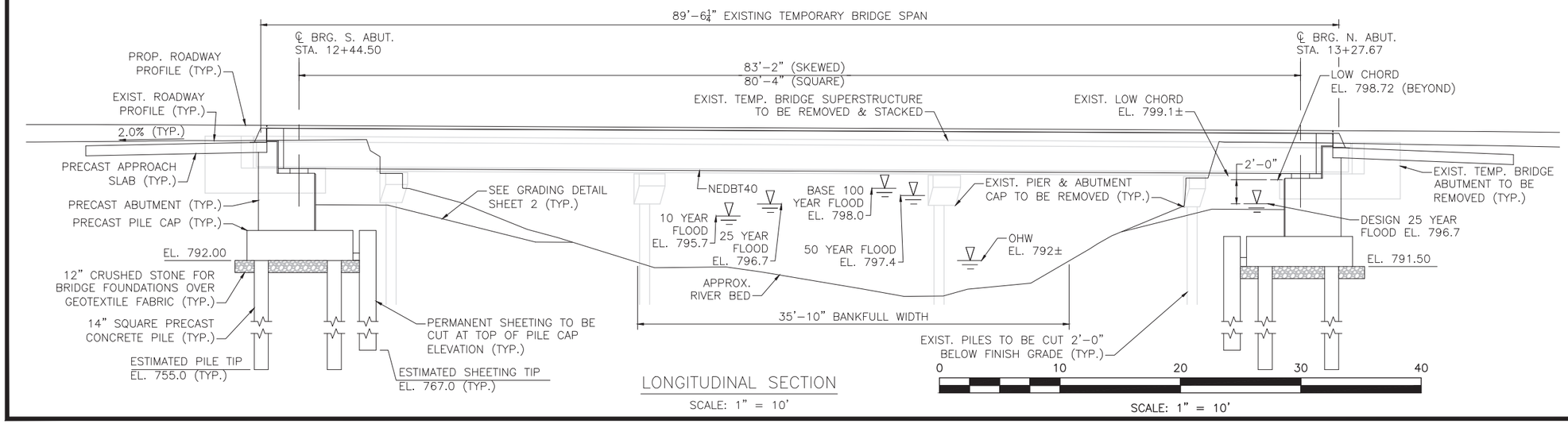
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1/8" = 1'−0"

HORIZONTAL SCALE: 1" = 40'

0 40 80 120 160

0 8 16 24 32

VERTICAL SCALE: 1/8" = 1'−0"



LONGITUDINAL SECTION

SCALE: 1" = 10'

NOTES:

1. THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983 (NAD83) MASSACHUSETTS STATE PLANE COORDINATE SYSTEM IN U.S. SURVEY FEET.
2. THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88).

SHEET 3 OF 5

SECTION 401/SECTION 404
PERMIT APPLICATION
CONWAY, MASSACHUSETTS
NORTH POLAND ROAD OVER POLAND BROOK
BRIDGE C−20−004
OCTOBER, 2023

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HIGHWAY GUARD DETAILS

GUARDRAIL TANGENT END TREATMENT, TL-2 - STA 11+23 LT
GUARDRAIL, TL-2 (SINGLE FACED - DEEP POST) - STA 11+33 TO 12+29 LT

TRAILING ANCHORAGE - STA 11+78 RT
GUARDRAIL, TL-2 (SINGLE FACED - DEEP POST) - STA 11+78 TO 12+35 RT

GUARDRAIL, TL-2 (SINGLE FACED - DEEP POST) - STA 13+39 TO 14+45 LT
TRAILING ANCHORAGE - STA 14+45 LT

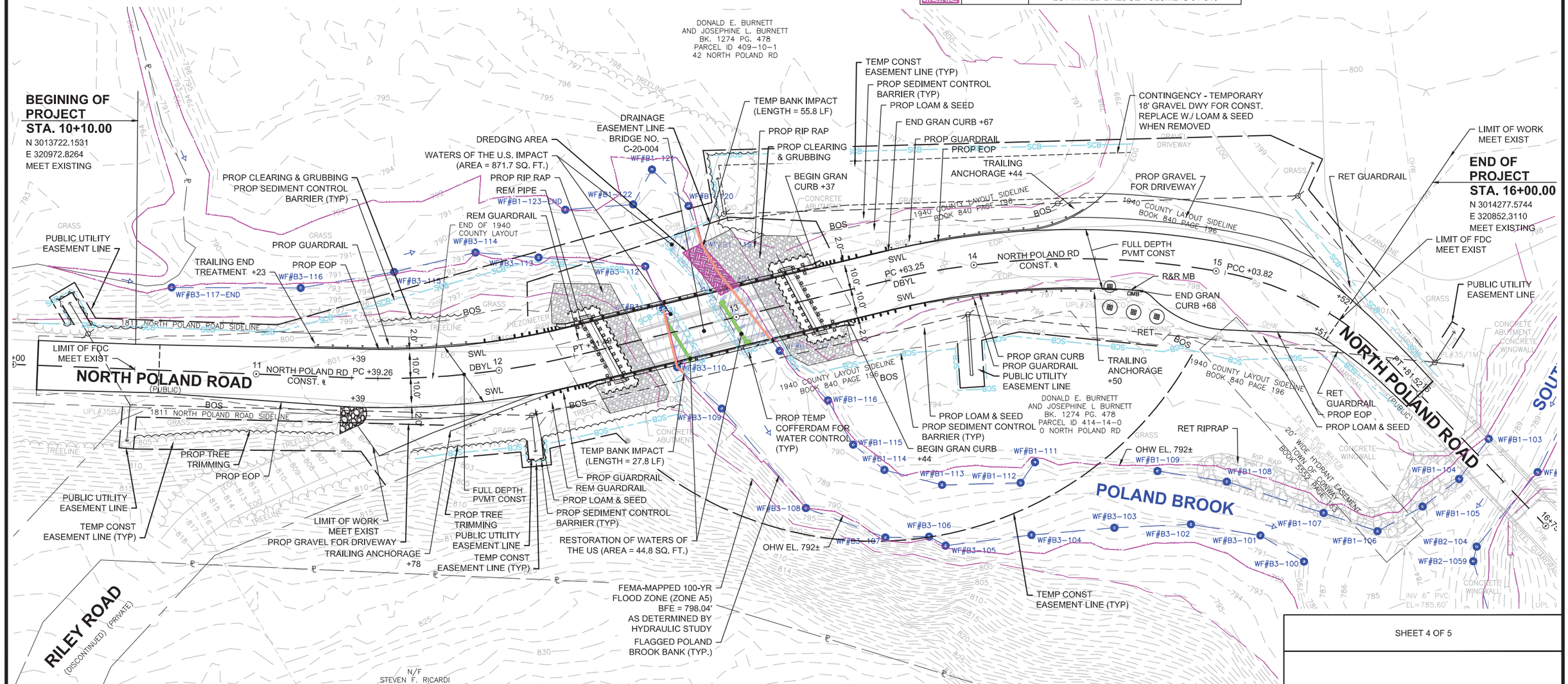
GUARDRAIL, TL-2 (SINGLE FACED - DEEP POST) - STA 13+46 TO 14+50 RT
TRAILING ANCHORAGE - STA 14+50 RT

WATER SUPPLY ALTERATIONS

NONE

SUMMARY OF RESOURCE AREA IMPACTS				
LEGEND	TYPE	TEMPORARY	PERMANENT	RESTORATION
	BANK	84 LF	N/A	N/A
	WATERS OF THE US	687 SF	185 SF	N/A
	WATERS OF THE US RESTORATION	N/A	N/A	45 SF
	DREDGING	ESTIMATED DREDGE AREA IS 185 SF. ESTIMATED DREDGE VOLUME IS 34 CY.		

Note: Water Controls will be in place for approximately 130 days



NOTES:

1. THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983 (NAD83) MASSACHUSETTS STATE PLAN COORDINATE SYSTEM IN U.S. SURVEY FEET.
2. THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

ENVIRONMENTAL IMPACTS PLAN

0 40 100 160

SCALE: 1" = 40'

SHEET 4 OF 5

SECTION 401/SECTION 404
PERMIT APPLICATION
CONWAY, MASSACHUSETTS
NORTH POLAND ROAD OVER POLAND BROOK
BRIDGE C-20-004
OCTOBER, 2023

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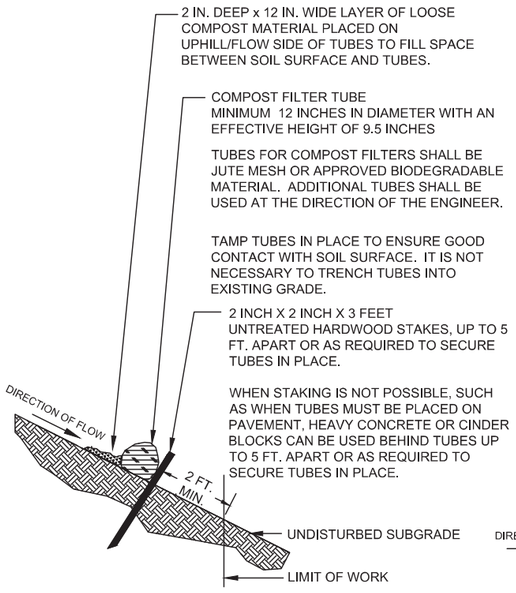
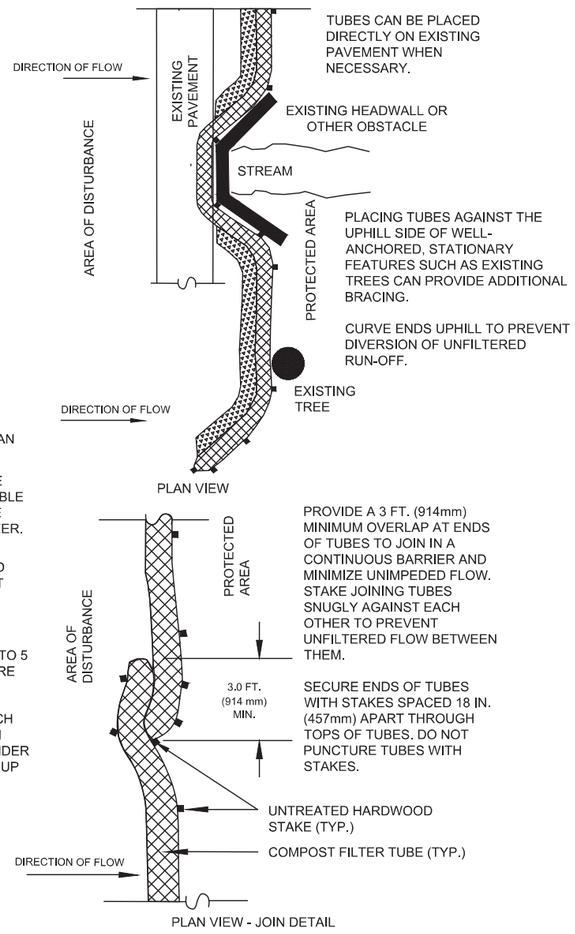
GENERAL NOTES:

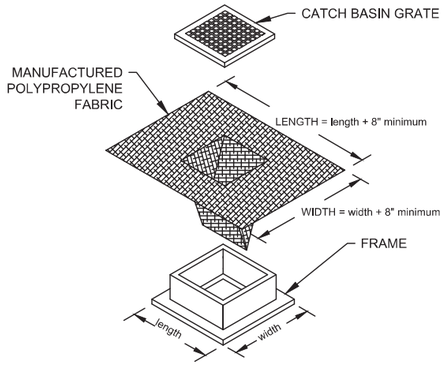
1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES (300mm) FOR SLOPES UP TO 50 FEET (15.24m) IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. INSTALL ONLY IN UPLAND AREAS.
4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.





SINGLE COMPOST FILTER TUBE DETAIL FOR EROSION CONTROL

NOT TO SCALE

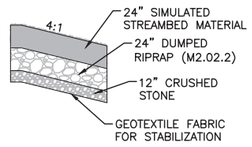


NOTES

1. LENGTH AND WIDTH OF POLYPROPYLENE FABRIC MUST EXCEED EXISTING CATCH BASIN FRAME DIMENSIONS BY A MINIMUM OF 8".
2. REMOVE CATCH BASIN GRATE AND INSTALL POLYPROPYLENE FABRIC OVER CATCH BASIN FRAME. REPLACE CATCH BASIN GRATE TO SECURE POLYPROPYLENE FABRIC IN PLACE.

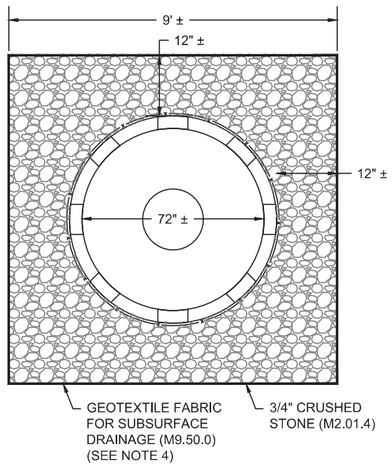
CATCH BASIN EROSION CONTROL PROTECTION (TYP)

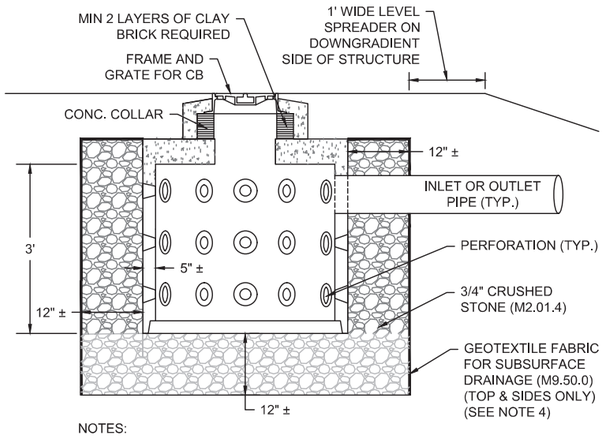
NOT TO SCALE



TYPICAL RIP RAP INSTALLATION DETAIL

NOT TO SCALE



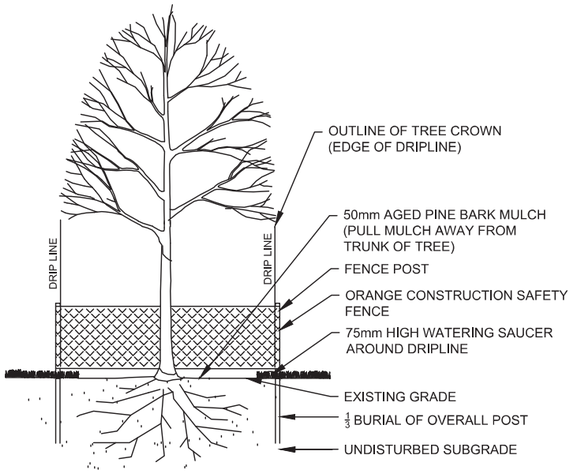


NOTES:

1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS
2. AASHTO H-20 LOADING
3. STEEL REINFORCEMENT PER ASTM A615 GRADE-60
4. FOR LEACHING BASINS INSTALLED IN SERIES GEOTEXTILE SHALL ENVELOPE THE OUTER PERIMETER OF CRUSHED STONE ONLY. GEOTEXTILE SHALL NOT BE INSTALLED BETWEEN LEACHING BASINS.

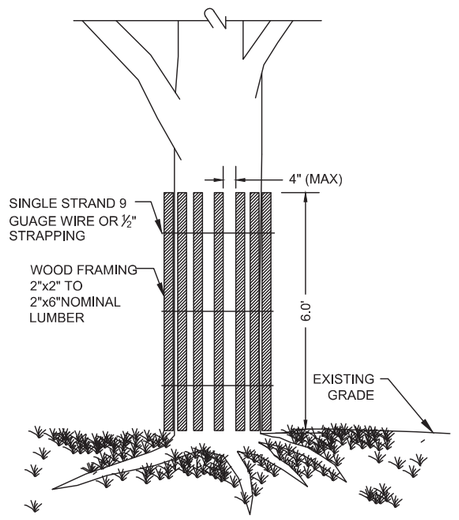
LEACHING BASIN (LB)

NOT TO SCALE



TEMPORARY TREE PROTECTION FENCE

NOT TO SCALE



INDIVIDUAL TREE PROTECTION DETAIL

NOT TO SCALE

SHEET 5 OF 5

SECTION 401/SECTION 404
PERMIT APPLICATION
CONWAY, MASSACHUSETTS
NORTH POLAND ROAD OVER POLAND BROOK
BRIDGE C-20-004
OCTOBER, 2023

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DOCUMENT A00831

ARMY CORPS OF ENGINEERS

General Permits for the Commonwealth of Massachusetts

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General Permit No.: NAE-2022-02649 Final Effective Date: June 2, 2023
Applicant: General Public, Commonwealth of Massachusetts Expiration Date: June 1, 2028

Department of the Army
General Permits for the Commonwealth of Massachusetts

The New England District of the U.S. Army Corps of Engineers (USACE) hereby issues twenty-five (25) regional general permits (GPs) for activities subject to USACE jurisdiction in waters of the U.S., including wetlands, navigable waters within the Commonwealth of Massachusetts and adjacent ocean waters to the seaward limit of the outer continental shelf. The Massachusetts GPs (hereafter referred to as the MA GP or GP) are issued in accordance with USACE regulations at 33 CFR 320 – 332 [see 33 CFR 325.5(c)(1)]. These GPs establish criteria and contain permit conditions to ensure that the authorized activities have no more than minimal individual and cumulative adverse impacts to the environment.

In issuing these GPs, the Federal Government does not assume any liability for the following: (a) damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes; (b) damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest; (c) damages to persons, property or to other permitted or unpermitted activities or structures caused by the activity authorized by any of the GPs; (d) design or construction deficiencies associated with the permitted work; or (e) damage claims associated with any future modification, suspension or revocation of these permits.

Tammy R. Turley 02 June 2023

Tammy R. Turley Date
Chief, Regulatory Division

SECTION I. STATUTORY AUTHORITES & REGULATED ACTIVITIES

1. Work Requiring USACE Authorization

a. Section 10: Work and structures that are located in, over, under or that affect navigable waters of the United States (U.S.) (see 33 CFR 329). The USACE regulates these activities under section 10 of the Rivers and Harbors Act of 1899 (see 33 CFR 322).

b. Section 404: The discharge of dredged or fill material into waters of the U.S (see 33 CFR 328). The USACE regulates these activities under Section 404 of the Clean Water Act (CWA). The term "discharge of dredged or fill material" also includes certain discharges resulting from excavation. Applicants should contact USACE to determine if a particular excavation discharge occurring within waters of the U.S., is a regulated activity. See 33 CFR 323.4 of the CWA for exempted activities.

For additional information on the limits of USACE jurisdiction, please see: https://www.nae.usace.army.mil/Portals/74/docs/regulatory/JurisdictionalLimits/Jurisdictional_Limits_Brochure.pdf

2. Authority to Issue General Permits

a. In accordance with 33 CFR 322.2(f), 325.2(e)(2), and 325.5(c), USACE may issue regional general permits authorizing activities under Section 10 of the RHA.

b. In accordance with Section 404(e) of the CWA, 33 USC 1344(e), and 33 CFR 323.2(h), 325.2(e)(2), and 325.5(c), after notice and opportunity for public hearing, USACE may issue regional general permits for any category of activities involving discharges of dredged or fill material if the activities in such category are similar in nature, will cause only minimal adverse environmental effects when performed separately, and will only have minimal cumulative adverse effect on the environment.

3. Related Laws

33 CFR 320.3 includes a list of related laws including, but not limited to, Section 408 of the Rivers and Harbors Act of 1899, Section 401 of the Clean Water Act, Section 402 of the Clean Water Act, Section 307(c) of the Coastal Zone Management Act of 1972, Section 106 of the National Historic Preservation Act of 1966, Section 7 of the Endangered Species Act, the Fish and Wildlife Coordination Act of 1956, the Magnuson-Stevens Fishery Conservation and Management Act, the Fish and Wildlife Coordination Act, Section 302 of the Marine Protection, Research and Sanctuaries Act of 1972, Section 7(a) of the Wild and Scenic Rivers Act, the Golden Eagle Protection Act, and the Migratory Bird Treaty Act.

SECTION II. REVIEW CATEGORIES & APPLICATION PROCEDURES

To qualify under these GPs, the design, construction, and maintenance associated with each proposed activity must meet the terms and eligibility criteria listed in Section III, all applicable general conditions (GCs) in Section IV, and any specific mitigation requirements in Section V. Applicants should first review the GPs to see if a project is eligible for authorization under one or more of the GPs within this document. Any activity not specifically listed may still be eligible for authorization under these GPs; applicants are advised to contact USACE for specific eligibility determination.

Please note that these GPs allow for Self-Verification (SV) contingent upon meeting all criteria and with full adherence to all GCs. Projects that do not qualify for SV, may meet criteria for Pre-Constriction Notification (PCN). Tables are provided under each activity, which outline criteria for SV and PCN. Activities that do not meet criteria for SV or PCN may require review as an Individual Permit (IP). Activities may require a PCN or IP as noted in Sections III and/or IV of this GP. Notwithstanding compliance with the terms of these GPs, USACE retains discretionary authority to require either PCN review or IP review on a case-by-case basis for any project based on concerns for the environment or for any of the other public interest factors found in 33 CFR 320.4(a). These GPs also do not replace or change those activities identified as exempt from USACE regulation (33 CFR 323.4).

1. Pre-Application Assistance

Prospective applicants may request a pre-application meeting to address any questions they may have. USACE may also request a pre-application meeting or additional information to facilitate review of the request. Pre-application meetings and/or site visits help streamline the authorization process by alerting the prospective applicant to potentially time-consuming factors that may arise during the evaluation of their project (e.g., avoidance, minimization and compensatory mitigation requirements, historic properties, endangered species, essential fish habitat, impacts to federal projects, and/or dredging of contaminated sediments).

To schedule a pre-application meeting, present questions, or if you need further assistance, please contact USACE at:

Email: cenae-r-ma@usace.army.mil (strongly preferred) Phone: (978) 318-8338

Mail: U.S. Army Corps of Engineers
New England District
Regulatory Division, Massachusetts Section
696 Virginia Road
Concord, MA 01742

2. Submitting a Request

Please follow the procedures outlined in Sections II.2-5 when requesting an SV or applying for PCN authorization for activities covered by these GPs. The GPs are provided in Section III below. For SV-eligible projects, the Self-Verification Notification (SVN) must be submitted within 30 days of commencing work. Otherwise, a Pre-Construction Notification (PCN) must be submitted for work that is not SV-eligible. Please include appropriate drawings and attachments and submit your request using the mailbox identified in Section II.4 or II.5 below. USACE will promptly confirm receipt of your request and notify you in the event additional information is required. Guidance on

how to submit electronic correspondence is located on the NAE Regulatory website here: https://www.nae.usace.army.mil/Missions/Regulatory/Submitting-Electronic-Correspondence.

3. Local, State & Federal Approvals

Applicants are responsible for applying for and obtaining any required local, state, and federal permits or approvals. These must be obtained prior to the commencement of work in waters. Such authorizations may include a Water Quality Certification, a Coastal Zone Management Act consistency determination, and other approvals as noted below. Authorization under these GPs does not obviate the need for the permittee to obtain other Federal, State, or local permits, approvals, or authorizations required by law.

I. Water Quality Certification under Section 401 of the Federal Clean Water Act (33 USC 1341).
Applicants are responsible for determining the appropriate 401 Water quality Certification (WQC) requirements and submitting this information to the USACE at the time of their PCN application or when completing their SVN. Applicants that are unsure of whether their activity has been certified should contact MassDEP, or EPA Region 1 when the activity is located on tribal lands, for a determination. The 401 WQC requirement must be satisfied by acquiring one of the following WQCs from MassDEP (see GC 8):

General 401 WQC: The MassDEP issued a WQC on April 21, 2023 conditionally certifies all activities in GPs 1 – 24 eligible for SV and PCN so long as the activity is described in 314 CMR 9.03, and is not an activity described in 314 CMR 9.04, and so long as the activity meets all other requirements, terms and conditions of this WQC. The MassDEP WQC also conditionally certifies activities described in GP 25 so long as the activity meets all other conditions of the WQC. Emergency projects described in GP 25 must obtain an emergency certification or otherwise be authorized pursuant to 310 CMR 10.06, qualify under a Severe Weather Emergency Declaration pursuant to 310 CMR 10.06(8) issued by the MassDEP, or meet the requirements of 9.12(2) or (3) in order to be certified under the WQC

Applicants should refer to the following link to determine if their activity is eligible: *https://www.nae.usace.army.mil/Missions/Regulatory/ State-General-Permits/ Massachusetts-General-Permit/*. If eligible, you must comply with all applicable WQC conditions. Activities listed in 314 CMR 9.03 that are not exempt from the Wetland Protection Act must have a valid Final Order of Conditions (OOC) or Final Restoration Order of Conditions pursuant to 310 CMR 10.00 to be eligible under the General 401 WQC.

Individual 401 WQC: In the event the proposed activity is not covered by the general WQC, applicants shall contact MassDEP and apply for an individual 401 WQC if their activity does not qualify for a General 401 WQC as outlined above. MassDEP may issue, waive, or deny the individual 401 WQC on a case-by-case basis. All activities listed in 314 CMR 9.04 must obtain an individual 401 WQC from MassDEP to be eligible under these GPs. When an Individual 401 WQC is required for *PCN activities*, the applicant shall submit their Individual 401 WQC application concurrently to MassDEP and the USACE to comply with 40 CFR 121.

Activities Proposed on Tribal Lands: When an activity is proposed on Tribal lands, the applicant shall refer to the general 401 WQCs granted by the Environmental Protection Agency (EPA), Region 1 on May 15, 2023. These 401 WQCs are located on the USACE Regulatory website: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/.

II. Coastal Zone Management Act Federal Consistency Concurrence pursuant to Section 307 of the CZMA of 1972, as amended. Federal consistency concurrence is required for all activities located within the coastal zone, unless determined otherwise by the Massachusetts Office of Coastal Zone Management (MA CZM) (see GC 9). As applicable, this requirement must be satisfied by acquiring one of the following from the MA CZM:

General CZM Federal Consistency Concurrence (General Concurrence): MA CZM has granted General Concurrence for all SV and PCN activities for GPs 1-25 and this can be found at: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/. The applicant must obtain all applicable permits and approvals prior to the commencement of work in USACE jurisdiction (i.e., construction begins on site). For SVs, General Concurrence is automatically granted and no further action is required from the applicant. For PCNs, the USACE will coordinate with MA CZM to acquire General Concurrence as part of the PCN application review. During review of the PCN application, USACE may request additional information from the applicant to support CZM's evaluation of the activity.

Individual CZM Federal Consistency Concurrence (Individual Concurrence): In certain cases, MA CZM may elevate any GP activity 1-25 to require Individual Concurrence. The applicant must contact MA CZM and follow the procedures to obtain Individual Concurrence as determined appropriate by MA CZM.

The MA CZM program includes five regional offices that serve 78 coastal municipalities. The following map provides more information about these offices: https://www.mass.gov/service-details/czm-regions-coastal-communities-and-coastal-zone-boundary

III. Other Approvals: Approvals typically required in Massachusetts include, but are not limited to, a Chapter 91 Permit/License, Massachusetts Environmental Protection Act (MEPA) review, Wetlands Protection Act Order of Conditions, and/or Aquaculture Certification. *Applicants should also be aware that USACE may not be able to render a permit decision in the event the proposed activity is denied by another local, state and/or federal agency.*

4. Procedures for Self-Verification (SV) Eligible Projects

If the activity is eligible for an SV, the Self-Verification Notification (SVN) must be completed prior to the start of project construction and submitted to USACE within 30 days of commencing work. The purpose of the SVN is to provide applicants with a tool to assist them when determining if the activity as proposed is SV-eligible. The following GPs do not require submission of the SVN: GP 1 (SV #1), GP 3 (SV #2-3), GP 4 (SV #2), GP 11, GP 12 (note #2), GP 14 (see note), GP 15 (see note), and GP 24 (SV #3). **For the activities not listed above, the SVN must be completed prior to the start of work and be kept on site at all times during project construction.** The applicant shall not begin work for SV-eligible activities until they have completely verified the bulleted items below.

Digital submittals by email are **strongly encouraged** to facilitate the most efficient processing of the SVN submittal. Please communicate with USACE staff if you are unable to provide a digital copy. Addresses are cenae-r-ma-sv@usace.army.mil (email) or Regulatory Division, U.S. Army Corps of Engineers, New England District, 696 Virginia Road, Concord, MA 01742-2751 (mail).

Eligible SV Activities:

- Are subject to USACE jurisdiction (see GC 2); and
- Qualify for one or more of the GPs within this document (Section III); and
- Meet the GCs within this document (Section IV); and

- When required, are supported by a complete SVN (Appendix C); and
- Receive all other required local, State, and/or Federal approvals.

5. Procedures for Pre-Construction Notification (PCN) Eligible Projects

For activities that require a PCN, an application to and written authorization from USACE is required. *No work requiring a PCN may proceed until the applicant receives written authorization from USACE verifying that the activity is authorized.* The verification letter may include special conditions that the applicant must comply with. When possible, it is *highly* recommended that PCN application materials are submitted at least 90 days before the target start date to allow for USACE evaluation and any necessary agency consultations. PCN applications shall demonstrate in writing how the proposed activity complies with all GCs, as applicable to their activity.

Digital submittals by email are **strongly encouraged** to facilitate the most efficient processing of the PCN application. Please communicate with USACE staff if you are unable to provide a digital copy. Addresses are cenae-r-ma@usace.army.mil or Regulatory Division, U.S. Army Corps of Engineers, New England District, 696 Virginia Road, Concord, MA 01742-2751 (mail).

Eligible PCN Activities:

- Are subject to USACE jurisdiction (see GC 2); and
- Qualify for one or more of the GPs within this document (Section III); and
- Meet the GCs within this document (Section IV); and
- Comply with the Mitigation Standards within this document (Section V); and
- Are supported by a complete PCN document (Appendix B); and
- When required, are supported by the submittal of project information to the appropriate parties identified in Appendix A; and
- Receive all other required local, State, and/or Federal approvals.

6. Interagency Review Procedures

The USACE reserves the opportunity to coordinate PCN activities with Federal and State agencies to ensure that the proposed activity results in no more than a minimal impact to the aquatic environment. In some cases, USACE may require project modifications involving avoidance, minimization, and/or compensatory mitigation for unavoidable impacts to ensure the net effects of a project are minimal. The USACE determines, after review and coordination with the agencies and/or the applicant, if PCN applications:

a. Meet the terms and conditions of the GP as proposed;
b. Require additional information;
c. Require avoidance, minimization, compensatory mitigation, construction sequencing, project modification, or other special conditions to avoid or minimize adverse impacts to the aquatic environment;
d. Require individual permit review regardless of whether the terms and GCs of these GPs are met, based on concerns for the aquatic environment or any other factor of the public interest (see Section 9 below).

For activities requiring a PCN, the applicant must wait for written authorization from USACE before commencing activities in waters of the U.S. Beginning work for PCN required activities without a USACE written authorization is a violation of these GPs, and the terms and conditions of this document. The applicant may be subjected to an enforcement action by USACE and/or the Environmental Protection Agency (EPA).

7. Construction of Solid Fill Structures and Fills Along the Coastline or Baseline from Which the Territorial Sea is Measured.

Projects involving the construction of solid fill structures or discharge of fill that may extend beyond the coastline or the baseline from which the territorial sea is measured (i.e., mean low water) will require a PCN. The USACE will submit a description of the proposed work and a copy of the plans to the Solicitor, Department of the Interior, Washington, DC 20240, and request comments concerning the effects of the proposed work on the outer continental rights of the United States. These comments will be included in the administrative record of the application. After completion of permit review, the record will be forwarded to the Chief of Engineers. The decision on the application will be made by the Secretary of the Army after coordination with the Attorney General.

8. Emergency Activities

Per 33 CFR 325.2(e)(4), an emergency is limited to a situation that would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process an application under standard procedures. Emergency work shall be limited to that which is necessary to stabilize and secure the situation. Additional work needed for final repairs shall not be completed until approval is obtained through the appropriate, non-emergency process. Emergency work is subject to the same terms and conditions of these GPs as non-emergency work, and similarly, must qualify for authorization under these GPs; otherwise, an IP is required. *See GP 25 Emergency Situations for additional information.*

9. Individual Permit

Projects that do not meet the terms and conditions of this GP may require review as an IP (33 CFR 325.5 (b)). Proposed work in this category will require a separate Federal application for an individual permit from USACE (33 CFR 325.1). In addition, USACE retains discretionary authority on a case-by-case basis to elevate GP-eligible activities to an IP based on concerns for the environment or any other factor of the public interest (33 CFR 320.4 (a)). Applicants are required to submit the appropriate application materials directly to USACE as early as possible to expedite the permit review process. General information and application forms can be obtained at our website or by contacting our office at cenae-r-ma@usace.army.mil or (978) 318-8338. Individual 401 WQC and/or CZMA Federal consistency concurrence from the appropriate MA agencies are required before USACE can issue an individual permit. Applying for an IP does not relieve the applicant from their obligation to obtain all required Federal, State and/or local approvals.

10. Compliance

Applicants shall ensure compliance with all applicable GPs in Section III, GCs in Section IV, and any special conditions included in USACE verification letters. Noncompliance with these GPs, GCs, and special conditions may subject the applicant to criminal, civil, or administrative penalties, and/or an ordered restoration, and/or the permit may be modified, suspended or revoked by USACE. The USACE will consider any activity requiring USACE authorization to be noncompliant if that activity does not comply with all GP terms and conditions at all times, including while the project is under construction and when work is completed.

SECTION III. MASSACHUSETTS GENERAL PERMITS

Applicants are encouraged to review Sections I & II prior to submitting an application to confirm that the activity as proposed complies with all terms and conditions of the 2023 MA GPs. Applicants are also encouraged to review the definitions in Section VII, Definitions & Acronyms, of this document. Several terms are frequently used throughout the GPs, and it is important for the reader to understand these terms. If seeking verification for an activity previously verified under the 2018 MA GPs, please contact the USACE to discuss permitting needs in advance of submitting an application.

General Permits

1. Aids to Navigation and Temporary Recreational Structures
2. Maintenance
3. Moorings
4. Structures in Navigable Waters of the U.S.
5. Boat Ramps and Marine Railways
6. Utility Lines, Oil or Natural Gas Pipelines, Outfall Or Intake Structures, and Appurtenant Features
7. Dredging, Disposal of Dredged Material, Beach Nourishment, Rock Removal and Rock Relocation
8. U.S. Coast Guard Approved Bridges
9. Bank and Shoreline Stabilization
10. Aquatic Habitat Restoration, Enhancement, and Establishment Activities
11. Fish and Wildlife Harvesting and Attraction Devices and Activities
12. Response Operations, Oil and Hazardous Substances
13. Cleanup of Hazardous and Toxic Waste
14. Scientific Measurement Devices
15. Survey Activities
16. Land and Water-Based Renewable Energy Generation Facilities and Hydropower Projects
17. Residential, Commercial and Institutional Developments, and Recreational Facilities
18. Aquaculture
19. Mining Activities
20. Living Shorelines
21. Agricultural Activities
22. Reshaping Existing Drainage Ditches, Construction of New Ditches, and Mosquito Management
23. Linear Transportation Projects and Wetland/Stream Crossings
24. Temporary Construction, Access, and Dewatering
25. Emergency Situations

GP 1. AIDS TO NAVIGATION AND TEMPORARY RECREATIONAL STRUCTURES (Authority: §10)

(a) The placement of aids to navigation and regulatory markers that are approved by and installed in accordance with the requirements of the U.S. Coast Guard (USCG). See 33 CFR, Part 66; and (b) Temporary buoys, markers, and similar structures placed for recreational use during specific events such as water skiing competitions and boat races or seasonal use. See GC 16.

Self-Verification Eligible	Pre-Construction Notification Required
1. Aids to navigation and regulatory markers approved by and installed in accordance with the requirements of the USCG. 2. Temporary buoys, markers and similar structures that are: (a) placed for recreational use during specific events and removed within 30 days after event; or (b) placed during winter events on ice and removed before spring thaw. These structures must be authorized by the local harbormaster, not located within an FNP or its buffer zone, and not located in saltmarsh or tidal vegetated shallows.	1. Impacts in saltmarsh or tidal vegetated shallows. 2. Activities that are not SV eligible.

Note: An SVN submittal to USACE is not required for work authorized under SV #1 above.

GP 2. MAINTENANCE (Authorities: §10 and §404)

Repair, rehabilitation, or replacement of any previously authorized[1], currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3 (activities occurring before certain dates), provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction technique requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. This GP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the activities above. Maintenance dredging and beach nourishment are not eligible under GP 2 (see GP 7). Stream crossing modifications (including sliplining), replacements or extensions are not eligible under GP 2 (see GPs 6, 17, 23). *See GP 25 Emergency Situations for expedited review of emergency activities.*

Not authorized under GP 2 (IP required): (a) Permanent impacts in >1 acre in non-tidal waters and/or wetlands; or (b) Permanent impacts >1/2 acre in tidal waters; >1000 SF in saltmarsh, mud flats, riffle and pool complexes, or non-tidal vegetated shallows; or >100 SF in tidal vegetated shallows; or (c) Temporary impacts >1 acre in tidal waters; >5000 SF in saltmarsh, mud flats, riffle and pool complexes, or non-tidal vegetated shallows; or >1000 SF in vegetated shallows; (d) New stream channelization or stream relocation projects (e.g., those in response to storm or flood events).

Self-Verification Eligible

Maintenance activities that meet all of the following terms:

1. In non-tidal waters, the combined permanent and temporary impacts extending beyond the original footprint are ≤5,000 SF[2] and not located in vegetated shallows or riffle and pool complexes.

2. In tidal waters, the combined permanent and temporary impacts extending beyond the original footprint are ≤5,000 SF, ≤1,000 SF in mudflats and/or natural rocky habitat, and not located in saltmarsh and tidal vegetated shallows.

3. Minor deviations in the repair, rehabilitation, or replacement of previously authorized, currently serviceable structures or fills.

4. Bulkhead replacement in tidal and non-tidal waters via installation of new bulkhead within 18 inches of the existing bulkhead and associated backfill.

5. Drawdown of an impoundment for dam/levee repair provided it does not exceed 18 months and one growing season (April through September).

Pre-Construction Notification Required

1. Discharges associated with removal of accumulated sediments and debris in the vicinity of existing structures, including intake and outfall structures and associated canals.

2. The removal of sediment outside the immediate vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) that is ≥200 linear feet. This activity is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions existing when the structure was built.

3. Dam and flood control or levee repair, rehabilitation, or replacement involves:
   a. A change in the flood elevation or permanent water surface elevation of the impoundment; or
   b. Drawdown of impoundment for construction exceeding one growing season (see SV eligible #5);
   c. Any modification that changes the character, scope, or size of the original fill design; or
   d. Does not meet SV eligible 1-7.

4. Installation of steel piles, including steel sheet piles, that cannot be done in the dry and where NOAA-ESA listed species are mapped as present.

[1] Some maintenance activities may not be subject to regulation under Section 404 of the CWA in accordance with 33 CFR 323.4(a)(2). Per 33 CFR 330.3, Vested dates are: a) Work performed and structures installed before December 18, 1968 (Section 10); and b) Fill placed before July 25, 1975 (Section 404).
[2] This excludes dam projects that may require a temporary drawdown with impacts >5,000 SF in non-tidal waters. Instead, the drawdown shall comply with SV #5 to be eligible under Self-Verification.

6. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill. 7. Work to previously approved tide gates not affecting upstream tidal resource areas.	5. Activities located in the Connecticut River or Merrimack River, unless they are completed in the dry or when the tide is waterward of the work area. 6. Activities on USACE properties & USACE-controlled easements. 7. Activities that do not require an IP. Activities that do not require a PCN or an IP may be SV eligible.
Notes: 1. This authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the CWA §404(f) exemption for maintenance. See 33 CFR 323.4(a)(2). Prior USACE permits may have included authorization to maintain the activity, in which case authorization under this GP is not necessary. 2. See GC 22 for information on temporary construction mats.	

GP 3. MOORINGS (Authority: §10)

New moorings and mooring fields; the relocation of previously authorized moorings; expansions, boundary reconfigurations or modifications of previously authorized mooring fields; and maintenance and replacement of moorings.

Not authorized under GP 3 (IP required): (a) Moorings or mooring fields converted to or associated with a new boating facility[1]; or (b) Moorings in a USACE Federal Navigation Anchorage or USACE Federal Navigation Channel, except municipal-operated mooring fields.

Self-Verification Eligible	Pre-Construction Notification Required
1. New or relocated moorings that meet all the following terms: a. Authorized by a local harbormaster/ municipality under MGL Chapter 91 §10A; and b. No interference with navigation; and c. Single boat, single-point and non-commercial; and d. Not associated with a boating facility, and e. Neither placed within nor impact tidal vegetated shallows (e.g., eelgrass); and f. Not located within a USACE Federal navigation project (FNP) or the FNP buffer zone. 2. Existing, authorized moorings are converted from traditional moorings to low impact mooring technology (see note below) and/or helical anchors. 3. Maintenance and replacement of moorings authorized by the USACE.	1. New mooring fields; or expansions, boundary reconfigurations or modifications of existing, authorized mooring fields. 2. Moorings located such that they, and/or vessels docked or moored at them, are within the buffer zone of the horizontal limits of a Federal Anchorage. The buffer zone is equal to 3 times the authorized depth of that channel (see GC 15). 3. New individual moorings located in saltmarsh, mudflats, natural rocky habitat, and tidal vegetated shallows. Locating moorings these areas should be avoided to the maximum extent practicable. If these areas cannot be avoided, plans should show conservation mooring or low-impact mooring systems that prevent mooring chains from resting or dragging on the bottom substrate at all tides, where practicable. USACE may require a survey in areas previously mapped as containing eelgrass or within 100 ft. of existing eelgrass beds to document presence or absence of eelgrass and to determine the appropriate type and amount of compensatory mitigation for impacts to eelgrass. 4. Replacement moorings located in tidal vegetated shallows. 5. Moorings that are not SV eligible and do not require an IP.

Notes:

1. Low impact mooring systems, including conservation moorings, are encouraged to minimize impacts of chain scouring from conventional moorings during the tidal cycle.
2. An SVN submittal to USACE is not required for work authorized under SV #2-3 above.

[1] Boating facilities are marinas, yacht clubs, boat clubs, boat yards, dockominiums, town facilities, land/homeowner's associations, etc. that provide for a fee, rent or sell mooring or docking space. Not classified as boating facilities are municipal moorings or municipal mooring fields that charge an equitable user fee based only on the actual costs incurred.

GP 4. STRUCTURES IN NAVIGABLE WATERS OF THE U.S. (Authority: §10 & §404)

New, expansions, reconfigurations or modifications of structures for navigational access in waters of the U.S. including but not limited to temporary/seasonal or permanent pile and pole-supported piers, floats, stairs, shore outhauls, and boat and float lifts.

Not authorized under GP 4 (IP required): (a) Structures associated with a new boating facility; (b) Structures in a USACE Federal anchorage or channel; or (c) Artificial reefs.

Self-Verification Eligible

1. Private, non-commercial piers, floats and lifts that meet all the following terms:

a. Piers and floats in: (i) Tidal waters total ≤600 SF combined; and (ii) Non-tidal navigable waters of the U.S. total ≤600 SF combined; and

b. Piers are ≤4 feet wide and ≥6 feet above the marsh substrate (the height is measured from the marsh substrate to the bottom of the lowest longitudinal support); and

c. Floats and lifts in tidal waters and non-tidal navigable waters of the U.S. are ≥24 inches above the substrate during all tidal cycles. Float stops are preferred when site conditions warrant them (i.e., low tide exposes substrate), and skids can only be used in areas where piles are not feasible and on sandy or hard bottom substrates; and

d. Piers, floats and lifts: (i) Are ≥25 feet from previously mapped or existing vegetated shallows, or riparian property line extensions; (ii) Extend ≤25% of the waterway width in non-tidal navigable waters of the U.S. or MHW in tidal navigable waters of the U.S.

e. Installation of ≤12-inch diameter timber piles. Installation of ≥12-inch diameter piles of any material type when installed in the dry.

2. Fenders and similar structures.

Pre-Construction Notification Required

1. Shore outhauls.
2. Expansions, modifications, or new reconfiguration zones at any authorized boating facility.
3. New, expansions, reconfigurations, reconfiguration zones, or modifications of structures that provide public, community or government recreational uses such as boating, fishing, swimming, access, etc.
4. Installation of steel piles, including steel sheet piles, that cannot be done in the dry and where NOAA-ESA listed species are mapped as present.
5. Located within the buffer zone of the horizontal limits of an FNP (GC 15).
6. Miscellaneous structures.
7. Impacts in tidal vegetated shallows.
8. Structures that are not SV eligible and do not require an IP.

Notes:

1. See GC 19 regarding pile driving and pile removal in navigable waters and
2. See GC 20 regarding time of year restrictions in tidal waters.
3. Boating facilities are facilities that provide for a fee, rent, or sell mooring space, such as marinas, yacht clubs, boat clubs, boat yards, town facilities, dockominiums, etc. Pile supported structures with no discharges of dredged or fill material are not regulated by USACE in non-navigable waters.
4. A SVN submittal to USACE is not required for SV #2 above.

GP 5. BOAT RAMPS AND MARINE RAILWAYS (Authorities: §10 and §404)

Activities required for the construction of boat ramps and marine railways, including excavation and fill.

Not authorized under GP 5 (IP required): (a) Permanent impacts that are >1 acre in non-tidal waters of the U.S., >½ acre in tidal waters; >1000 SF in saltmarsh, mud flats, riffle and pool complexes, or non-tidal vegetated shallows; or >100 SF in tidal vegetated shallows; (b) Temporary impacts in tidal waters that are >1 acre; >5000 SF in saltmarsh, mud flats, or riffle and pool complexes; or >1000 SF in vegetated shallows[1]; or (c) dredging in navigable waters of the U.S. (see GP 7).

Self-Verification Eligible	Pre-Construction Notification Required
1. In non-tidal waters, the combined permanent and temporary impacts are (a) ≤5,000 SF, and (b) not located in riffle and pool complexes and non-tidal vegetated shallows.	1. Boat ramps are located within 25 feet of property line extensions unless the properties are owned by the same owner. The USACE may require a letter of no objection from the abutter(s).
2. In tidal waters, the combined permanent and temporary impacts are (a) ≤5,000 SF, (b) ≤1,000 SF in mudflats and/or natural rocky habitat, and (c), not located in saltmarsh and tidal vegetated shallows.	2. Activities that are not eligible for SV and do not require an IP.

GP 6. UTILITY LINES, OIL OR NATURAL GAS PIPELINES, OUTFALL OR INTAKE STRUCTURES, AND APPURTENANT FEATURES (Authorities: §10 & §404)

Activities required for: (a) The construction, maintenance, repair or removal of utility lines, oil or natural gas pipelines[1], outfall or intake structures[2], and appurtenant features including the associated excavation, backfill, or bedding for these structures. (b) The construction, maintenance, or expansion of substations and other appurtenant facilities associated with a utility line, oil or natural gas pipeline, and outfall or intake structure in non-tidal waters of the U.S.; and (c) The construction and maintenance of foundations for overhead utility line towers, poles, and anchors in tidal and non-tidal waters of the U.S., provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) are used where feasible. This GP authorizes the construction of access roads to facilitate construction of the above activities provided the activity, in combination with all other activities included in one single and complete project, does not exceed the thresholds identified below (IP required). Access roads used solely for construction of the utility line must be removed upon completion of the work. This GP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the activities above.[3]

Not authorized under GP 6 (IP required): (a) Permanent impacts for any single and complete project that are >1 acre in non-tidal waters of the U.S.; >½ acre in tidal waters; >1000 SF in saltmarsh, mud flats, riffle and pool complexes, or non-tidal vegetated shallows; or >100 SF in tidal vegetated shallows; (b) Temporary impacts in tidal waters that are >1 acre; >5000 SF in saltmarsh, mud flats, or riffle and pool complexes; or >1000 SF in vegetated shallows; (c) Stormwater treatment or detention systems, or subsurface sewage disposal systems in waters of the U.S.; or (d) New tide gates that do not meet SV criteria below.

Self-Verification Eligible	Pre-Construction Notification Required
1. In non-tidal waters, the combined permanent and temporary impacts are (a) ≤5,000 SF, and (b) not located in riffle and pool complexes and non-tidal vegetated shallows. 2. In tidal waters, the combined permanent and temporary impacts are (a) ≤5,000 SF, (b) ≤1,000 SF in mudflats and/or natural rocky habitat, and (c), not located in saltmarsh and tidal vegetated shallows. 3. Intake structures that are dry hydrants used exclusively for firefighting activities with no stream impoundments. 4. New tide gates on outfall structures for pipes conveying stormwater and/or industrial NPDES-permitted discharges from waters that are not waters of the U.S.	1. New outfall and/or intake structures. 2. Unconfined work or silt producing activities in streams with diadromous fish. 3. Submarine cables, conduits, or pipelines that occur in, over or under navigable waters of the U.S. 4. Stream channelization, relocation, impoundment, or loss of streambed occurs. 5. The activity is placed within and runs parallel to or along a streambed within waters of the U.S. 6. There is a permanent change in preconstruction contours in waters of the U.S. 7. Installation of utility lines or gas/oil pipelines using trench excavation where material is temporarily sidecast into waters of the U.S. for >3 months. Applicants must demonstrate how the material would not be dispersed by currents or other forces. 8. Activities that are not SV eligible and do not require an IP.

[1] See the definitions of a “utility line” and “oil or natural gas pipeline” in Section VII.
[2] Outfall structures must be in compliance with regulations issued under the National Pollutant Discharge Elimination System Program (Section 402 of the Clean Water Act).
[3] Temporary impacts shall comply with all GCs, including GC 32 Utility Line Installation and Removal.

GP 7. DREDGING (Authority: §10), DISPOSAL OF DREDGED MATERIAL (Authorities: §10, §404), BEACH NOURISHMENT (Authorities: §10 & §404), ROCK REMOVAL (Authority: §10) AND ROCK RELOCATION (Authorities: §10 & §404)

New, improvement and maintenance dredging (see notes below) including: (a) Disposal of dredged material at a confined aquatic disposal cell, beach nourishment location, near shore site, or ocean disposal site selected under Section 404 of the Clean Water Act pursuant to the 404(b)(1) Guidelines, provided the dredged material meets the requirements for such disposal; (b) Beach nourishment not associated with dredging; and (c) Rock removal and relocation for navigation.

Not authorized under GP 7 (IP required): (a) Dredging where ocean disposal is required for the disposal of dredged material (Section 103); New dredging >½ acre; ≥10,000 CY; >1000 SF permanent impacts to intertidal areas, saltmarsh, mud flats, riffle and pool complexes, or non-tidal vegetated shallows; or >100 SF permanent impacts to tidal vegetated shallows; (b) Maintenance or improvement dredging and/or disposal with >1 acre of impacts to intertidal areas, saltmarsh, mudflats, riffle and pool complexes, or non-tidal vegetated shallows; (c) New dredging where the primary purpose is sand mining for beach nourishment; (d) Beach scraping; (e) Boulder removal and relocation for navigation >½ acre; or (f) Blasting.

Self-Verification Eligible

1. Maintenance dredging of previously dredged areas, with upland disposal, that meet all of the following terms:
   a. Dredged area ≤1/2 acre; and
   b. Activities comply with GC 20, TOY Restrictions. The time-of-year restriction(s) stated in Appendix B of the MA Division of Marine Fisheries (DMF) Technical Report TR-47[1] can apply instead if the general TOY restriction if a TOY is provided for a specific waterbody and is less restrictive. This is to protect endangered species, EFH, and other species; and
   c. The dredge footprint is located >25' from salt marsh or >100' from vegetated shallows; and
   d. Combined permanent and temporary impacts that are (i) ≤1,000 SF in mudflats or natural rocky habitat, or (ii) ≤5,000 SF within intertidal habitat and areas containing shellfish (an area contains shellfish unless: it is verified that minimal shellfish are present per the local shellfish constable or a shellfish survey; or it is not mapped as a MassGIS shellfish suitability area).
   e. No return water from upland disposal areas.

2. Boulder relocation with ≤1,000 SF of impacts, relocated to a similar depth and substrate.

Pre-Construction Notification Required

1. Maintenance dredging where the primary purpose is sand mining for beach nourishment.

2. New dredging and associated disposal ≤1/2 acre or <10,000 cubic yards.

3. Improvement dredging.

4. Beach nourishment in waters of the U.S. not associated with dredging.

5. Activities that are located in saltmarsh and tidal vegetated shallows.

6. Dredging in a Federal Navigation Project or within the buffer zone (see GC 15).

7. Activities that are not eligible for SV and do not require an IP.

Notes:

1. See Section VII for definitions of improvement and maintenance dredging.
2. For PCN activities, the USACE may waive or adjust the time of year requirement on a case-by-case basis after consultation with resource agencies.
3. Disposal site of any dredged material must be identified prior to obtaining USACE authorization.
4. Contact the USACE if a ten-year authorization to maintain an area is desired.

[1] The MA DMF Technical Report TR-47: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/

GP 8. U.S. COAST GUARD APPROVED BRIDGES (Authorities: §404)

Discharges of dredged or fill material incidental to the construction and modification of bridges across navigable waters of the U.S., including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills provided that the USCG authorizes the construction of the bridge structure under Section 9 of the Rivers and Harbors Act of 1899 or other applicable laws. A USCG Authorization Act Exemption or a Surface Transportation and Uniform Relocation Assistance Act (STURRA) (144h) exemption do not constitute USCG authorization.

Not authorized under GP 8 (IP Required): Causeways and approach fills (see GP 23).

Self-Verification Eligible	**Pre-Construction Notification Required**
1. Discharges of dredged or fill material that are incidental to the construction of bridges across navigable waters and meet all of the following: a. Combined permanent and temporary impacts that are ≤5,000 SF. b. Combined permanent and temporary impacts that are ≤1,000 SF in mudflats and natural rocky habitat. c. Not located in saltmarsh and tidal vegetated shallows.	1. Activities on USACE properties & USACE controlled easements.2. Installation of steel piles, including steel sheet piles, that cannot be done in the dry and where NOAA-ESA listed species are mapped as present. 3. Activities that are not eligible for SV and do not require an IP.

Notes:

1. GP 8 is not applicable to bridges over inland waters or wetlands that are not tidally influenced or regulated as navigable under Section 10.
2. See eligibility criteria for GPs 2 & 23 for projects that are not subject to USCG regulations.

GP 9. BANK AND SHORELINE STABILIZATION (Authorities: §10 & §404)

Bank stabilization activities necessary for erosion protection along the banks of lakes, ponds, streams, estuarine and ocean waters, and any other open waters. Includes bulkheads, seawalls, riprap, revetments, living seawalls, or slope protection & similar structures, specifically for the purpose of shoreline protection. This GP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the activities above.

Activities must meet the following criteria: (a) No material is placed in excess of the minimum needed for erosion protection; (b) No material is of a type, or is placed in any location, or in any manner, that will impair surface water flow into or out of any waters of the U.S.; (c) No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored native trees and treetops may be used in low energy areas); (d) Native plants appropriate for current site conditions, including salinity, must be used for bioengineering or vegetative bank stabilization; (e) The activity is not a stream channelization activity; and (f) The activity must be properly maintained, which may require repairing it after severe storms or erosion events. This GP authorizes those maintenance and repair activities if they require authorization. This GP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the bank stabilization activity. See GP 20 for living shoreline stabilization structures or fills.

Not authorized under GP 9 (IP required): (a) New bank stabilization >500 feet in total length (>1,000 linear feet in total length when necessary to protect transportation infrastructure) or permanent loss of saltmarsh >1,000 SF, unless the District Engineer waives this criterion by making a written determination concluding that the discharge of dredged or fill material will result in no more than minimal adverse environmental effects (an exception is for bulkheads – the district engineer cannot issue a waiver for a new bulkhead that is >1,000 feet in length along the bank); (b) Stream channelization or relocation activities; or (c) Breakwaters, groins or jetties.

Self-Verification Eligible

1. Activities in tidal and non-tidal waters that are:
   a. <200 feet in length.
   b. <400 feet in length when necessary to protect transportation infrastructure.
   c. ≤1 cubic yard of fill per linear foot average along the bank waterward of the plane of OHW or HTL.
   d. Not located in non-tidal wetlands, saltmarsh, vegetated shallows.

Pre-Construction Notification Required

1. Activities in tidal and non-tidal waters that are:
   a. ≥200 feet to ≤500 feet in total length. Activities >500 feet in total length must have a written waiver from USACE.
   b. ≥400 feet to ≤1,000 feet in total length when necessary to protect transportation infrastructure. Activities >1,000 feet in total length must have a written waiver from USACE.
   c. >1 cubic yard of fill per linear foot average along the bank waterward of the plane of OHW or HTL.
   d. Located in non-tidal wetlands, saltmarsh, vegetated shallows.
2. Activities with permanent loss of tidal or non-tidal waters that is (a) ≥5,000 SF or (b) ≥1,000 SF in mudflats and natural rocky habitat.
3. Activities that are (a) located in the Connecticut River or Merrimack River and/or (b) require installation of steel piles/steel sheet piles that cannot be done in the dry where NOAA ESA-listed species are mapped as present.
4. Activities on USACE properties & USACE-controlled easements.
5. Activities that require grouted riprap and/or poured/unformed concrete.
6. Activities that are not eligible for SV and do not require an IP.

Note: The applicant shall comply with GC 24. This includes utilization of bioengineering techniques in lieu of hard armoring to the maximum extent practicable as site conditions allow.

GP 10. AQUATIC HABITAT RESTORATION, ENHANCEMENT, AND ESTABLISHMENT ACTIVITIES (Authorities: §10 and §404)

Activities for the restoration, enhancement and establishment of non-tidal and tidal wetlands and riparian areas, including invasive, non-native or nuisance species control; the restoration and enhancement of non-tidal streams and other non-tidal open waters; the relocation of non-tidal waters, including non-tidal streams & associated wetlands for reestablishment of a natural stream morphology and reconnection of the floodplain; the restoration and enhancement of shellfish, finfish and wildlife; and the rehabilitation or enhancement of tidal streams, tidal wetlands and tidal open waters; provided those activities result in net increases in aquatic resource functions and services. See GP 9 for bank and shoreline stabilization. See GP 20 for living shorelines.

Not authorized under GP 10 (IP required): Stream channelization activities and artificial reefs.

Self-Verification Eligible	**Pre-Construction Notification Required**
1. In tidal and non-tidal waters excluding tidal vegetated shallows, the combined permanent and temporary impacts are ≤5,000 SF. 2. Eelgrass (vegetated shallows) planting and transplanting ≤100 SF in tidal waters.	1. In tidal and non-tidal waters excluding tidal vegetated shallows, the combined permanent and temporary impacts are >5,000 SF. 2. Eelgrass (vegetated shallows) planting and transplanting >100 SF in tidal waters. 3. Permanent water impoundments, dam removal, fish ladders, or tide gates. 4. Stream relocation, impoundment, or loss of streambed occurs. 5. Runneling projects with the purpose of restoring saltmarsh by removing excess water that ponds on the saltmarsh surface. 6. The conversion of: (a) a stream or natural wetlands to another aquatic habitat type (e.g., stream to wetland or vice versa, wetland to pond, etc.) or uplands, (b) one wetland type to another (e.g., forested wetland to an emergent wetland). 7. Activities in the Connecticut River from the Turners Falls Dam to the MA/CT border, or Merrimack River from the Essex Dam to the mouth, involving permanent or temporary impacts unless they are performed <5 feet waterward from OHW or HTL and in the dry. This is to protect endangered species. 8. Activities on USACE properties & USACE-controlled easements. 9. Activities that are not eligible for SV and do not require an IP.

Notes:

1. Changes in wetland plant communities that occur when wetland hydrology is more fully restored during wetland rehabilitation activities are not considered a conversion to another aquatic habitat type.
2. See RGL 18-01 for guidance on removal of obsolete dams and other structures from rivers and streams. https://www.usace.army.mil/missions/civil-works/regulatory-program-and-permits/guidance-letters/
3. An ecological reference site may be used for a design basis of the restoration activity. The reference site should possess characteristics of an intact aquatic habitat or riparian area that exists in the region. The reference site shall represent the target habitat type of the proposed activity. A reference site may be required at the discretion of USACE.

GP 11. FISH AND WILDLIFE HARVESTING AND ATTRACTION DEVICES AND ACTIVITIES (Authorities: §10 and §404)

Fish and wildlife harvesting and attraction devices and activities in waters of the U.S. such as pound nets, crab traps, crab and shellfish dredging, eel pots, lobster traps, duck blinds, clam and oyster digging, fish aggregating devices, and small fish attraction devices such as open-water fish concentrators (sea kites, etc.).

Not authorized under GP 11 (IP required): Artificial reefs; or new, or expansions of, impoundments and semi-impoundments of waters of the U.S. for the culture or holding of motile species such as lobster with an impounded area >½ acre.

Self-Verification Eligible	**Pre-Construction Notification Required**
1. In non-tidal waters, the combined permanent and temporary impacts are (a) ≤1/2 acre, and (b) not located in riffle and pool complexes and non-tidal vegetated shallows. 2. Fish and wildlife harvesting and attraction devices and activities that do not require a PCN or IP.	1. Pound nets, impoundments or semi-impoundments of waters of the U.S. for the culture or holding of motile species such as lobster with an impounded area ≤½ acre, fish aggregating devices, or small fish attraction devices. 2. Devices and activities that are located in tidal vegetated shallows, mud flats, or saltmarsh. 3. Devices and activities that do not require an IP.

Note: An SVN submittal to USACE is not required for work authorized under GP 11.

GP 12. RESPONSE OPERATIONS, OIL AND HAZARDOUS SUBSTANCES (Authorities: §10 & §404)

(a) Activities conducted in response to a discharge or release of oil and hazardous substances that are subject to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300) including containment, cleanup, and mitigation efforts, provided that the activities are done under either: (i) The Spill Prevention, Control and Countermeasure Plan required by 40 CFR 112.3; (ii) The direction or oversight of the Federal on-scene coordinator designated by 40 CFR 300; or (iii) Any approved existing State, regional or local contingency plan provided that the Regional Response Team concurs with the proposed response efforts or does not object to the response effort; (b) Activities required for the cleanup of oil releases in waters of the U.S. from electrical equipment that are governed by EPA's polychlorinated biphenyl (PCB) spill response regulations at 40 CFR 761; (c) Booms placed in navigable waters of the U.S. for oil and hazardous substance containment, absorption and prevention; and (d) The use of structures and fills for spill response training exercises. Wetlands, vegetated shallows, mudflats, and riffle and pool complexes should be restored in place at the same elevation.

Self-Verification Eligible	**Pre-Construction Notification Required**
1. Activities are conducted in accordance with (a) or (b) above that are not planned or scheduled, but an emergency response (see Note 1). 2. Booms placed in navigable waters of the U.S. for oil and hazardous substance containment, absorption and prevention. 3. Temporary impacts for spill response training exercises ≤5000 SF in non-tidal waters and ≤1000 SF in tidal waters with no impacts to wetlands, saltmarsh, mudflats, or vegetated shallows. 4. Temporary structures in tidal waters with no impacts to wetlands, saltmarsh, mudflats, vegetated shallows, or riffle and pool complexes and in place ≤30 days.	1. Activities (a) or (b) above are planned or scheduled, not an emergency response; or 2. Activities that are not eligible for SV and do not require an IP.

Notes:

1. For emergency response activities in the Connecticut River from the Turners Falls Dam to the MA/CT border, Merrimack River from the Essex Dam to the mouth, and remaining tidal waters that are not rivers, the permittee must contact the USACE at (978) 318-8338 before or as soon as possible after the work authorized under GP 12(a) - (c) commences for the USACE to address effects under the Endangered Species Act.
2. An SVN submittal to USACE is not required for booms used for spill prevention, or properly contained and cleaned de minimus oil or hazardous substance discharges into navigable waters of the U.S.

GP 13. CLEANUP OF HAZARDOUS AND TOXIC WASTE (Authorities: §10 and §404)

Specific activities required to affect the containment, stabilization, or removal of hazardous or toxic waste materials, including court ordered remedial action plans or related settlements, which are performed, ordered or sponsored by a government agency with established legal or regulatory authority.

Not authorized under GP 13: (a) Establishment of new disposal sites; or (b) Expansion of existing sites used for the disposal of hazardous or toxic waste.

Self-Verification Eligible	Pre-Construction Notification Required
1. In non-tidal waters, the combined permanent and temporary impacts are (a) ≤5,000 SF, and (b) not located in vegetated shallows and riffle and pool complexes.	1. In non-tidal waters, the combined permanent and temporary impacts are (a) >5,000 SF, and (b) located in vegetated shallows and riffle and pool complexes. 2. Permanent and temporary impacts in tidal waters or navigable waters of the U.S. 3. Stream channelization, relocation, impoundment, or loss of streambed occurs. 4. Activities that are not eligible for SV and do not require an IP.

Notes:

1. Wetlands, vegetated shallows, mudflats, and riffle and pool complexes should be restored in place at the same elevation to the maximum extent practicable.
2. Activities undertaken entirely on a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site by authority of CERCLA, are not required to obtain permits under Section 404 of the CWA or Section 10 of the Rivers and Harbors Act.

GP 14. SCIENTIFIC MEASUREMENT DEVICES (Authorities: §10 and §404)

Scientific measurement devices for measuring and recording scientific data, such as staff gauges, tide and current gauges, meteorological stations, water recording and biological observation devices, water quality testing and improvement devices, and similar structures. Also eligible are small weirs and flumes constructed primarily to record water elevation, flow and/or velocity. Upon completion of the use of the device to measure and record scientific data, the measuring device and any other structures or fills associated with that device (e.g., foundations, anchors, buoys, lines, etc.) must be removed to the maximum extent practicable and the site restored to preconstruction elevations.

Not authorized under GP 14 (IP required): (a) Permanent impacts that are >5,000 SF in tidal and non-tidal waters of the U.S.; >1000 SF in tidal saltmarsh, mud flats, riffle and pool complexes; or >100 SF in tidal vegetated shallows; or (b) Temporary impacts in tidal waters that are >1 acre, unless the District Engineer waives this criterion by making a written determination concluding that the discharge of dredged or fill material will result in no more than minimal adverse environmental effects; >5000 SF in saltmarsh, mud flats, or riffle and pool complexes; or >1000 SF in vegetated shallows.

Self-Verification Eligible	**Pre-Construction Notification Required**
1. In non-tidal waters, the combined permanent and temporary impacts are (a) ≤5,000 SF, (b) not located in riffle and pool complexes and non-tidal vegetated shallows. 2. In tidal waters, the combined permanent and temporary impacts are (a) ≤5,000 SF, (b) ≤1,000 SF in mudflats and/or natural rocky habitat, (c) not located in saltmarsh and tidal vegetated shallows. 3. Temporary, non-biological sampling devices in waters that do not restrict or concentrate movement of aquatic organisms and will not adversely affect the course, condition, or capacity of a waterway for navigation. 4. Scientific measurement devices, and small weirs and flumes constructed primarily to record water quantity and velocity provided the discharge of fill is limited to 25 cubic yards. These cannot obstruct or restrict the waterway course, condition, capacity, and location. 5. Temporary measuring devices and associated structures (e.g., anchors, buoys, etc.) in tidal and non-tidal waters that do not require a PCN or IP.	1. Biological sampling devices, weirs or flumes, or the activity restricts or concentrates movement of aquatic organisms. 2. Permanent towers located in navigable waters that record and measure scientific data. 3. Devices that are not eligible for SV and do not require an IP.

Note: An SVN submittal to USACE is not required for temporary measuring devices with a footprint of <10 SF, with a profile of <3 feet high measured from the substrate and located in water deeper than -10 feet MLW.

GP 15. SURVEY ACTIVITIES (Authorities: §10 and §404)

Survey activities such as soil borings, core sampling, seismic exploratory operations, plugging of seismic shot holes and other exploratory-type bore holes, exploratory trenching, soil surveys, sampling, sample plots or transects for wetland delineations, and historic resources surveys.

Not authorized under GP 15 (IP required): (a) Permanent impacts that are >1 acre in tidal and non-tidal waters; >1000 SF in tidal saltmarsh, mud flats, or riffle and pool complexes; or >100 SF in tidal vegetated shallows; or (b) Temporary impacts in tidal waters that are >1 acre, unless the District Engineer waives this criterion by making a written determination concluding that the discharge of dredged or fill material will result in no more than minimal adverse environmental effects; >5000 SF in saltmarsh, mud flats, or riffle and pool complexes; or >1000 SF in vegetated shallows.

Self-Verification Eligible	**Pre-Construction Notification Required**
1. In non-tidal waters, the combined permanent and temporary impacts are (a) ≤5,000 SF, (b) not located in riffle and pool complexes and non-tidal vegetated shallows. 2. In tidal waters, the combined permanent and temporary impacts are (a) ≤5,000 SF, (b) ≤1,000 SF in mudflats and/or natural rocky habitat, (c) not located in saltmarsh and tidal vegetated shallows.	1. Exploratory trenching (see Note 2) occurs in waterways (e.g., streams, tidal waters). 2. Activities associated with the recovery of historic resources, and the drilling and discharge of excavated material from test wells for oil and gas exploration. 3. Seismic exploratory operations occur in tidal waters, the Connecticut River from the Turners Falls Dam to the MA/CT border, or the Merrimack River from the Essex Dam to the mouth. This is to protect endangered species. 4. Activities that are not eligible for SV and do not require an IP.

Notes:

1. An SVN submittal is not required for wetland delineations, and core sampling conducted for preliminary evaluation of dredge project analysis.
2. For the purposes of GP 15, the term “exploratory trenching” means mechanical land or underwater clearing of the upper soil profile to expose bedrock or substrate for the purpose of mapping or sampling the exposed material.
3. The discharge of drilling mud and cuttings may require a permit under §402 of the CWA.

GP 16. LAND AND WATER-BASED RENEWABLE ENERGY GENERATION FACILITIES (Authorities: §10 and §404), AND HYDROPOWER PROJECTS (Authority: §10 and §404)

Structures and work in tidal waters and discharges of dredged or fill material into tidal and non-tidal waters for the construction, expansion, modification or removal of: (a) Land-based renewable energy production facilities (e.g., solar, wind, biomass, geothermal) and their attendant features; (b) Water-based wind or hydrokinetic renewable energy generation projects and their attendant features; and (c) Discharges of dredged or fill material associated with hydropower projects. Attendant features may include, but are not limited to, land-based collection and distribution facilities, control facilities, and parking lots. For each single and complete project in (b) above, no more than 10 generation units (e.g., wind turbines or hydrokinetic devices) are authorized in navigable waters of the U.S. Upon completion of the pilot project (see note 2), the generation units, transmission lines, and other structures or fills associated with the pilot project must be removed to the maximum extent practicable.

Not authorized under GP 16 (IP required): (a) Permanent impacts that are >1 acre in non-tidal waters, >½ acre in tidal waters; >1000 SF in saltmarsh, mud flats, riffle and pool complexes, or non-tidal vegetated shallows; or >100 SF in vegetated shallows; or (b) Temporary impacts in tidal waters that are >1 acre; >5000 SF in saltmarsh, mud flats, or riffle and pool complexes; or >1000 SF in vegetated shallows.

Self-Verification Eligible	**Pre-Construction Notification Required**
In non-tidal waters, the combined permanent and temporary impacts for land-based activities are (a) ≤5,000 SF, (b) not located in riffle and pool complexes and non-tidal vegetated shallows.	1. In non-tidal waters, the combined permanent and temporary impacts for land-based activities are (a) >5000 SF, or (b) located in vegetated shallows or riffle and pool complexes. 2. Permanent and temporary impacts in tidal waters. 3. Water-based wind or hydrokinetic renewable energy generation projects, and hydropower projects. 4. For all activities eligible for authorization under GP 16: a. The activity occurs in tidal waters or in, over or under navigable waters. b. Stream channelization, relocation, impoundment, or loss of streambed occurs. 5. Activities that are not eligible for SV and do not require an IP.

Notes:

1. Utility lines constructed to transfer the energy from the land-based renewable generation or collection facility to a distribution system, regional grid, or other facility may be authorized by GP 6.
2. For the purposes of this GP, the term “pilot project” means an experimental project where the renewable energy generation units will be monitored to collect information on their performance and environmental effects at the project site.

GP 17. RESIDENTIAL, COMMERCIAL AND INSTITUTIONAL DEVELOPMENTS AND RECREATIONAL FACILITIES (AUTHORITIES: §404)

Discharges of dredged or fill material into non-tidal waters for the construction or expansion of: (a) Residences and residential subdivisions; (b) Residential, commercial and institutional building foundations and building pads; and (c) Recreational facilities such as playgrounds, playing fields, bikeways, trails, etc. This GP also authorizes attendant features that include, but are not limited to, roads, parking lots, garages, yards, and utility lines, and stormwater management facilities. This GP authorizes attendant features if they are necessary for the use of the project purpose.

Not authorized under GP 17 (IP required): (a) Permanent impacts that result in loss of non-tidal waters >1/2 acre; >1000 SF in riffle and pool complexes or vegetated shallows; or (b) Subsurface sewerage disposal systems in non-tidal waters.

Self-Verification Eligible	**Pre-Construction Notification Required**
1. In non-tidal waters, the combined permanent and temporary impacts are (a) <5,000 SF, and (b) not located in riffle and pool complexes and non-tidal vegetated shallows. 2. Stream channelization or relocation resulting in loss of streambed that is <200 LF.	1. In non-tidal waters, the combined permanent and temporary impacts are (a) ≥5,000 SF, or (b) located in riffle and pool complexes or non-tidal vegetated shallows. 2. Stream and wetland crossings that require a PCN per GCs 20 TOY Restrictions and GC 31 Stream Work and Crossings & Wetland Crossings. 3. Stream channelization or relocation resulting in loss of streambed that is ≥200 LF. Stream impoundment activities of any kind. 4. Activities on USACE properties & USACE-controlled easements. 5. Activities that are not SV eligible and do not require an IP.

Notes:

1. Stream and wetland crossings (permanent and temporary), including those built with construction mats; and modifications (including sliplining), replacements or extensions to existing crossings.
2. See GC 22 for information on temporary construction mats.
3. Subdivisions: For residential subdivisions, the aggregate total loss of waters of United States authorized by this GP cannot exceed 1/2-acre. This includes any loss of waters of the United States associated with development of individual subdivision lots.

GP 18. AQUACULTURE (Authorities: §10 and §404)

(a) The installation of buoys, floats, racks, trays, nets, lines, tubes, containers, and other structures into navigable waters of the U.S.; (b) Discharges of dredged or fill material into tidal and non-tidal waters necessary for shellfish seeding, rearing, cultivating, transplanting, and harvesting activities; and (c) Shellfish seeding or brushing the flats projects. Any fill material imported to the project from offsite (this is limited to mineral growth medium used in culture trays) shall be clean and of comparable grain size to the native substrate. Activities authorized under this GP must have (a) their MA DMF Aquaculture Certificate letter for licensed shellfish aquaculture sites, (b) documentation that the applicant has coordinated with the U.S. Coast Guard regarding USCG Private Aids to Navigation standards, (c) their MEPA Certificate (if required), and (d) documentation that the applicant has contacted their local authorities (ex. harbormaster, select board, shellfish constable) for authorization of their facility.

Not authorized under GP 18 (IP required): (a) New, or expansions of, impoundments and semi-impoundments of tidal and non-tidal waters for the culture or holding of motile species such as lobster with an impounded area >½ acre; (b) Cultivation of a nonindigenous species (see Note 1) unless that species has been previously cultivated in the waterbody; (c) Cultivation of an aquatic nuisance species (see Note 1); (d) Attendant features such as docks, piers, boat ramps (see GP 4); (e) stockpiles, staging areas, or the deposition of shell material back into tidal and non-tidal waters as waste.

Self-Verification Eligible

1. In tidal waters, a new lease site area is (a) ≤2-acre, (b) not located in salt marsh, natural rocky habitat, or tidal vegetated shallows.

2. In tidal waters, *expansions* of existing lease sites not to exceed 2 acres for the entire site (e.g. 1 acre lease site increasing to a 2 acre lease site may qualify as SV). A PCN is required for expansions in salt marsh, natural rocky habitat, and tidal vegetated shallows.

3. Cages, racks that are elevated ≥2 feet above the ocean floor with legs within a lease site with ≤4 buoys marking the corners.

4. Floating cage strings with a single connecting line, ≤2 anchors and ≤2 end marker buoys per string within a lease site with ≤4 buoys marking the corners.

5. No activities located within 25 feet of tidal vegetated shallows.

6. Culture only indigenous species.

7. Not located in FNP or within a distance of three times the authorized depth of an FNP (see GC 15).

8. Not located in or impinge upon the value of any National Lands or Federal Properties.

9. Floating upweller docks that total ≤600 SF in area.

Pre-Construction Notification Required

1. Discharges of fill material associated with aquaculture >5,000 SF.

2. Research, educational, commercial-viability or experimental aquaculture gear activities >1,000 SF.

3. Kelp or finfish aquaculture.

4. Land-based hatchery intakes >3 inches in diameter.

5. Activities in water depths >10 feet mean low lower water (MLLW).

6. Activities with in-water lines, ropes or chains that are not SV eligible (see #3-4).

7. Activities occur in the Connecticut River from the Turners Falls Dam to the MA/CT border or the Merrimack River from the Essex Dam to the mouth. This is to protect endangered species.

8. New, or expansions of, impoundments and semi-impoundments for the culture or holding of motile species such as lobster with an impounded area ≤1/2 acre.

9. Activities that do not require an IP. Activities that do not require a PCN or an IP may be SV eligible.

Note: The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 defines: (a) nonindigenous species as “any species or other viable biological material that enters an ecosystem beyond its historic range, including any such organism transferred from one country into another”; and (b) aquatic nuisance species as “a nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural, or recreational activities dependent on such waters.”

GP 19. MINING ACTIVITIES (Authorities: §10 and §404)

Discharges of dredged or fill material into non-tidal waters for mining activities, except for coal mining and metallic mineral mining activities.

Not authorized under GP 19 (IP required): (a) Permanent impacts >1 acre in non-tidal waters; or (b) Activities in tidal waters.

Self-Verification Eligible	Pre-Construction Notification Required
In non-tidal waters, the combined permanent and temporary impacts are (a) ≤5,000 SF, and (b) not located in riffle and pool complexes, non-tidal vegetated shallows, and streams.	1. In non-tidal waters, the combined permanent and temporary impacts are (a) >5,000 SF, or (b) located in riffle and pool complexes, non-tidal vegetated shallows, and streams. 2. The activity occurs in non-tidal navigable waters of the U.S. 3. Stream channelization, relocation, impoundment, loss of streambed, or discharge of tailings into streams occurs. 4. Work on USACE properties & USACE-controlled easements. 5. Activities that are not eligible for SV and do not require an IP.

GP 20. LIVING SHORELINES[1] (Authorities: §10 and §404)

Construction and maintenance of living shorelines to stabilize banks and shores in tidal waters. In non-tidal waters that are not subject to the ebb and flow of the tide, nature-based bank stabilization techniques such as bioengineering and vegetative stabilization may be authorized by GP 9. This GP authorizes those maintenance and repair activities in-kind that are necessary to address changing environmental conditions.

The following terms must be met for both SVs and PCNs as applicable: (a) Coir logs, coir mats, stone, native oyster shell, native wood debris, and other structural materials must be adequately anchored, of sufficient weight, or installed in a manner that prevents relocation in most wave action or water flow conditions, except for extremely severe storms; (b) For living shorelines consisting of tidal fringe wetlands, native plants appropriate for current site conditions, including salinity and elevation, must be used if the site is planted by the permittee; (c) Discharges of dredged or fill material into waters of the U.S., and oyster or mussel reef structures in navigable waters, must be the minimum necessary for the establishment and maintenance of the living shoreline; (d) If sills or other structural materials per PCN #4 must be constructed to protect fringe wetlands for the living shoreline, those structures must be the minimum size necessary to protect those fringe wetlands; (e) The activity must be designed, constructed, and maintained so that it has no more than minimal adverse effects on water and sediment movement between the waterbody and the shore and the movement of aquatic organisms between the waterbody and the shore; and (f) The living shoreline must be properly maintained and monitored, which may require periodic repair of sills, bioengineered components, or replacing sand fills after severe storms or erosion events. Vegetation may be replanted to maintain the living shoreline.

Not authorized under GP 20 (IP required): (a) The activity is ≥1000 feet in length along the bank (≥2000 LF both banks) unless waived by the District Engineer; or (b) The activity is >30 feet channel ward of mean low water in tidal waters; or (c) Upland reclamation activities; or (d) Stream channelization or relocation activities; or (e) Breakwaters, groins, jetties, or artificial reefs; or (f) Permanent impacts >1,000 SF in existing saltmarsh; >100 SF in existing tidal vegetated shallows.

Self-Verification Eligible	**Pre-Construction Notification Required**
1. Tidal and non-tidal living shorelines ≤100 LF for each bank (≤200 LF for both banks). 2. Combined permanent and temporary impacts ≤5,000 SF in tidal waters, excluding existing salt marsh, tidal vegetated shallows, natural rocky habitat, and mudflats.	1. Tidal and non-tidal living shorelines >100 LF to <1000 LF (>200 LF to <2000 LF for both banks). 2. Permanent and temporary impacts in existing salt marsh, tidal vegetated shallows, or mudflats. 3. Work on USACE properties & USACE-controlled easements. 4. Use of stone sills, native oyster shell, native wood debris, or other structural materials.

Notes:

1. PCNs require monitoring for a minimum of 5 years in accordance with an approved restoration plan, unless otherwise determined by the USACE. The first year of monitoring will be the first year that the site has been through a full growing period after completion of construction and planting.
2. Applicants are encouraged to obtain a MEPA certificate prior to submitting a USACE permit application.

[1] A living shoreline has a footprint that is made up mostly of native material. It incorporates vegetation or other living, natural "soft" elements alone or in combination with some type of harder shoreline structure (e.g., oyster or mussel reefs or rock sills) for added protection and stability. Living shorelines should maintain the natural continuity of the land-water interface and retain or enhance shoreline ecological processes. Living shorelines must have a substantial biological component, either tidal or lacustrine fringe wetlands or oyster or mussel reef structures.

GP 21. AGRICULTURAL ACTIVITIES (Authority: §404)

Discharges of dredged or fill material in non-tidal waters for agricultural activities, including the construction of building pads for farm buildings. Authorized activities include: (a) installation, placement, or construction of drainage tiles, ditches, or levees; mechanized land clearing; land leveling; the relocation of existing serviceable drainage ditches; and similar activities; (b) construction of farm ponds, excluding perennial streams, provided the farm pond is used solely for agricultural purposes; and (c) discharges of dredged or fill material to relocate existing serviceable drainage ditches constructed in non-tidal streams.

Not authorized under GP 21 (IP required): (a) Permanent impacts that are >1 acre in non-tidal waters; or >1000 SF in riffle and pool complexes, or non-tidal vegetated shallows; (b) Work in tidal waters; or (c) Construction of farm ponds in perennial streams.

Self-Verification Eligible	**Pre-Construction Notification Required**
In non-tidal waters, the combined permanent and temporary impacts are (a) ≤5,000 SF, and (b) not located in riffle and pool complexes and non-tidal vegetated shallows.	1. In non-tidal waters, the combined permanent and temporary impacts are (a) >5,000 SF, or (b) located in riffle and pool complexes and non-tidal vegetated shallows. 2. Activities occur in non-tidal navigable waters of the U.S. 3. Stream channelization, relocation, impoundment, loss of streambed, or farm ponds in non-perennial streams occurs. 4. Activities that are not eligible for SV and do not require an IP.

Note: Some discharges for agricultural activities may qualify for an exemption under Section 404(f) of the CWA (see 33 CFR 323.4). This GP authorizes the construction of farm ponds that do not qualify for the CWA §404(f)(1)(C) exemption because of the recapture provision at §404(f)(2).

GP 22. RESHAPING EXISTING DRAINAGE DITCHES, CONSTRUCTION OF NEW DITCHES, AND MOSQUITO MANAGEMENT (Authorities: §10 and §404)

Discharges to modify the cross-sectional configuration of currently serviceable drainage ditches constructed in tidal and non-tidal waters, for the purpose of improving water quality by regrading the drainage ditch with gentler slopes, which can reduce erosion, increase growth of vegetation, and increase uptake of nutrients and other substances by vegetation. Also authorized are mosquito reduction activities.

Not authorized under GP 22 (IP required): Stream channelization, relocation, impoundments, or loss of streambed.

Self-Verification Eligible	**Pre-Construction Notification Required**
≤500 linear feet of drainage ditch will be reshaped provided excavated material is deposited in an upland area.	1. >500 linear feet of drainage ditch will be reshaped, excavated material is deposited in a water of the U.S., or the reshaping of the ditch increases the drainage capacity beyond the original as-built capacity or expands the area drained by the ditch as originally constructed (i.e., the capacity of the ditch is not the same as originally constructed or drains additional wetlands or other waters of the U.S.). 2. Permanent and temporary impacts in tidal vegetated shallows. 3. New ditches or relocation of drainage ditches constructed in waters of the U.S. (i.e., the location of the centerline of the reshaped drainage ditch is not approximately the same as the location of the centerline of the original drainage ditch). 4. Activities that are not eligible for SV and do not require an IP.

Note: Some ditch activities are exempt under Section 404(f) of the CWA (see 33 CFR 323.4).

GP 23. LINEAR TRANSPORTATION PROJECTS AND WETLAND/STREAM CROSSINGS (Authorities: §10 & §404)

Activities[1] required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., driveways, roads, highways, railways, trails, airport runways, and taxiways) and attendant features. This GP also authorizes temporary structures, fills, and work, including the use of temporary mats (see Note 1), necessary to construct the linear transportation project.

Not authorized under GP 23 (IP required): (a) Permanent impacts for any single and complete project that are >1 acre in non-tidal waters; >½ acre in tidal waters; >1000 SF in saltmarsh, mud flats, riffle and pool complexes, or non-tidal vegetated shallows; or >100 SF in tidal vegetated shallows; (b) Temporary impacts in tidal waters that are >1 acre; >5000 SF in saltmarsh, mud flats, or riffle and pool complexes; or >1000 SF in vegetated shallows; (c) Non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars (see GP 17); or (d) New tide gates.

Self-Verification Eligible

1. In non-tidal waters, the combined permanent and temporary impacts are a) ≤5,000 SF; b) not located in riffle and pool complexes and non-tidal vegetated shallows; and c) meet the Massachusetts River and Stream Crossing Standards

2. Existing crossings (e.g., culverts, elliptical or arch pipes, etc.) are not modified by (a) decreasing the diameter of the crossing or (b) changing the friction coefficient, such as through slip lining (retrofitting an existing culvert by inserting a smaller diameter pipe), culvert relining or invert lining.

3. Stream channelization or relocation resulting in loss of streambed that is <200 LF.

Pre-Construction Notification Required

1. In non-tidal waters, the combined permanent and temporary impacts are a) >5,000 SF; b) located in vegetated shallows or riffle and pool complexes; or c) do not meet the Massachusetts River and Stream Crossing Standards (see note 4).

2. The activity occurs in tidal waters, salt marsh, or in, over or under navigable waters of the U.S.

3. Stream and wetland crossings that require a PCN per GC 20 TOY Restrictions and GC 31 Stream Work and Crossings & Wetland Crossings.

4. Stream channelization or relocation resulting in loss of streambed that is ≥200 LF. Stream impoundment activities of any kind.

5. Work on USACE properties & USACE-controlled easements.

6. Activities that are not eligible for SV and do not require an IP.

Notes:

1. See GC 22 for information on temporary construction mats.
2. Discharges of dredged or fill material incidental to the construction of bridges across navigable waters of the U.S. may be authorized under GP 8.
3. Loss of streambed does not require a PCN when bridge piers or similar supports are used.
4. In their PCN application submission to the USACE, applicants must explain why they are unable to meet the Massachusetts River and Stream Crossing Standards.
5. For tidal crossings, modeling is encouraged as a method to verify the proposed crossing would not be undersized and resilient to the effects of sea level rise.

[1] Stream crossings must conform with the MA Stream Crossing Guidelines when practicable and comply with all applicable GCs of this document (Section IV).

GP 24. TEMPORARY CONSTRUCTION, ACCESS, AND DEWATERING (Authorities: §10 and §404)

Temporary structures, work, and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites that are not authorized under another GP activity.

Not authorized under GP 24 (IP required): (a) Permanent structures or impacts; (b) Temporary impacts in tidal waters that are >1 acre; >5000 SF in saltmarsh, mud flats, or riffle and pool complexes; or >1000 SF in vegetated shallows; (c) Use of cofferdams to dewater wetlands or other aquatic areas to change their use; (d) Temporary stream crossings (see GPs 6, 17, 23); (e) Structures or fill left in place after construction is completed.

Self-Verification Eligible	**Pre-Construction Notification Required**
1. In non-tidal waters, temporary impacts are a) ≤5,000 SF; b) not located in riffle and pool complexes and non-tidal vegetated shallows. 2. In tidal waters, temporary impacts are a) ≤5,000 SF, b) ≤1,000 SF in mudflats and/or natural rocky habitat, and c) not located in saltmarsh and tidal vegetated shallows. 3. Structures in navigable waters of the U.S. provided impacts do not require a PCN and they are left in place ≤30 days.	1. In non-tidal waters, temporary impacts are a) >5,000 SF; b) located in riffle and pool complexes or non-tidal vegetated shallows. 2. In tidal waters, temporary impacts are a) >5,000 SF; b) >1,000 SF in mudflats and/or natural rocky habitat, or (c) located in saltmarsh and tidal vegetated shallows. 3. Activities in the Connecticut River from the Turners Falls Dam to the MA/CT border, or Merrimack River from the Essex Dam to the mouth, involving temporary impacts unless they are performed <5 feet waterward from OHW or HTL and in the dry. This is to protect endangered species; or 4. Activities not eligible for SV and do not require an IP.

Notes:

1. Turbidity or sediment resuspension is generally not considered to occur when properly using management techniques to work in dry conditions. See GC 25.
2. Total impact areas under SV Eligible 1-2 exclude use of temporary construction mats. See GC 22 for information on temporary construction mats.
3. An SVN submittal to USACE is not required for SV #3 above.

GP 25. EMERGENCY SITUATIONS (Authorities: §10 and §404)

Structures or work in or affecting navigable waters of the U.S. and the discharge of dredged or fill material into waters of the U.S., including wetlands, necessary for repair or protection measures associated with an emergency situation[1], MassDEP Emergency Declaration/Certification, or FEMA Declared Disaster. The activity shall be the minimum necessary to alleviate the immediate emergency unless that additional work would result in no more than minimal effects to aquatic environment and is necessary to reduce the potential for future failure or loss of the structure or site. Typical activities authorized under this GP include, but are not limited to, restoration of damaged areas; bank stabilization; temporary fills for staging, access, and dewatering; and, repair, replacement, or rehabilitation of existing structures and/or fills (i.e., roads, bridges, utility pipelines and flood control structures, including attendant features, and other existing structures located in waters of the U.S.).

For the restoration of areas damaged by storms floods, or other discrete events: (a) The restored area must not extend waterward of the ordinary high-water mark or high tide line that existed prior to the damage. (b) The slope of the restored area below the ordinary high-water mark or high tide line must not exceed the slope that existed prior to the damage. (c) The bottom elevation of the restored area must not exceed the bottom elevation that existed prior to the damage (i.e., the restored area must not result in a reduction in the depth of the waterbody that existed prior to the damage). (d) Except in cases of FEMA reimbursement, the activity must be initiated, under contract to commence, or funds shall be allocated for the activity within 30 days of authorization under GP 25.

Not authorized under GP 25 (IP required): (a) Permanent impacts for a single and complete project >1/2 acre in tidal waters, unless the district engineer waives this criterion by making a written determination concluding that the activity will result in no more than minimal adverse environmental effects; >1,000 SF in saltmarsh, mud flats, riffle and pool complexes, or non-tidal vegetated shallows; or >100 SF in tidal vegetated shallows; (b) Temporary impacts in tidal waters that are >5,000 SF in saltmarsh, mud flats, or riffle and pool complexes; or >1,000 SF in vegetated shallows; (c) New structures or fills that did not previously exist before the storm event or other discrete event (see other GPs).

Self-Verification Eligible	**Pre-Construction Notification Required**
1. Activities that qualify under a Severe Weather Emergency Declaration pursuant to 310 CMR 10.06(8) and/or receive an Emergency Certification pursuant to 310 CMR 10.06 and/or meet the requirements of 314 CMR 9.12(2) or (3); and 2. Activities eligible under a FEMA Declared Disaster that also comply with #1 above.	1. Activities that are eligible under a FEMA Declared Disaster and do not qualify under SV #1. 2. Minor deviations in the structure or fill area, including those to existing structures or fills are authorized due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to alleviate the emergency. 3. Activities that are not eligible for SV and do not require an IP.

Notes:

1. Review the GCs (Section IV) to confirm if a PCN is not required elsewhere in this document.
2. If the activity is not a MassDEP Emergency Declaration/Certification, does not meet the requirements of 314 CMR 9.12(2) or (3), or is not a FEMA Declared Disaster, applicants must explain in writing why their activity qualifies as an emergency (see footnote) to be eligible under GP 25.
3. SV eligible activities qualify under the general 401 WQC MassDEP issued for the 2023 MA GPs (GC 9).

[1] An emergency, as determined by this office and 33 CFR 325.2(e)(4), is one which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a Department of the Army permit is not undertaken within a time period less than the normal time to process the request under standard processing procedures.

SECTION IV. GENERAL CONDITIONS:

To qualify for GP authorization, the applicant must comply with the following general conditions, as applicable, in addition to authorization-specific conditions imposed by the division or district engineer.

1. Other Permits
2. Federal Jurisdictional Boundaries
3. Single and Complete Projects
4. Use of Multiple General Permits
5. Suitable Material
6. Tribal Rights & Burial Sites
7. Avoidance, Minimization, and Compensatory Mitigation
8. Water Quality & Stormwater Management
9. Coastal Zone Management
10. Federal Threatened and Endangered Species
11. Essential Fish Habitat
12. National Lands
13. Wild and Scenic Rivers
14. Historic Properties
15. USACE Property and Federal Projects (§408)
16. Navigation
17. Permit/Authorization Letter On-Site
18. Storage of Seasonal Structures
19. Pile Driving and Pile Removal in Navigable Waters
20. Time of Year Restrictions
21. Heavy Equipment in Wetlands
22. Temporary Fill & Construction Mats
23. Restoration of Wetland Areas
24. Bank Stabilization
25. Soil Erosion and Sediment Controls
26. Aquatic Life Movements and Management of Water Flows
27. Spawning, Breeding, and Migratory Areas
28. Vernal Pools
29. Invasive Species
30. Fills Within 100-Year Floodplains
31. Stream Work and Crossings & Wetland Crossings
32. Utility Line Installation and Removal
33. Water Supply Intakes
34. Coral Reefs
35. Blasting
36. Inspections
37. Maintenance
38. Property Rights
39. Transfer of GP Verifications
40. Modification, Suspension, and Revocation
41. Special Conditions
42. False or Incomplete Information
43. Abandonment
44. Enforcement Cases
45. Previously Authorized Activities
46. Duration of Authorization

1. Other Permits. Authorization under these GPs does not obviate the need for the permittee to obtain other Federal, State, or local permits, approvals, or authorizations required by law. Permittees are responsible for obtaining all required permits, approvals, or authorizations. Activities that are not regulated by the State, but subject to USACE jurisdiction, may still be eligible for these GPs.

2. Federal Jurisdictional Boundaries.
a. Applicability of these GPs shall be evaluated with reference to Federal jurisdictional boundaries. Activities shall be evaluated with reference to "waters of the U.S." under the CWA (33 CFR 328) and "navigable waters of the U.S." under §10 of the Rivers and Harbors Act of 1899 (33 CFR 329). Permittees are responsible for ensuring that the boundaries used satisfy the Federal criteria defined at 33 CFR 328-329. These sections prescribe the policy, practice, and procedures to be used in determining the extent of the USACE jurisdiction. Note: Waters of the U.S. includes all waters pursuant to 33 CFR 328.3(a), and adjacent wetlands as the term is defined in 33 CFR 328.3(c).
b. Wetlands shall be delineated in accordance with the USACE Wetlands Delineation Manual and the most recent Northcentral/Northeast Regional Supplement. Wetland delineation and jurisdiction information is located at: www.nae.usace.army.mil/missions/regulatory/jurisdiction-and-wetlands and maps are located at www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit.
c. Vegetated shallows shall be delineated when present on the project site. Vegetated shallow survey guidance and maps are located at: www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit.
d. Natural rocky habitats shall be delineated when present on the project site. The definition of natural rocky habitats is in Section VII of the MA GP. Natural rocky habitat survey guidance and maps are located at: www.nae.usace.army.mil/ missions/regulatory/state-general-permits/massachusetts-general-permit.

3. Single and Complete Projects. The MA GP shall not be used for piecemeal work and shall be applied to single and complete projects. The term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers.
a. For non-linear projects, a single and complete project must have independent utility. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed, even if the other phases were not built, can be considered as separate single and complete projects with independent utility.
b. Unless USACE determines the activity has independent utility, all components of a single project and/or all planned phases of a multi-phased project (e.g., subdivisions should include all work such as roads, utilities, and lot development) shall be evaluated as one single and complete project.
c. For linear projects such as power lines or pipelines with multiple crossings, a "single and complete project" is all crossings of a single water of the U.S. (i.e., single waterbody) at a specific location. For linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately. If any crossing requires a PCN review or an individual permit review, then the entire linear project shall be reviewed as one project under PCN or the individual permit procedures.

4. Use of Multiple General Permits. The use of more than one GP for a single and complete project is prohibited, except when the acreage loss of waters of the U.S. authorized by the GPs does not exceed the acreage limit of the GPs with the highest specified acreage limit. For example, if a road crossing over waters is constructed under GP 23, with an associated utility line

crossing authorized by GP 6, if the maximum acreage loss of waters of the U.S. for the total project is ≥1 acre it shall be evaluated as an IP.

5. Suitable Material & Discharge of Pollutants. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). All activities involving any discharge into waters of the U.S. authorized under these GPs shall be consistent with applicable water quality standards, effluent limitations, standards of performance, prohibitions, and pretreatment standards and management practices established pursuant to the CWA (33 U.S.C. 1251), and applicable state and local laws. If applicable water quality standards, limitations, etc., are revised or modified during the term of this GP, the authorized work shall be modified to conform with these standards within six months from the effective date of such revision or modification, or within a longer period of time deemed reasonable by the District Engineer in consultation with the Regional Administrator of the EPA. Unless monitoring data indicates otherwise, applicants may presume that their activity complies with state water quality standards provided they are in compliance with the Section 401 WQC (Applicable only to the Section 404 activity).

6. Tribal Rights & Burial Sites

a. For all SV and PCN applications, prospective permittees shall follow the guidance set forth in Appendix A, Guidance for NHPA Section 106 Compliance in Massachusetts.

b. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

c. Many tribal resources are not listed on the National Register of Historic Places (NRHP) and may require identification and evaluation in collaboration with the identifying tribe and by qualified professionals. The Tribal Historic Preservation Officer (THPO) and State Historic Preservation Officer (SHPO) may be able to assist with locating information on:

i. Previously identified tribal resources; and
ii. Areas with potential for the presence of tribal resources.

d. Discovery of Previously Unknown Remains and Artifacts: If any previously unidentified human remains, cultural deposits, or artifacts are discovered while accomplishing the activity authorized by this permit, you must immediately notify the USACE of what you have found, and to the maximum extent practicable, cease work and avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The USACE will initiate the appropriate the Federal, Tribal, and state coordination required to determine if the items or remains are eligible for listing in the NRHP and warrant a recovery effort or can be avoided.

e. Burial Sites: Burial sites, marked or unmarked, are subject to state law (Massachusetts Unmarked Burial Law). Native American burial sites on federal or tribal land are subject to the provisions of Native American Graves Protection and Repatriation Act (NAGPRA). Regulated activities may not result in disturbance or removal of human remains until disposition of the remains has been determined by the appropriate authority under these laws, and the work is authorized by the USACE. Regulated activities which result in an inadvertent discovery of human remains must stop immediately, and the USACE, as well as the appropriate state and tribal authority, must be notified. Regulated work at inadvertent discovery sites requires compliance with state law or NAGPRA, as appropriate, prior to re-starting work.

7. Avoidance, Minimization, and Compensatory Mitigation. To qualify under the MA GP, activities must comply with Section V Mitigation Standards and the following as applicable:

a. Avoid and Minimize: Activities must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the U.S. to the maximum extent practicable at the project site. Avoidance and minimization are required to the extent necessary to ensure that the adverse effects to the aquatic environment (both area and function) are no more than minimal.

b. Compensatory mitigation for unavoidable impacts to waters of the U.S., including direct, indirect, secondary, and temporal loss, will generally be required for permanent impacts that exceed the thresholds identified in Section V, and may be required for temporary impacts, to offset unavoidable impacts which remain after all appropriate and practicable avoidance and minimization has been achieved and to ensure that the adverse effects to the aquatic environment are no more than minimal. Proactive restoration projects or temporary impact work with no secondary effects may generally be excluded from this requirement.
c. Mitigation proposals shall follow the guidelines found in the Compensatory Mitigation for Losses of Aquatic Resources; Final Rule April 10, 2008; 33 CFR 332. Prospective permittees may purchase mitigation credits in-lieu of permittee-responsible mitigation as compensation for unavoidable impacts to waters of the U.S. in the Commonwealth of Massachusetts.

8. Water Quality & Stormwater Management. The 401 WQC requirement applies to all activities listed under GPs 1-25, unless determined otherwise by MassDEP. Permittees shall also satisfy stormwater management requirements in Massachusetts.

a. General 401 WQC: MassDEP issued a WQC on April 21, 2023 which conditionally certifies all activities in GPs 1 – 24 eligible for SV and PCN so long as the activity is described in 314 CMR 9.03, and is not an activity described in 314 CMR 9.04, and so long as the activity meets all other requirements, terms and conditions of the WQC. The MassDEP WQC also conditionally certifies activities described in GP 25 so long as the activity meets all other conditions of the WQC. Emergency projects described in GP 25 must obtain an emergency certification or otherwise be authorized pursuant to 310 CMR 10.06, qualify under a Severe Weather Emergency Declaration pursuant to 310 CMR 10.06(8) issued by the MassDEP, or meet the requirements of 9.12(2) or (3) in order to be certified under the WQC. Prospective permittees may refer to the following link to determine if their activity is eligible: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/ Massachusetts-General-Permit/. The General 401 WQC is located here, and it provides detailed information regarding what activities are certified and the conditions for certification. Activities listed in 314 CMR 9.03 that are not exempt from the Wetland Protection Act must have a valid Final Order of Conditions (OOC) or Final Restoration Order of Conditions pursuant to 310 CMR 10.00 to be eligible under the General 401 WQC.
b. Individual 401 WQC: Prospective permittees shall contact MassDEP and apply for an individual 401 WQC if their activity does not qualify for a General 401 WQC as outlined above. MassDEP may issue, waive, or deny the individual 401 WQC on a case-by-case basis. All activities listed in 314 CMR 9.04 must obtain an individual 401 WQC from MassDEP to be eligible under these GPs. When an Individual 401 WQC is required for *PCN activities*, the prospective permittee shall submit their Individual 401 WQC application concurrently to MassDEP and USACE to comply with 40 CFR 121.
c. The prospective permittee is responsible for determining the appropriate 401 WQC requirement and submitting this information to the USACE at the time of their PCN application or when completing their SVN. Prospective permittees that are unsure of whether their activity has been certified should contact MassDEP for a determination.
d. As applicable, all activities shall be compliant with the Massachusetts Stormwater Handbook. The Stormwater Handbook can be accessed on the NAE Regulatory website here: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/.
e. No work requiring authorization under Section 404 of the CWA may be performed unless (1) the prospective permittee qualifies for coverage under the April 21, 2023 General 401 WQC, (2) the prospective permittee receives an individual Section 401 WQC from the MassDEP, or (3) the MassDEP waives individual Section 401 WQC.

9. Coastal Zone Management. The permittee must obtain CZM consistency concurrence when an activity is located in the coastal zone in order to be eligible under the MA GP. This requirement

shall be satisfied by acquiring one of the following from the Massachusetts Office of Coastal Zone Management (MA CZM):

a. General CZM Federal Consistency Concurrence (General Concurrence): MA CZM has granted General Concurrence for all SV and PCN activities for GPs 1-25. The prospective permittee must obtain all applicable permits and approvals before construction of the authorized activity begins (e.g., before work begins on site). For SVs, General Concurrence is automatically granted and no further action is required from the prospective permittee. For PCNs, the USACE will coordinate with MA CZM to acquire General Concurrence as part of the PCN application review.
b. Individual CZM Federal Consistency Concurrence (Individual Concurrence): In certain cases, MA CZM may elevate any GP activity 1-25 and require Individual Concurrence. The prospective permittee must contact MA CZM and follow the procedures to obtain Individual Concurrence as determined appropriate by MA CZM.
c. Permittees must obtain CZM consistency concurrence as outlined above before commencing work authorized under these GPs.

10. Federal Threatened and Endangered Species

a. No activity is authorized under any GP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify designated critical habitat or critical habitat proposed for such designation. No activity is authorized under any GP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the consequences of the proposed activity on listed species or critical habitat has been completed. See 50 CFR 402.02 for the definition of "effects of the action" for the purposes of ESA section 7 consultation, as well as 50 CFR 402.17, which provides further explanation under ESA section 7 regarding "activities that are reasonably certain to occur" and "consequences caused by the proposed action."
b. Other Federal agencies should follow their own procedures for complying with the requirements of the ESA (see 33 CFR 330.4(f)(1)). If a PCN is required for the proposed activity, the Federal permittee must provide USACE with the appropriate documentation to demonstrate compliance with those requirements. The USACE will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.
c. USFWS ESA-Listed Species: Non-federal applicants shall use the USFWS website, Information for Planning and Consultation (IPAC), to determine if their activity is located within the ESA-listed species range. The IPAC website can be accessed on the NAE Regulatory website: https://www. nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/. Applicants shall ensure they have an updated, valid species list before construction begins. This may require applicants to update their species list in IPAC before the start of construction. Note: Applicants should refer to the NAE Regulatory Website at the link above to determine if they have been designated as a non-federal representative. Applicants shall complete Section 7 consultation according to the guidance document located on the NAE Regulatory Website. After completing the Rangewide Determination Key and reaching the outcome "may affect, not likely to adversely affect", you may be required to wait up to 15 days before that outcome is final and compliance under Section 7 of the ESA is fulfilled.

i. *Self-Verification Criteria*: The activity is SV-eligible if:
   1) The activity is not located within the ESA-listed species range;
   2) Another (lead) Federal agency has completed Section 7 consultation; or
   3) The activity is located within the ESA-listed species range ***and*** USACE has designated the applicant as a non-federal representative under 50 CFR 402.08 of the ESA for all

species within the project's action area. As the non-federal representative, the applicant shall complete consultation through IPAC and reach the outcome of "no effect" or "not likely to adversely affect".

ii. *Pre-Construction Notification Criteria*: The activity requires a PCN if:

1) The activity is located within the ESA-listed species range ***and*** USACE has NOT designated the applicant as a non-federal representative under 50 CFR 402.08 of the ESA for all species within the project's action area;

2) The activity is located in designated or proposed critical habitat; or

3) The activity is located within the ESA-listed species range and completion of the IPAC determination key has resulted in the outcome of "may affect" or "may affect, likely to adversely affect"; or

4) A PCN is required elsewhere in this document.

d. NOAA-Listed Species: Non-federal applicants shall refer to the Section 7 Mapper for federally listed species to determine if any species are mapped as present. When NOAA-listed species are present, the applicant shall generate a species report through the mapper and submit this document as part of their PCN or SVN submission. The NOAA Fisheries' Section 7 Mapper can be accessed here on the NAE Regulatory website here: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/.

e. Authorization of an activity by an GP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

11. Essential Fish Habitat (EFH).

a. SV eligible activities have been determined to result in no more than minimal adverse effects, provided the permittee complies with all terms and conditions of the MA GP as appliable to the activity. NMFS has granted General Concurrence [50 CFR 600.920(g)] for all SV eligible activities. These activities do not require project specific EFH consultation.

b. For PCN required activities, the applicant is required to describe and identify potential adverse effects to EFH and should refer to NOAA Fisheries' EFH Mapper (http://www.fisheries.noaa.gov/resource/map/essential-fish-habitat-mapper) and Omnibus Essential Fish Habitat Amendment 2 Volume 2: EFH and HAPC Designation Alternatives and Environmental Impacts (https://www.habitat.noaa.gov/application/efhmapper/oa2_efh_hapc.pdf). If an activity is located within EFH, the PCN application must contain:

1. A description of the action located in EFH.
2. An analysis of the potential adverse effects of the action on EFH and the managed Species.
3. Conclusions regarding the effects of the action on EFH.
4. Proposed mitigation, if applicable (refer to the mitigation thresholds located in Section V).

c. Federal agencies shall follow their own procedures for complying with the EFH requirements of the Magnuson-Stevens Fishery Conservation and Management Act. For activities requiring a PCN, the applicant is responsible for furnishing documentation that demonstrates consultation for EFH has been completed.

d. For PCN activities, no work may commence until EFH consultation as required by the Magnuson-Stevens Act has been completed.

12. National Lands. Activities that impinge upon the value of any National Wildlife Refuge, National Forest, National Marine Sanctuary, National Historic Landmarks or any other area administered by the National Park Service, U. S. Fish and Wildlife Service (USFWS) or U.S. Forest Service (USFS) require a PCN or Individual Permit. Federal land managers seeking authorization for activities located in the above listed National Lands may proceed under SV, unless a PCN is required elsewhere in this document.

13. Wild and Scenic Rivers. The following activities in designated river or study river segments in the National Wild and Scenic River (WSR) System require a PCN unless the Federal agency with direct management responsibility for such river, in Massachusetts this is generally the National Park Service, has determined in writing to the proponent that the proposed work will not adversely affect the WSR designation or study status:

a. Activities that occur in WSR segments, in and 0.25 miles up or downstream of WSR segments, or in tributaries within 0.25 miles of WSR segments;
b. Activities that occur in wetlands within 0.25 miles of WSR segments;
c. Activities that have the potential to alter free-flowing characteristics in WSR segments.

No GP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

As of May 10, 2023, affected rivers in Massachusetts include: the Taunton River (40 miles), Sudbury River (16.6 miles), Assabet River (4.4 miles), Concord River (8 miles), Nashua River (27 miles), Squannacook River (16.3 miles), Nissitissit River (4.7 miles), and the Westfield River, including West Branch, Middle Branch, Gendale Brook, East Branch, Drowned Land Brook, Center Brook, Windsor Jambs Brook, Shaker Mill Brook, Depot Brook, Savery Brook, Watson Brook, Center Pond Brook (78.1 miles). The most up to date list of designated and study rivers and their descriptions may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

14. Historic Properties

a. For all SV and PCN applications, permittees shall follow the guidance set forth in Appendix A, Guidance for NHPA Section 106 Compliance in Massachusetts.

b. No undertaking authorized by these GPs shall cause effects[1] (defined in 36 CFR Part 800 and 33 CFR Part 325, Appendix C, and its Interim Guidance) on properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places (NRHP)[2], including previously unknown historic properties within the permit area, unless the USACE or another Federal action agency has satisfied the consultation requirements of Section 106 of the National Historic Preservation Act (Section 106). If another Federal agency is determined the lead federal agency for compliance with Section 106, applicant must obtain the appropriate documentation and provide this information to the USACE to demonstrate compliance with Section 106. The applicant shall not begin the activity until the USACE notifies them in writing that the documentation provided satisfies Section 106 requirements.

[1] Effect means the alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register of Historic Properties.
[2] See the NAE Regulatory website, National Register of Historic Places link here: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/.

c. Many historic properties are not listed on the NRHP and may require identification and evaluation by qualified historic preservation and/or archaeological consultants. The State Historic Preservation Officer (SHPO), Massachusetts Board of Underwater Archaeological Resources (BUAR), local historical societies, certified local governments, general public, and NRHP may also be able to assist with locating information on:

i. Previously identified historic properties; and
ii. Areas with potential for the presence of historic properties.

d. Discovery of Previously Unknown Remains and Artifacts: If any previously unidentified human remains, cultural deposits, or artifacts are discovered while accomplishing the activity authorized by this permit, you must immediately notify the USACE of what you have found, and to the maximum extent practicable, cease work and avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The USACE will initiate the Federal, State and tribal coordination required to determine if the items or remains warrant a recovery effort and/or if the site is eligible for listing in the National Register of Historic Places.

e. Section 110k: Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. § 306113) prevents the USACE from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106, has intentionally significantly adversely effected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the USACE, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the USACE is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties effected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or effects historic properties on tribal lands or effects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

f. Underwater Archaeological Resources: Under Massachusetts General Law Ch. 6, s.'s 179-180, and Ch. 91, s. 63, the BUAR has statutory jurisdiction within state waters and is the sole trustee of the Commonwealth's underwater heritage, charged with the responsibility of encouraging the discovery and reporting, as well as the preservation and protection, of underwater archaeological resources. Underwater archaeological resources located within the waters of the Commonwealth of Massachusetts are property of the Commonwealth, which holds title to these resources and retains regulatory authority over their use. Under Massachusetts General Law, no person, organization or corporation may "remove, displace, damage, or destroy" any underwater archaeological resources located within the Commonwealth's submerged lands except through consultation with the BUAR and in conformity with the permits it issues. https://www.mass.gov/orgs/board-of-underwater-archaeological-resources.

15. USACE Property and Federal Projects. (33 USC §408)

a. USACE projects and property can be found at: https://www.nae.usace.army.mil/Missions/Civil-Works/.

b. In addition to any authorization under these GPs, prospective permittee shall contact the USACE Real Estate Division (https://www.nae.usace.army.mil/Missions/Real-Estate-Division/) at (978) 318-8585 for work occurring on or potentially affecting USACE properties and/or USACE-controlled easements. Work may not commence on USACE properties and/or USACE-controlled easements until they have received any required USACE real estate documents evidencing site-specific permission to work.

c. Any proposed temporary or permanent occupation or alteration of a Federal project (including, but not limited to, a levee, dike, floodwall, channel, anchorage, breakwater, seawall, bulkhead, jetty, wharf, pier, or other work built or maintained but not necessarily owned by the United States),

is not eligible for SV and requires a PCN. This includes all proposed structures and work in, over, or under a USACE federal navigation project (FNP) or in the FNP's buffer zone. The buffer zone is an area that extends from the horizontal limits of the FNP to a distance of three times the FNP's authorized depth. The activity also requires review and approval by the USACE pursuant to 33 USC 408 (Section 408 Permission). The prospective permittee may reach out to the POCs located here: https://www.nae.usace.army.mil/ Missions/Section-408/.
d. Any structure or work constructed in a FNP or its buffer zone shall be subject to removal at the owner's expense prior to any future USACE dredging or the performance of periodic hydrographic surveys.
e. Where a Section 408 permission is required, written verification for the PCN will not be issued prior to the decision on the Section 408 permission request.

16. Navigation
a. No activity may cause more than a minimal adverse effect on navigation.
b. Any safety lights and signals prescribed by the U.S. Coast Guard, must be installed, and maintained at the permittee's expense on authorized facilities in navigable waters of the U.S.
c. There shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein, and no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized herein.
d. The permittee understands and agrees that if future U.S. operations require the removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from USACE, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

17. Permit/Authorization Letter On-Site. For PCNs, the permittee shall ensure that a copy of these GPs and the accompanying authorization letter are at the work site (and the project office) whenever work is being performed, and that all personnel with operational control of the site ensure that all appropriate personnel performing work are fully aware of its terms and conditions. The entire permit authorization shall be made a part of any and all contracts and sub-contracts for work that affects areas of USACE jurisdiction at the site of the work authorized by these GPs. This shall be achieved by including the entire permit authorization in the specifications for work. The term "entire permit authorization" means these GPs, including GCs and the authorization letter (including its drawings, plans, appendices, special conditions, and other attachments), and any permit modifications. If the authorization letter is issued after the construction specifications, but before receipt of bids or quotes, the entire permit authorization shall be included as an addendum to the specifications. If the authorization letter is issued after receipt of bids or quotes, the entire permit authorization shall be included in the contract or sub-contract as a change order. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions contained within the entire authorization letter, and no contract or sub-contract shall require or allow unauthorized work in areas of USACE jurisdiction. For SVs, the permittee shall ensure that a complete and signed copy of the SVN is present on site during construction and is made available for review at any time by USACE and other Federal, State, & Local regulatory agencies. A complete and signed copy of the SVN must be submitted to USACE Regulatory within 30 days of initiating construction of the authorized activity, unless stated otherwise in the applicable GP.

18. Storage of Seasonal Structures. Coastal structures such as pier sections, floats, etc., that

are removed from the waterway for a portion of the year (often referred to as seasonal structures) shall be stored in an upland location, located above MHW and not in tidal wetlands. These seasonal structures may be stored on the fixed, pile-supported portion of the structure that is seaward of MHW. This is intended to prevent structures from being stored on the marsh substrate and the substrate seaward of MHW.

19. Pile Driving and Pile Removal in Navigable Waters.
a. Derelict, degraded or abandoned piles and sheet piles in navigable waters of the U.S., except for those inside existing work footprints for piers, must be completely removed, cut and/or driven to 3 feet below the substrate to prevent interference with navigation, and existing creosote piles that are affected by project activities shall be completely removed if practicable. In areas of fine-grained substrates, piles must be removed by the direct, vibratory or clamshell pull method[1] to minimize sedimentation and turbidity impacts and prevent interference with navigation from cut piles. Removed piles shall be disposed of in an upland location landward of MHW or OHW and not in wetlands, tidal wetlands or mudflats.
b. A PCN is required for the installation or removal of structures with jetting techniques.
c. A PCN is required for the installation of >12 inch-diameter piles of any material type or steel piles of any size in tidal waters, unless they are installed in the dry. If piles are not installed in the dry:
i. Impact pile driving shall commence with an initial set of three strikes by the hammer at 40% energy, followed by a one-minute wait period, then two subsequent 3-strike sets at 40% energy, with one minute waiting periods, before initiating continuous impact driving.
ii. Vibratory pile driving shall be initiated for 15 seconds at reduced energy followed by a one-minute waiting period. This sequence of 15 seconds of reduced energy driving, one-minute waiting period shall be repeated two more times, followed immediately by pile-driving at full rate and energy.
iii. In addition to using a soft start at the beginning of the workday for pile driving as described in 19c(i-ii), a soft start must also be used at any time following a cessation of pile driving for a period of 30 minutes or longer.
d. Bubble curtains may be used to reduce sound pressure levels during vibratory or impact hammer pile driving.

20. Time-of-Year (TOY) Restrictions. Activities that include in-water work must comply with the TOY Restrictions below to be SV eligible, otherwise a PCN is required. PCN submittals shall contain written justification for deviation from the TOY Restrictions. The term “in-water work” does not include conditions where the work site is “in-the-dry” (e.g., intertidal areas exposed at low tide). The term “in-the-dry” includes work contained within a cofferdam so long as the cofferdam is installed and subsequently removed outside the TOY Restriction. The TOY restrictions stated in Appendix B of the MA DMF Technical Report TR-47[2] can apply instead for activities in tidal waters if (1) TOYs are provided for a specific waterbody where the activity is proposed and (2) the TOYs are less restrictive than below. The activity must also not require a PCN elsewhere in this document to be SV eligible.

[1] Direct Pull: Each piling is wrapped with a choker cable or chain that is attached at the top to a crane. The crane then pulls the piling directly upward, removing the piling from the sediment. Vibratory Pull: The vibratory hammer is a large mechanical device (5-16 tons) that is suspended from a crane by a cable. The vibrating hammer loosens the piling while the crane pulls up. Clamshell Pull: This can remove intact, broken or damaged pilings. The clamshell bucket is a hinged steel apparatus that operates like a set of steel jaws. The bucket is lowered from a crane and the jaws grasp the piling stub as the crane pulls up. The size of the clamshell bucket is minimized to reduce turbidity during piling removal.
[2] The MA DMF Technical Report TR-47: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/

	TOY Restriction (No work)
Non-tidal Waters	Defer to TR-47
Tidal Waters	January 15 – November 15

Alternate work windows proposed under a PCN will generally be coordinated with the USFWS and NMFS. Resulting written verifications may include species-specific work allowed windows.

21. Heavy Equipment in Wetlands. Operating heavy equipment (drill rigs, fixed cranes, etc.) within wetlands shall be minimized, and such equipment shall not be stored, maintained, or repaired in wetlands, to the maximum extent practicable. Where construction requires heavy equipment operation in wetlands, the equipment shall:

i. Have low ground pressure (typically ≤3 psi);

ii. Be placed on swamp/construction/timber mats (herein referred to as "construction mats" or "mats") that are adequate to support the equipment in such a way as to minimize disturbance of wetland soil and vegetation. See GC 22 for information on the placement of construction mats; or

iii. Be operated on adequately dry or frozen wetlands such that shear pressure does not cause subsidence of the wetlands immediately beneath the equipment and upheaval of adjacent wetlands. Construction mats are to be placed in the wetland from the upland or from equipment positioned on mats if working within a wetland. Dragging construction mats into position is prohibited. Other support structures that are capable of safely supporting equipment may be used with written USACE authorization.

22. Temporary Fill, Work & Construction Mats.

a. *Construction mats in non-tidal waters*: Temporary construction mats shall be in place ≤1 year *and* for one growing season or less to be SV eligible. A PCN is required if construction mats are in place >1 year *or* for more than one growing season. Construction mats can be placed in an area of any size in non-tidal waters. The activity may occur in segments to ensure the requirements for SV above are met, otherwise a PCN is required.

b. *Construction mats in tidal waters*: Temporary construction mats placed in an area <5,000 SF in tidal waters are SV eligible, provided those mats are in place ≤6 months. Temporary construction mats placed in an area ≥5,000 SF or in place >6 months in tidal waters require a PCN.

c. *Management of construction mats:* At a minimum, construction mats shall be managed in accordance with the following construction mat best management practices (BMPs):

1. Mats shall be in good condition to ensure proper installation, use, and removal.
2. As feasible, mats shall be placed in a location that will minimize the amount of mats needed for the wetland crossing(s).
3. Inspect mats prior to their re-use and remove any plant debris. Mats are to be thoroughly cleaned before re-use to prevent the spread of invasive plant species.
4. Impacts to wetland areas shall be minimized during installation, use, and removal of the mats.
5. Adequate erosion & sediment controls shall be installed at approaches to mats to promote a smooth transition to, and minimize sediment tracking onto, the mats.
6. In most cases, mats should be placed along the travel area so that the individual boards are resting perpendicular to the direction of traffic. No gaps should exist between mats. Place mats far enough on either side of the resource area to rest on firm ground.

d. A PCN is required for temporary fills in place >2 years. All temporary fills and disturbed soils shall be stabilized to prevent the material from eroding into waters of the U.S. where it is not authorized. Work shall include phased or staged development to ensure only areas under active development are exposed and to allow for stabilization practices as soon as practicable. Temporary fill must be placed in a manner that will prevent it from being eroded by expected high flows.

e. Activities that require unconfined temporary fill and are authorized for discharge into waters of the U.S. shall consist of material that minimizes effects to water quality.
f. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable when temporary structures, work, and discharges of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Materials shall be placed in a location and manner that does not adversely impact surface or subsurface water flow into or out of the wetland. Temporary fill authorized for discharge into wetlands shall be placed on geotextile fabric or other appropriate material laid on the pre-construction wetland grade where practicable to minimize impacts and to facilitate restoration to the original grade. Construction mats are excluded from this requirement.
g. Construction debris and deteriorated materials shall not be located in waters of the U.S.
h. Temporary fills, construction mats, and corduroy roads shall be entirely removed as soon as they are no longer needed to construct the authorized activity and the disturbed areas be restored to pre-construction contours and conditions.
i. Construction equipment, such as temporary barges in tidal waters, shall provide clearance above the substrate to avoid grounding onto the substrate during all tides.

23. Restoration of Wetland Areas.
a. Upon completion of construction, all disturbed wetland areas shall be stabilized with a wetland seed mix or plant plugs containing only plant species native to New England, and be appropriate for site conditions, including salinity and frequency of inundation, and shall not contain any species listed in the “Invasive and Other Unacceptable Plant Species” Appendix K of the New England District “Compensatory Mitigation Standard Operating Procedures” found at https://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx.
b. The introduction or spread of invasive plant species in disturbed areas shall be prevented and controlled. Equipment shall be thoroughly cleaned before and after project construction to prevent the spread of invasive species. This includes, but is not limited to, tire treads and construction mats.
c. In areas of authorized temporary disturbance, if trees are cut in USACE jurisdiction, they shall be cut at or above ground level and not uprooted in order to prevent disruption of any kind to the wetland soil structure and to allow stump sprouts to revegetate the work area, unless otherwise authorized.
d. Wetland areas where permanent disturbance is not authorized shall be restored to their original condition and elevation, which under no circumstances shall be higher than the pre-construction elevation. Original condition means careful protection and/or removal of existing soil and vegetation, and replacement back to the original location such that the original soil layering and vegetation schemes are approximately the same, unless otherwise authorized.

24. Bank Stabilization.
a. Projects involving construction or reconstruction/maintenance of bank stabilization within USACE jurisdiction shall be designed to minimize environmental effects, effects to neighboring properties, scour, conversion of natural shoreline to hard armoring, etc. to the maximum extent practicable.
b. Projects involving the construction of new bank stabilization within USACE jurisdiction shall use bioengineering techniques and natural materials in the project design to the maximum extent practicable. Use of hard structures shall be eliminated or minimized unless the prospective permittee can demonstrate that use of bioengineering techniques is not practicable due to site conditions.
c. Where possible, bank stabilization projects shall optimize the natural function of the shoreline, including self-sustaining stability to attenuate flood flows, fishery, wildlife habitat and water quality protection, while protecting upland infrastructure from storm events that can cause erosion as well as impacts to public and private property.
d. No material shall be placed in excess of the minimum needed for erosion protection.
e. No material shall be placed in a manner that will be eroded by normal or expected high flows (properly anchored native trees and treetops may be used in low energy areas).

f. Native plants appropriate for current site conditions, including salinity, must be used for bioengineering or vegetative bank stabilization.
g. The activity must be properly maintained, which may require repairing it after severe storms or erosion events.

25. Soil Erosion and Sediment Controls.
a. Appropriate soil erosion and sediment controls[1] (hereinafter referred to as "controls") must installed prior to earth disturbance and maintained in effective operating condition during construction. Biodegradable wildlife friendly erosion controls should be used whenever practicable to minimize effects to water quality.
b. Activities in streams (rivers, streams, brooks, etc.) and tidal waters that are capable of producing sedimentation or turbidity should be done during periods of low-flow or no-flow, when the stream or tide is waterward of the work area. Controls may also be used to obtain dry work conditions (e.g., coffer dam, turbidity curtain). The prospective permittee must demonstrate in the project plans where the controls are proposed and how these controls would avoid and/or minimize turbidity or sedimentation.
c. A PCN is required for controls that encroach: i) >25% of the stream width measured from OHW in non-tidal diadromous streams from March 15 to June 30; or ii) >25% of the waterway width measured from MHW in tidal waters from Feb. 1 to June 30, or >50% of the waterway width measured from MHW in tidal waters from July 1 to Jan. 14. This is to protect upstream fish passage. Proponents must also maintain downstream fish passage throughout the project.
d. No dewatering shall occur with direct discharge to waters or wetlands. Excess water in isolated work areas shall be pumped or directed to a sedimentation basin, tank or other dewatering structures in an upland area adequately separated from waters or wetlands. Suspended solids shall be removed prior to discharge back into waters or wetlands from these dewatering structures. All discharge points back into waters and wetlands shall use appropriate energy dissipaters and erosion and sedimentation control BMPs.
e. Temporary controls shall be removed upon completion of work, but not until all exposed soil and other fills, as well as any work waterward of OHW or the HTL, are permanently stabilized at the earliest practicable date. Sediment and debris collected by these devices shall be removed and placed at an upland location in a manner that will prevent its later erosion into a waterway or wetland. Controls may be left in place if they are biodegradable and flows and aquatic life movements are not disrupted.

26. Aquatic Life Movements and Management of Water Flows.
a. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies and wetlands shall be:
   i. Suitably spanned, bridged, culverted, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species; and
   ii. Properly aligned and constructed to prevent bank erosion or streambed scour both adjacent to and inside the crossing.

[1] Appropriate soil erosion, sediment and turbidity controls include cofferdams, bypass pumping around barriers immediately up and downstream of the work footprint (i.e., dam and pump), installation of sediment control barriers (i.e., silt fence, vegetated filter strips, geotextile silt fences, filter tubes, erosion control mixes, hay bales or other devices) downhill of all exposed areas, stream fords, retention of existing vegetated buffers, application of temporary mulching during construction, phased construction, and permanent seeding and stabilization, etc.

b. To avoid adverse impacts on aquatic organisms, the low flow channel/thalweg shall remain unobstructed during periods of low flow, except when necessary to perform the authorized work.
c. For work in tidal waters, in-stream controls (e.g., cofferdams) should be installed in such a way as to not obstruct fish passage.
d. Riprap and other stream bed materials shall be installed in a manner that avoids organism entrapment in rock voids or water displaced to subterranean flow with crushed stone and riprap.
e. To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity shall not restrict or impede the passage of normal or high flows unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

27. Spawning, Breeding, and Migratory Areas.
a. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized under these GPs.
b. Activities in waters of the U.S. that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.
c. The applicant is responsible for obtaining any "take" permits required under the USFWS's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The applicant should contact the appropriate local office of the USFWS to determine if such "take" permits are required for a particular activity.
d. Information on spawning habitat for species managed under the Magnuson-Stevens Fishery Conservation and Management Act (i.e., EFH for spawning adults) can be obtained from NAE Regulatory website, Essential Fish Habitat section, at: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/.
e. Information regarding diadromous fish habitat can be obtained from the following DMF website at: https://www.mass.gov/info-details/massgis-data-diadromous-fish.

28. Vernal Pools.
a. A PCN is required if a discharge of dredged or fill material is proposed within a vernal pool depression that is also a water of the U.S.
b. Vernal pools must be identified on the plans that show aquatic resource delineations.
c. Adverse impacts to vernal pools shall be avoided & minimized to the maximum extent practicable.

29. Invasive Species.
a. The introduction, spread or the increased risk of invasion of invasive plant or animal species on the project site, into new or disturbed areas, or areas adjacent to the project site caused by the site work shall be avoided. Construction mats shall be thoroughly cleaned before reuse to avoid spread of invasive species.
b. Unless otherwise directed by USACE, all applications for PCN non-tidal projects proposing fill in USACE jurisdiction shall include an Invasive Species Control Plan. Additional information can be found at: https://www.nae.usace.army.mil/Missions/Regulatory/Invasive-Species/, https://www.nae.usace.army.mil/Missions/Regulatory/Mitigation/.

30. Fills Within 100-Year Floodplains. The activity shall comply with applicable Federal Emergency Management Agency (FEMA) approved, Massachusetts Emergency Management

Agency (MEMA) approved and/or local floodplain management requirements. Applicants should contact FEMA and/or MEMA regarding floodplain management requirements.

31. Stream Work and Crossings & Wetland Crossings.
a. When feasible, all temporary and permanent crossings of waterbodies and wetlands (hereinafter referred to as "crossings") shall conform to the "Massachusetts River and Stream Crossing Standards" located at: https://www.mass.gov/doc/massachusetts-river-and-stream-crossing-standards/download or https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/. Projects that do not conform to these guidelines shall be reviewed under PCN or IP procedures.
b. Crossings shall be suitably culverted, bridged, or otherwise designed to withstand and to prevent the restriction of high flows, to maintain existing low flows, maintain water quality, and not obstruct the movement of aquatic life indigenous to the waterbody beyond the duration of construction.
c. Crossings shall be installed in such a manner as to preserve hydraulic capacity and flow, sediment transport, and organism passage at its present level, between the wetlands on either side of the road. The applicant shall take necessary measures to correct any wetland damage resulting from deficiencies in hydraulic capacity, sediment transport and organism passage.
d. Stream crossings shall utilize a natural mixed grain-size streambed material composition that matches upstream and downstream substrates to create a stable streambed. Substrate should function appropriately during normal and high flows without washing out. If natural streambed material is not utilized, a PCN is required.
e. Activities involving open trench excavation in flowing waters require a PCN. Work should not occur in flowing waters (requires using management techniques such as temporary flume pipes, culverts, cofferdams, etc.). Normal flows should be maintained within the stream boundary's confines when practicable. Projects utilizing these management techniques must meet all applicable terms and conditions of the GP, including the GCs in Section IV.

32. Utility Line Installation and Removal
a. Subsurface utility lines must be installed at a sufficient depth to avoid damage from anchors, dredging, etc., and to prevent exposure from erosion and stream adjustment.
b. When utility lines are installed via horizontal directional drilling, a frac-out contingency plan shall be present on site for the duration of construction. As necessary, the applicant shall immediately contain, control, recover, and remove drilling fluids released into the environment.
c. Abandoned or inactive utility lines must be removed and faulty lines (e.g., leaking hazardous substances, petroleum products, etc.) must be removed or repaired. A written verification from the USACE is required if they are to remain in place, e.g., to protect sensitive areas or ensure safety.
d. Utility lines shall not adversely alter existing hydrology, and trenches cannot be constructed or backfilled in such a manner as to drain waters of the U.S. (e.g., backfilling with extensive gravel layers, creating a French drain effect). In wetland areas, structures such as ditch plugs, cut-off walls, clay blocks, bentonite, or other suitable material shall be used within utility trenches to ensure that the trench through which the utility line is installed does not drain waters of the U.S. including wetlands.
e. Stockpiling of tree debris, to the extent where it has the effect of fill material, shall not occur in waters of the U.S. Tree debris shall be removed from waters of the U.S. and placed in uplands without causing additional disturbance to aquatic resources. Failure to meet this condition could change the bottom elevation of the wetland and be considered a discharge of fill material, and depending on the area of alteration, may require a PCN or IP.

33. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

34. Coral Reefs. Impacts to coral reefs are not authorized under these GPs. Coral reefs consist of the skeletal deposit, usually of calcareous or silicaceous materials, produced by the vital activities of anthozoan polyps or other invertebrate organisms present in growing portions of the reef.

35. Blasting. Blasting in waters of the U.S. associated with work such as dredging, trenching, pile installation, etc. is not authorized under these GPs.

36. Inspections. The permittee shall allow USACE to make periodic inspections at any time deemed necessary to ensure that the work is being or has been performed in accordance with the terms and conditions of this permit. To facilitate these inspections, for activities requiring a PCN, the permittee shall complete and return the Certificate of Compliance when it is provided with a PCN verification letter. For SV-eligible activities, the permittee shall complete and submit the SVN to USACE within 30 days of initiating project construction, at which point, USACE may opt to inspect the activity to verify compliance with the terms and conditions of the GP. Post-construction engineering drawings may be required by USACE for completed work. This includes post-dredging survey drawings for any dredging work.

37. Maintenance. The permittee shall maintain the activity authorized by these GPs in good condition and in conformance with the terms and conditions of this permit. Some maintenance activities may not be subject to federal regulation under Section 404 in accordance with 33 CFR 323.4(a)(2). This condition is not applicable to maintenance of dredging projects. Prospective permittees should contact USACE to inquire about maintenance of dredging projects, and its eligibility under these GPs. Maintenance dredging is subject to the review thresholds in GP #7 as well as any conditions included in a written USACE authorization. Maintenance dredging includes only those areas and depths previously authorized and dredged.

38. Property Rights. Per 33 CFR 320.4(g)(6), these GPs do not convey any property rights, either in real estate or material, or any exclusive privileges, nor do they authorize any injury to property or invasion of rights or any infringement of Federal, State, or local laws or regulations.

39. Transfer of GP Verifications. When the work authorized by these GPs is still in existence at the time the property is transferred, the terms and conditions of these GPs, including any special conditions, will continue to be binding on the entity or individual who received the GP authorizations, as well as the new owner(s) of the property. If the permittee sells the property associated with a GP authorization, the applicant may transfer the GP authorization to the new owner by submitting a letter to USACE to validate the transfer. A copy of the GP authorization letter must be attached to the letter, and the letter must include the following statement: “The terms and conditions of these general permits, including any special conditions, will continue to be binding on the new owner(s) of the property.” This letter shall be signed by both the seller and new property owner(s).

40. Modification, Suspension, and Revocation. These GPs and any individual authorization issued thereof may be either modified, suspended, or revoked in whole or in part pursuant to the policies and procedures of 33 CFR 325.7; and any such action shall not be the basis for any claim for damages against the U.S.

41. Special Conditions. The USACE may impose other special conditions on a project authorized pursuant to these GPs that are determined necessary to minimize adverse navigational and/or environmental effects or based on any other factor of the public interest. Failure to comply with all conditions of the authorization, including special conditions, constitutes a permit violation and may subject the applicant to criminal, civil, or administrative penalties or restoration.

42. False or Incomplete Information. If USACE makes a determination regarding the eligibility of a project under these GPs, and subsequently discovers that it has relied on false, incomplete, or inaccurate information provided by the applicant, the authorization will not be valid, and the U.S. Government may institute appropriate legal proceedings.

43. Abandonment. If the permittee decides to abandon the activity authorized under these GPs, unless such abandonment is merely the transfer of property to a third party, he/she/they may be required to restore the area to the satisfaction of USACE.

44. Enforcement cases. These GPs do not apply to any existing or proposed activity in USACE jurisdiction associated with an on-going USACE or EPA enforcement action, until such time as the enforcement action is resolved or USACE or EPA determines that the activity may proceed independently without compromising the enforcement action.

45. Previously Authorized Activities.

a. Completed projects that received prior authorization from USACE (SV or PCN), shall remain authorized in accordance with the original terms and conditions of those authorizations, including their terms, GCs, and any special conditions provided in a written verification.

b. Activities authorized pursuant to 33 CFR 330.3 (activities occurring before certain dates) are not affected by these GPs.

46. Duration of Authorization.

These GPs expire on June 1, 2028. Activities authorized under these GPs will remain authorized until the GPs expire, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 325.2(e)(2). Activities authorized under GPs 1-25 that have either commenced (i.e., are under construction) or are under contract to commence in reliance upon this authorization will have until June 1, 2029 to complete the work. If requested by USACE, the permittee shall furnish documentation that demonstrates the project was under construction or under contract to commence by June 1, 2028. If work is not completed before June 1, 2029, the permittee must contact USACE. The USACE may issue a new authorization provided the project meets the terms and conditions of the MA GPs in effect at the time. Activities completed under the SV or PCN authorizations of these GPs will continue to be authorized after their expiration date.

SECTION V: MITIGATION STANDARDS

1. Mitigation Types

For all activities, applicants must (a) demonstrate how the project has been designed to avoid or minimize impacts to aquatic resources; and (b) describe measures taken to avoid or minimize impacts to aquatic resources through construction techniques and/or site access. Please see https://www.nae.usace.army.mil/Missions/Regulatory/Mitigation/ for assistance with preparing mitigation in accordance with the 2008 Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (33 CFR 332.3), hereafter referred to as "2008 Mitigation Rule."

Avoidance - Avoidance of impacts (direct and indirect) to aquatic resources means that project activities would not result in the placement of fill material or installation of a structure that could impact the resource area. Avoidance can include, but is not limited to, designing the project to avoid impacts to all or a portion of the aquatic resource areas.

Minimization - Minimization of impacts (direct and indirect) to aquatic resources means that measures are taken to ensure the amount and duration of impacts are limited to the maximum extent practicable. There are many minimization measures that could be implemented, prior to, during, or after the proposed activity, to ensure impacts are minimized. Examples include, but are not limited to:

- Permanent preservation of avoided aquatic features and buffer zone, in perpetuity. In these cases, the preserved area would be under a conservation easement and managed by conservation oriented third-party manager.
- Utilization of best management practices (BMPs) to ensure impacts are limited, and do not result in adverse impacts to the integrity and long-term functions of preserved/avoided features.

Compensatory Mitigation - Compensatory mitigation is generally required for PCN activities in which the impacts to the aquatic resources have been avoided and minimized to the maximum extent practicable but would still result in unavoidable adverse effects to the environment that are considered more than minimal or are contrary to the public interest. *Whatever the case may be, compensatory mitigation is no substitute for avoidance and minimization.*

2. Thresholds for Compensatory Mitigation

The basic objective of compensatory mitigation in the USACE Regulatory Program is to offset environmental losses resulting from unavoidable impacts to waters of the U.S. authorized by Department of the Army permits. **The following compensatory mitigation thresholds apply to all PCN activities that result in loss[1] of the resource area types listed below. Activities[2] in waters of the U.S. associated with the restoration, enhancement, and establishment of tidal and non-tidal aquatic resources are not considered loss and are not subject to the thresholds below.** Thresholds for different resource areas may not be combined to exceed 5,000 SF of total loss of all waters. The USACE will continue to evaluate projects on a case-by-case basis, and may in some cases require compensatory mitigation below these thresholds (e.g. minor impacts that add to a cumulative loss).

[1] See definition of loss in Section VII.
[2] These activities must result in net increases in aquatic resource functions and services to be exempted from the thresholds above.

Compensatory Mitigation Thresholds in Massachusetts		
Resource Area	**Non-Tidal Threshold**	**Tidal Threshold**
Stream	200 LF	200 LF
Bank Stabilization	500 LF	500 LF
Open Water	Project Dependent	Project Dependent
Wetland	5,000 SF	500 SF
Vernal Pool	All	N/A
SAV	Project dependent	25 SF
Mudflat	N/A	1,000 SF
Intertidal	N/A	1,000 SF

These thresholds can be utilized to determine at what point compensatory mitigation is required but are not used to determine how much mitigation may be needed to offset impacts to resources. Per the 2008 Mitigation Rule (33 CFR 332.3(f)(1)) "the amount of required compensatory mitigation must be, to the extent practicable, sufficient to replace lost aquatic resource functions. In cases where appropriate functional or condition assessment methods or other suitable metrics are available, these methods should be used where practicable to determine how much compensatory mitigation is required. If a functional or condition assessment or other suitable metric is not used, a minimum one-to-one acreage or linear foot compensation ratios must be used."

3. Compensatory Mitigation Hierarchy

Compensatory mitigation should follow the hierarchy as outlined in 33 CFR 332.3(b)(2-6) or current regulation. This hierarchy in order of preference includes: (1) Mitigation Bank credits, (2) In-Lieu Fee program credits, (3) permittee-responsible mitigation under a watershed approach, (4) permittee-responsible mitigation through on-site and in-kind mitigation, and (5) permittee-responsible mitigation through off-site and/or out-of-kind mitigation. If the proposed mitigation deviates from this mitigation hierarchy, the applicant **must** justify in writing why the proposed mitigation is environmentally preferable to the preferred method of compensatory mitigation (See 2008 Mitigation Rule). **In order for your application to be considered complete, you must provide a statement that discusses how your project will compensate for the loss or impact to aquatic resources.** If you are proposing permittee responsible mitigation, the 12 components of a mitigation plan (33 CFR 332.4(c)(2-14) must be addressed for your application to be considered complete. Prospective applicants are encouraged to contact USACE with questions at any time. Addressing the 12 components of a mitigation plan is commensurate with the amount of compensatory mitigation required, and USACE can assist prospective applicants with the level of information needed to satisfy each component.

For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee.

4. In-Lieu Fee (ILF)

The purchase of credits from the Massachusetts In-Lieu Fee Program (MA ILFP) is the ***preferred*** method of compensatory mitigation in Massachusetts since, as of the issuance date of this GP, there are no mitigation banks available in Massachusetts. The applicant shall develop a mitigation plan that addresses the baseline conditions at the impact site and the number of credits to be provided (see 33 CFR 332.4(c)(1)(ii)).

The MA ILFP is administered by the Massachusetts Department of Fish & Game (DFG) in accordance with the 2008 Mitigation Rule at 33 CFR 332. The Mitigation Rule governs in-lieu fee compensatory mitigation associated with USACE permits under §404 of the Clean Water Act and/or §9 or §10 of the Rivers and Harbors Act of 1899.

MA ILFP Website: https://www.mass.gov/in-lieu-fee-program

Acceptance of an ILF payment into the ILFP established by the 2014 MA ILFP Instrument (link below) is an acknowledgement by DFG that it assumes all legal responsibility for satisfying the mitigation requirements of the USACE (i.e., the implementation, performance, and long-term management and monitoring of the compensatory mitigation project(s) approved under this Instrument and subsequent Compensatory Mitigation Plans). This transfer of legal responsibility is established by: 1) the approval of this In-Lieu Fee Instrument; 2) receipt by the district engineer of a Notice of Credit Sale and Transfer of Legal Responsibility to DFG that is signed by the DFG and the permittee and dated; and 3) the transfer of fees from the permittee to DFG.

MA ILFP Fact Sheet: https://www.mass.gov/files/documents/2017/01/sj/ilfp-fact-sheet-ma-ilfp-fees.pdf

MA ILFP Instrument: https://www.mass.gov/files/documents/2016/08/nd/ilfp-final-instrument-dfg.pdf

5. Permittee-Responsible

The USACE may determine that the proposed permittee-responsible compensatory mitigation is appropriate on a case-by-case basis. As described in the Compensatory Mitigation Hierarchy section above, applicants must justify in writing why the proposed mitigation is environmentally preferable to the purchase of ILF credits. Applicants are encouraged to contact the USACE prior to submission of a permit application to seek further guidance regarding USACE mitigation requirements.

Applicants will demonstrate their proposed compensatory mitigation in writing by addressing the 12 components of a mitigation plan (33 CFR 332.4(c)(2-14). *Please note that all elements must be addressed, or the permit application will be deemed incomplete.* In certain circumstances, the district engineer may determine that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). Guidance on how to address these components can be found on the New England District Mitigation webpage: https://www.nae.usace.army.mil/Missions/Regulatory/Mitigation/

Performance standards will be used to measure the successfulness of the mitigation project. A successful mitigation project is one that is self-sustaining. For a mitigation project that will restore, enhance, or create wetlands, proper performance standards must address hydrology, hydric soils, and hydrophytic vegetation. The mitigation proposal must include an explanation of quantitative methods used to measure the success of performance standards (i.e., percent cover may be measured using vegetation plots, hydrology may be measured using data loggers, soil cores may be taken and evaluated for hydric soil indicators).

Monitoring methods should include quantitative sampling methods following established, scientific protocols. Sampling documentation, as part of monitoring reports, should include maps and coordinates (also shapefiles, if available) showing locations of sampling points, transects, quadrats, etc. In addition, permanent photo stations should be established coincident with sampling locations.

SECTION VI: FEDERAL & STATE AGENCY CONTACT INFORMATION & ORGANIZATIONAL WEBSITES

Federal Agencies

U.S. Army Corps of Engineers
Regulatory Division
696 Virginia Road
Concord, Massachusetts 01742-2751
(978) 318-8338 (phone); (978) 318-8303 (fax)
www.nae.usace.army.mil/missions/regulatory

U.S. Army Corps of Engineers
Navigation Division – Section 408
696 Virginia Road
Concord, Massachusetts 01742-2751
See link below for contact information:
https://www.nae.usace.army.mil/Missions/Section-408/

National Marine Fisheries Service
55 Great Republic Drive
Gloucester, Massachusetts 01930
(978) 281-9300 (phone)
(*Federal endangered species & EFH)*

U.S. Fish & Wildlife Service
70 Commercial Street, Suite 300
Concord, New Hampshire 03301
(603) 223-2541 (phone)
(Federal endangered species)

National Park Service
15 State Street
Boston, Massachusetts 02109
(617) 223-5191 (phone)
(*Wild and Scenic Rivers*)

Bureau of Ocean and Energy Management
1849 C Street, NW
Washington D.C. 20240
202-208-6474 (phone)
(*Offshore Wind Facilities)*

Chief, Risk Analysis Branch
FEMA Region 1
99 High Street, 6th Floor
U.S. Department of Homeland Security
Boston, Massachusetts 02110
(617) 956-7576 (phone)

Commander (dpb)
First Coast Guard District
Battery Building
One South Street
New York, New York 10004-1466
(212) 514-4331 (phone); (212) 514-4337 (fax)
(*Bridge permits*)

U.S. Environmental Protection Agency
5 Post Office Square
Suite 100 (OEP06–3)
Boston, Massachusetts 02109-3912
(617) 918-1692 (phone)

State Agencies in Massachusetts

Massachusetts Department of Environmental Protection (MassDEP)	
DEP Division of Wetlands & Waterways	100 Cambridge Street, Suite 900 Boston, Massachusetts 02114 (617) 292-5695
Northeast Region	150 Presidential Way, Suite 300 Woburn, Massachusetts 01801 (978) 694-3200
Southeast Region	20 Riverside Drive, Route 105 Lakeville, Massachusetts 02347 (508) 946-2800
Central Region	8 New Bond Street Worcester, Massachusetts 01606 (508) 792-7650
Western Region	436 Dwight Street Springfield, Massachusetts 01103 (413) 784-1100

Massachusetts Office of Coastal Zone Management (CZM) Emails may be sent to: czm@mass.gov	
MA Office of Coastal Zone Management	100 Cambridge Street, Suite 900 Boston, Massachusetts 02114 (617) 626-1200
North Shore Region	2 State Fish Pier Gloucester, Massachusetts 01930 (978) 281-3972
South Shore Region	175 Edward Foster Road Scituate, Massachusetts 02066
Cape Cod and Islands Region	3195 Main Street, P.O. Box 220 Barnstable, MA 02630
South Coastal Region	81-B County Road, Suite E Mattapoisett, MA 02739

Massachusetts Historical Commission (MHC)	
Office Location:	220 Morrisey Boulevard Boston, Massachusetts 02125 (617) 727-8470

Massachusetts Board of Underwater Archaeological Resources (BUAR) Emails may be sent to: david.s.robinson@mass.gov	
Office Location:	100 Cambridge Street, Suite 900 Boston, Massachusetts 02114 (617) 626-1014

SECTION VII: Definitions & Acronyms

Artificial or Living Reef: A structure which is constructed or placed in waters for the purpose of enhancing fishery resources and commercial and recreational fishing opportunities.
Attendant Features: Occurring with or as a result of; accompanying.
Biodegradable: A material that decomposes into elements found in nature within a reasonably short period of time and will not leave a residue of plastic or a petroleum derivative in the environment after degradation. In contrast, degradable plastics break down into plastic fragments that remain in the environment after degradation. Examples of biodegradable materials include jute, sisal, cotton, straw, burlap, coconut husk fiber (coir) or excelsior. In contrast, degradable plastics break down into plastic fragments that remain in the environment after degradation. Photodegradable, UV degradable or Oxo-(bio)degradable plastics are not considered biodegradable under this GP.
Boating facilities: These provide, rent or sell mooring space, such as marinas, yacht clubs, boat yards, dockominiums, municipal facilities, land/home owners, etc. Not classified as boating facilities are piers shared between two abutting properties or municipal mooring fields that charge an equitable user fee based on the actual costs incurred.
Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. Must comply with the applicable provisions of 33 CFR 332. See also the New England District Compensatory Mitigation Guidance at http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx.
Construction mats: Constructions, swamp and timber mats (herein referred to as “construction mats”) are generic terms used to describe structures that distribute equipment weight to prevent wetland damage while facilitating passage and providing work platforms for workers and equipment. They are comprised of sheets or mats made from a variety of materials in various sizes. A timber mat consists of large timbers bolted or cabled together. Corduroy roads, which are not considered to be construction mats, are cut trees and/or saplings with the crowns and branches removed, and the trunks lined up next to one another. Corduroy roads are typically installed as permanent structures. Like construction mats, they are considered as fill whether they are installed temporarily or permanently.
Cumulative Impacts: The impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.1). Although the impact of a particular discharge may constitute a minor change in itself, the cumulative effect of numerous such piecemeal changes can result in a major impairment of the water resources and interfere with the productivity and water quality of existing aquatic ecosystems. See 40 CFR 230.11(g).
Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.
Dredging:
Improvement Dredging: For the purposes of these GPs, this is dredging deeper than previously authorized by the USACE and dredged under that authorization.
Maintenance Dredging: For the purposes of these GPs, this is dredging from an area previously authorized by the USACE and dredged under that authorization. The USACE may require proof of authorization and dredging. Maintenance dredging typically refers to the routine removal of accumulated sediment to maintain the design depths of serviceable navigation channels, harbors, marinas, boat launches and port facilities. Maintenance dredging is conducted for navigational purposes and does not include any expansion of the previously dredged area. The USACE may

review a maintenance dredging activity as new dredging if sufficient time has elapsed to allow for the colonization of SAS, shellfish, etc.

New Dredging: For the purposes of these GPs, this is a) first time the USACE authorizes dredging of a particular location or b) dredging has not occurred for an extended period of time, and this has allowed for aquatic resources (i.e., eelgrass, shellfish, etc.) to redevelop in the area.

Dredged material & discharge of dredged material: These are defined at 33 CFR 323.2(c) and (d). The term dredged material means material that is excavated or dredged from waters of the U.S.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s) but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: A stream with flowing water only during, and for a short duration, after precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Erosion Controls: Appropriate soil erosion, sediment and turbidity controls include cofferdams, bypass pumping around barriers immediately up and downstream of the work footprint (i.e., dam and pump), installation of sediment control barriers (i.e., silt fence, vegetated filter strips, geotextile silt fences, filter tubes, erosion control mixes, hay bales or other devices) downhill of all exposed areas, stream fords, retention of existing vegetated buffers, application of temporary mulching during construction, phased construction, and permanent seeding and stabilization, etc.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area (33 CFR 332.2).

Expansions: Work that increases the footprint of fill, structures, depth of basin or drainage features, or floats, or slip capacity.

Essential Fish Habitat (EFH): The Federal Magnuson-Stevens Fishery Management and Conservation Act broadly defines EFH to include those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. See www.greateratlantic.fisheries.noaa.gov/habitat for more information.

Fill material & discharge of fill material: Material placed in waters of the U.S. where the material has the effect of either replacing any portion of a water of the U.S. with dry land or changing the bottom elevation of any portion of a water of the U.S. Fill material does not include any pollutant discharged into the water primarily to dispose of waste. These are defined at 33 CFR 323.2 (e) & (f).

Federal navigation projects (FNPs): These areas are maintained by the USACE; authorized, constructed and maintained on the premise that they will be accessible and available to all on equal terms; and comprised of USACE Federal anchorages, Federal channels and Federal turning basins. The buffer zone is equal to three times the authorized depth of a FNP. The following are FNPs in MA and more information, including the limits, is provided at www.nae.usace.army.mil/missions/navigation >> Navigation Projects:

- Andrews River, Harwich, MA
- Aunt Lydia's Cove
- Beverly Harbor
- Boston Harbor
- Buttermilk Bay Channel
- Canapitsit Channel
- Cape Cod Canal
- Chatham Harbor
- Cohasset Harbor
- Cross Rip Shoals, Nantucket Sound
- Cuttyhunk Harbor
- Dorchester Bay and Neponset River
- Duxbury Harbor
- Edgartown Harbor
- Essex River
- Fall River Harbor
- Falmouth Harbor
- Gloucester Harbor and Annisquam River
- Green Harbor
- Hingham Harbor
- Hyannis Harbor
- Ipswich River
- Island End River (Chelsea, MA)
- Kingston Harbor
- Lagoon Pond
- Little Harbor Woods Hole

Lynn Harbor
Malden River
Menemsha Creek
Merrimack River
Mystic River
Nantucket Harbor of Refuge
New Bedford and Fairhaven Harbor
Newburyport Harbor
Oak Bluffs Harbor
Pigeon Cove Harbor
Plymouth Harbor
Pollock Rip Shoals, Nantucket Sound
Provincetown Harbor
Red Brook Harbor
Rockport Harbor
Salem Harbor
Sandy Bay Harbor of Refuge
Saugus River
Scituate Harbor
Sesuit Harbor
Taunton River
Vineyard Haven Harbor
Wareham Harbor
Wellfleet Harbor
Westport River and Harbor
Weymouth Back River
Weymouth Fore and Town Rivers
Winthrop Harbor
Woods Hole Channel

Flume: An open artificial water channel, in the form of a gravity chute, which leads water from a diversion dam or weir alongside a natural flow. A flume can be used to measure the rate of flow.
FNP buffer zone: The buffer zone of a USACE Federal Navigation Project (FNP) is equal to three times the authorized depth of the FNP.
Frac out: During horizontal directional drilling (HDD) operations, drilling fluid travels up the borehole into a pit. When the borehole becomes obstructed or the pressure becomes too great inside the borehole, the ground fractures and fluid escapes to the surface and may affect surface waters.
Ground disturbance: Any activity that compacts, relocates, overturns, removes, mixes, or otherwise disturbs the ground, including under water. Ground disturbance can be caused by the use of hand tools (shovels, pick axe, posthole digger, etc.), heavy equipment (excavators, backhoes, bulldozers, dredgers, trenching and earthmoving equipment, etc.), and heavy trucks (large four wheel drive trucks, dump trucks and tractor trailers, etc.). Trenching, bulldozing, dredging, excavating, scraping, and plowing are typical examples of ground disturbance activities.
Height:width ratio: The height of structures shall at all points be equal to or exceed the width of the deck. For the purpose of this definition, height shall be measured from the marsh substrate to the bottom of the longitudinal support beam.
High Tide Line (HTL): The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides 58 that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds. (33 CFR 328). Refer to the highest predicted tide for the current year at the nearest NOAA tide gage. https://tidesandcurrents.noaa.gov/map/index.html
Historic Property: Any prehistoric or historic site (including archaeological sites), district, building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).
Impacts:
Direct Impacts: Effects that are caused by the activity and occur at the same time and place (40 CFR 1508.7).
Indirect impacts: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.
Secondary impacts: Effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material.

Information about secondary effects on aquatic ecosystems shall be considered prior to the time final section 404 action is taken by permitting authorities. Some examples of secondary effects on an aquatic ecosystem are: aquatic areas drained, flooded, fragmented; fluctuating water levels in an impoundment and downstream associated with the operation of a dam; septic tank leaching and surface runoff from residential or commercial developments on fill; and leachate and runoff from a sanitary landfill located in waters of the U.S. See 40 CFR 230.11(h).

Incidental Fallback: Incidental fallback is the redeposit of small volumes of dredged material that is incidental to excavation activity in waters of the U.S. when such material falls back to substantially the same place as the initial removal (33 CFR 323.2(d)(2)(iii)).

In the dry: Work that is done under dry conditions, e.g., work behind cofferdams or when the stream or tide is waterward of the work.

Independent utility: A test to determine what constitutes a single and complete non-linear project in the USACE Regulatory Program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Individual permit: A Department of the Army authorization that is issued following a case-by-case evaluation of a specific structure or work in accordance with the procedures of 33 CFR 322, or a specific project involving the proposed discharge(s) in accordance with the procedures of 33 CFR 323, and in accordance with the procedures of 33 CFR 325 and a determination that the proposed discharge is in the public interest pursuant to 33 CFR 320.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Intertidal: The area in between mean low water and the high tide line.

Living reef: See the definition of “artificial or living reef.”

Living shoreline: A term used to describe a low-impact approach with a substantial biological component to shoreline protection and restoration along coastal shores, riparian zones, lacustrine fringe wetlands, or oyster or mussel reef structures. This approach integrates natural features to restore, enhance, maintain, or create habitat, functions, and processes while also functioning to mitigate flooding or shoreline erosion. Living shorelines may stabilize banks and shores with small fetch and gentle slopes that are subject to low-to mid-energy waves. A living shoreline has a footprint that is made up mostly of native material. It incorporates vegetation or other living, natural “soft” elements alone or in combination with some type of harder shoreline structure (e.g., oyster or mussel reefs or rock sills) for added protection and stability. Living shorelines should maintain the natural continuity of the land-water interface and retain or enhance shoreline ecological processes.

Loss of waters of the United States: Waters of the U.S. that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. The loss of stream bed includes the acres of stream bed that are permanently adversely affected by filling or excavation because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the U.S. is a threshold measurement of the impact to jurisdictional waters or wetlands for determining whether a project may qualify for a GP; it is not a net threshold that is calculated after considering compensatory mitigation that maybe used to offset losses of aquatic functions and services. Waters of the U.S. temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the U.S. Impacts resulting from activities that do not require Department of the Army authorization, such as activities eligible for exemptions under section 404(f) of the Clean Water Act, are not considered when calculating the loss of waters of the U.S.

Maintenance: The repair, rehabilitation, or in-kind replacement of any previously authorized, currently serviceable structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3 – "Activities occurring before certain dates," provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Maintenance includes minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, or current construction codes or safety standards that are necessary to make repair, rehabilitation, or replacement are authorized. Currently serviceable means useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.
Maintenance Exemption: In accordance with 33 CFR 323.4(a)(2), any discharge of dredged or fill material that may result from any of the following activities is not prohibited by or otherwise subject to regulation under Section 404 of the CWA: "Maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, bridge abutments or approaches, and transportation structures. Maintenance does not include any modification that changes the character, scope, or size of the original fill design."
Mean high water: Line on the shore reached by the plane of the average high water. Where precise determination of the actual location of the line becomes necessary, it must be established by survey with reference to the available tidal datum, preferably averaged over a period of 18.6 years. Less precise methods, such as observation of the "apparent shoreline" which is determined by reference to physical markings, lines of vegetation, or changes in type of vegetation, may be used only where an estimate is needed of the line reached by the mean high water.
Mechanized land clearing: Land clearing activities using mechanized equipment such as backhoes or bulldozers with sheer blades, rakes or discs constitute point source discharges and are subject to section 404 jurisdiction when they take place in wetlands or waters of the U.S (Regulatory Guidance Letter 90-05).
Metallic mineral: Any ore or material to be excavated from the natural deposits on or in the earth for its metallic mineral content to be used for commercial or industrial purposes. "Metallic mineral" does not include thorium or uranium.
Minor deviations: Deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, or current construction codes or safety standards, which are necessary to make repair, rehabilitation, or replacement are permitted, provided the adverse environmental effects resulting from such repair, rehabilitation, or replacement are minimal.
Natural Rocky Habitats: Intertidal and subtidal substrates of pebble-gravel, cobble, boulder, or rock ledge and outcrops. Manufactured stone (e.g., cur or engineered riprap) is not considered a natural rocky habitat. Natural rocky habitats are either found as pavement (consolidated pebble-gravel, cobble, or boulder areas) or as a mixture with fines (i.e., clay and sand) and other substrates. Rocky habitats as EFH are defined as follows: (1) All pebble-gravel, cobble, or boulder pavements; (2) Pebble-gravel mixed with fines: mixed substrate of pebble-gravel and fines where pebble-gravel is an evident component of the substrate (either through visual observation or within sediment samples). Sediment samples with a content of 10% or more of pebble-gravel in the top layer (6-12 inches) should be delineated; (3) Scattered cobble, scattered boulder, scattered cobble/boulder: mixed substate of cobble and/or boulder and other substrates. The aerial extent of cobbles and/or boulders should be delineated; and (4) All rock ledge outcrops: area should be delineated along the edge of the ledge/outcrop (as defined by NMFS Habitat and Ecosystems Services Branch, Gloucester, MA).
Navigable waters or Navigable waters of the U.S.: These waters are subject to section 10 of the Rivers and Harbors Act of 1899 and are defined as those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce (33 CFR Part 329). Work or structures in navigable

waters require permits pursuant to §9 and §10 of the Rivers and Harbors Act of 1899. Also see the definition of “waters of the U.S.” below.
Note: Currently the following non-tidal waters have been determined to be navigable waters of the U.S. subject to permit jurisdiction in Massachusetts: Merrimack River, Connecticut River, and Charles River to the Watertown Dam.
Nearshore disposal: This is defined in the USACE Coastal Engineering Manual as “(1) In beach terminology an indefinite zone extending seaward from the shoreline well beyond the breaker zone. (2) The zone which extends from the swash zone to the position marking the start of the offshore zone, typically at water depths of the order of 20m.” A nearshore berm is an artificial berm built in shallow water using dredged material. Often, the berm is intended to renourish the adjacent and downdrift shore over time under the influence of waves and currents.
Non-regulated activity: Only structures or fills that were previously authorized and are in compliance with the terms and condition of the original authorization can be maintained as a non-regulated activity under 33 CFR 323.4(a)(2). Minor deviations from the previously authorized footprint do not qualify as a non-regulated activity and require new authorization from the USACE. The state’s maintenance provisions may differ from the USACE and a project may require reporting and written authorization from the state.
Non-tidal wetlands: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. Non-tidal wetlands contiguous to tidal waters are located landward of the HTL (*i.e.,* spring HTL). Also see the definition of “Waters of the U.S.” below.
Oil or natural gas pipeline: Any pipe or pipeline for the transportation of any form of oil or natural gas, including products derived from oil or natural gas, such as gasoline, jet fuel, diesel fuel. heating oil, petrochemical feedstocks, waxes, lubricating oils, and asphalt.
Ordinary High Water Mark (OHWM): A line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas. See 33 CFR 328.3(e).
Overall project: The overall project, for purposes of these GPs, includes all regulated activities that are reasonably related and necessary to accomplish the project purpose. Also see the definition of “single and complete linear project.”
Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.
Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.
Permanent impacts: Permanent impacts means waters of the U.S. that are permanently affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent impacts include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody.
Preconstruction notification (PCN): A request submitted by the applicant to the USACE for confirmation that a particular activity is authorized by these GPs. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Preconstruction notification may be required by the terms and conditions of these GPs. A PCN may be voluntarily submitted in cases where PCN is not required and the applicant wants confirmation that the activity is authorized under these GPs.
Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions (33 CFR 332.2).
Real estate subdivision: Includes circumstances where a landowner or developer divides a tract of land into smaller parcels for the purpose of selling, conveying, transferring, leasing, or

developing said parcels. This would include the entire area of a residential, commercial or other real estate subdivision, including all parcels and parts thereof

Reconfiguration zone: A USACE authorized area in which permittees may rearrange pile-supported structures and floats without additional authorizations. A reconfiguration zone does not grant exclusive privileges to an area or an increase in structure or float area.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/ historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in again in aquatic resource area and functions (33 CFR 332.2).

Reference Site: Reference sites - Compensatory restoration, rehabilitation, and creation mitigation projects should seek to duplicate the features of reference aquatic resources or enhance connectivity with adjacent natural upland and aquatic resource landscape elements. Performance standards related to reference sites are encouraged. Mitigation project sites must be selected based on their ability to be, and continue to be, resistant to disturbance from the surrounding landscape, by locating them adjacent to refuges, buffers, green spaces, and other preserved natural elements of the landscape. In general, aquatic resource mitigation projects must be designed to be self-sustaining, natural systems within the landscape and climate in which they are located, with little or no ongoing maintenance and/or hydrologic manipulation.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area (33 CFR 332.2).

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation (33 CFR 332.2).

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Sedimentation: Sedimentation is defined as the process of deposition of a solid material from a state of suspension. Deposited sediments may accumulate and have temporal impacts to aquatic resource areas. See secondary effects definition above. For the purposes of this document, “greater than minimal sedimentation” is generally not considered to occur when using proper erosion controls (GC 25) or when sedimentation is considered “de minimis” 33 CFR 323.2(d)(5).

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term “single and complete project” is defined as that portion of the total linear project proposed or accomplished by one owner/ developer or partnership or other association of owners/developers that includes all crossings of a single water of the U.S. (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for the purposes of these GPs. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term “single and complete project” is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete

non-linear project must have independent utility (see the definition of “independent utility”). Single and complete non-linear projects may not be “piecemealed” to avoid the limits in a GP authorization.
Special aquatic sites (SAS): These include inland and saltmarsh wetlands, mud flats, vegetated shallows, sanctuaries and refuges, coral reefs, and riffle and pool complexes. These are defined at 40 CFR 230.3 and listed in 40 CFR 230 Subpart E.
Streambed: The stream substrate between the OHW marks on each side. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the streambed, but outside of the OHW marks, are not considered part of the streambed.
Stream channelization: The manipulation of a stream’s course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the U.S.
Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.
Temporal loss: The time lag between the loss of aquatic resource functions caused by the permitted impacts and the replacement of aquatic resource functions at the compensatory mitigation site(s) (33 CFR 332.2).
Temporary impacts: Temporary impacts include, but are not limited to, jurisdictional waters that are temporarily filled, flooded, excavated, or drained because of the regulated activity. Impacts are considered temporary when they are removed immediately upon completion of the activity. Note: An impact is considered temporary when the aquatic resource is restored to pre-project conditions, but effects to archaeological and/or cultural resources may be permanent in duration.
Tidal wetlands: A wetland that is subject to the ebb and flow of the tide. See the definition of “Waters of the U.S.” below.
Tide gates: Structures such as duckbills, flap gates, manual and self-regulating tide gates, etc. that regulate or prevent upstream tidal flows.
Turbidity: A measure of the level of particles such as sediment, plankton, or organic by-products, in a body of water. As the turbidity of water increases, it becomes denser and less clear due to a higher concentration of these light-blocking particles. Suspended solids are more likely to carry toxic chemicals, and can also negatively affect aquatic organisms, water temperature, and dissolved oxygen levels.
Utility line: Any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose that is not oil, natural gas, or petrochemicals. A utility line also includes any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and radio and television communication. The term ‘utility line’ does not include activities that drain a water of the U.S., such as drainage tile or French drains, but it does apply to pipes conveying drainage from another area.
Vegetated shallows: Permanently inundated areas that under normal circumstances support communities of rooted aquatic vegetation, such as eelgrass *(Zostera marina)* and widgeon grass (*Rupia maritima*) in marine systems (does not include salt marsh) as well as a number of freshwater species in rivers and lakes. These are a type of SAS defined at 40 CFR 230.43. Vegetated shallows are commonly referred to as submerged aquatic vegetation or SAV. Vegetated shallow survey guidance is located at www.nae.usace.army.mil/missions/regulatory /jurisdiction-and-wetlands. Maps of vegetated shallows in Massachusetts are located at www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit.
Vernal pools: For the purposes of these GPs, vernal pools are depressional wetland basins that typically dry up in most years and may contain inlets or outlets, typically of intermittent flow. Vernal pools range in both size and depth depending upon landscape position and parent material(s). In

most years, vernal pools support one or more of the following obligate indicator species: wood frog, spotted salamander, blue-spotted salamander, marbled salamander, Jefferson's salamander and fairy shrimp. However, they should preclude sustainable populations of predatory fish.

Water diversions: Water diversions are activities such as bypass pumping (e.g., "dam and pump") or water withdrawals. Temporary flume pipes, culverts or cofferdams where normal flows are maintained within the stream boundary's confines aren't water diversions. "Normal flows" are defined as no change in flow from pre-project conditions.

Waters of the United States (U.S.) These waterbodies are the waters where permits are required for the discharge of dredged or fill material pursuant to §404 of the CWA. These waters include but are not limited to navigable waters of the U.S. and tidal wetlands and include many non-tidal wetlands and other waterbodies. See definitions for navigable waters of the U.S., tidal wetlands, waterbody, and non-tidal wetlands. (33 CFR 328)

Waterbody: Examples of "waterbodies" include oceans, coastal waters, rivers, streams, ditches, lakes, ponds, and wetlands. If a wetland is adjacent to a waterbody determined to be a water of the U.S., that waterbody and any adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)).

Weir: A barrier across a river designed to alter the flow characteristics. In most cases, weirs take the form of a barrier, smaller than most conventional dams, across a river that causes water to pool behind the structure and allows water to flow over the top. Weirs are commonly used to alter the flow regime of a river, prevent flooding, measure discharge and help render a river navigable.

Wetland: Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. The Corps of Engineers Wetlands Delineation Manual in conjunction with the associated regional supplement should be used to determine if a wetland is present and delineate wetland boundaries.

Acronyms

BMPs	Best Management Practices
BUAR	Massachusetts Board of Underwater Archaeological Resources
CWA	Clean Water Act
CZM	Coastal Zone Management
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
EFH	Essential Fish Habitat
FNP	Federal Navigation Project
GC	General Condition
GP	General Permit
HTL	High Tide Line
IP	Individual Permit
LID	Low impact development
MassDEP	Massachusetts Department of Environmental Protection
MA DMF	Massachusetts Division of Marine Fisheries
MHC	Massachusetts Historical Commission
MHW	Mean High Water
MLLW	Mean Lower Low Water
MLW	Mean Low Water
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
OHW	Ordinary High Water Mark
PCN	Preconstruction Notification
SAS	Special Aquatic Sites
SF	Square Feet
SV	Self-Verification
SHPO	State Historic Preservation Officer
THPO	Tribal Historic Preservation Officer
USFWS	U.S. Fish and Wildlife Service
USCG	U.S. Coast Guard
USFS	U.S. Forest Service
USGS	U.S. Geological Service
WQC	Water Quality Certification

Appendix A: Guidance for NHPA Section 106 Compliance in Massachusetts

1. Purpose & Applicability

Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) (54 U.S.C § 306108), requires Federal agencies to take into account the effects of their undertakings on Historic Properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. Therefore, in order for an activity to be eligible for authorization under the 2023 Massachusetts General Permit, the USACE must consider the effect the activity may have on historic properties. Historic properties may include, but are not limited to, historic districts, archaeological districts, sites, buildings, structures, objects, sacred sites, traditional cultural places, and traditional cultural landscapes that are included in, or eligible for inclusion in, the National Register of Historic Places (NRHP).

This guidance applies to projects that require authorization under Section 404 of the Clean Water Act (33 U.S.C. § 1344) and/or Section 10 of the Rivers and Harbors Act (33 U.S.C. §403) and will assist applicants when evaluating and documenting the presence of historic properties within or near their project site(s). The prospective applicant will evaluate their proposed project using the criteria below to determine if their project has the potential to affect historic properties and if so, whether or not historic properties are present or are likely to be present. All activities authorized under these GPs shall follow the terms outlined in General Condition 14: Historic Properties and General Condition 6: Tribal Rights & Burial Sites. Prospective applicants shall complete their due diligence according to the procedures below for their application to be deemed complete.

2. No Potential to Affect Historic Properties

Certain activities do not have the potential to cause effects on historic properties, assuming such historic properties were present, based on the nature of the activity and site-specific conditions. Therefore, these activities **do not** require historic property identification efforts or notification of the SHPO, THPOs, and/or BUAR under Section 106. The USACE has determined the following activities within the stated parameters have no potential to affect historic properties:

General Permit	Activity Parameters
1	Temporary buoys, markers and similar structures that are placed during winter events on ice and removed before spring thaw.
2	Repair or rehabilitation of structures that are less than 45 years in age. Any temporary structures or fills or work necessary to complete repairs or rehabilitation must not result in any ground disturbance.
3	Maintenance and replacement of moorings that are less than 45 years in age.
6	Maintenance, repair, replacement, or removal of utility lines, oil or natural gas pipelines, outfall or intake structures, and/or appurtenant features that are less than 45 years in age when all access, staging, and ground disturbance is strictly limited to previously disturbed areas (including any previous ground disturbance). Replacement must be in kind or smaller in size. Installation of tide gates on outfall structures that are less than 45 years in age.
7	Maintenance dredging of previously dredged areas where dredging does not extend beyond the original bottom elevations.

	Disposal of dredged material at an existing established and USACE-approved confined aquatic disposal cell. Beach nourishment in ongoing existing nourishment areas.
11	Fish and wildlife harvesting and attraction devices and activities.
13	Cleanup of hazardous and toxic waste materials, including contaminated sediments, that are less than 45 years in age.
16	Removal of land-based and water-based renewable energy generation facilities and hydropower projects that are less than 45 years in age.
18	Installation of buoys, floats, racks, trays, nets, lines, tubes, containers, and other structures for previously authorized by the USACE and ongoing aquaculture activities. Discharges of dredged or fill material into tidal or non-tidal waters necessary for shellfish seeding, rearing, cultivating, transplanting, and harvesting activities for previously authorized and ongoing aquaculture activities.
20	Maintenance activities for existing living shorelines excluding maintenance activities that require new ground disturbance such as excavation or re-sloping of the bank/shoreline.
22	Reshaping or maintenance of existing drainage ditches less than 45 years in age excluding ditch enlargement.
23	Placement of temporary and removable linear transportation and wetland/stream crossings that have no ground disturbance prior to placement, during placement, and during removal (i.e., placed on the surface and subsequently removed within one year of placement).
24	Placement of temporary and removable crossings and cofferdams that have no ground disturbance prior to placement, during placement, and during removal (i.e., placed on the surface and subsequently removed within one year of placement).
25	Emergency repair of existing structures and/or fills less than 45 years in age.

3. Historic Property Identification

If the activity does not fit under the criteria above, the following historic property identification efforts must be completed to demonstrate compliance with Section 106 of the NHPA. This includes documenting previously identified and unidentified historic properties in the project area.

a. Previously Identified Historic Properties: The prospective applicant shall document if previously identified historic properties are present on or adjacent to the project site by notifying the Massachusetts Historical Commission (MHC) and the Massachusetts Board of Underwater Archaeological Resources (BUAR), as appropriate, of the proposed project. The MHC and BUAR will check their records for the presence of any previously identified historic properties. The following outlines how prospective applicants should notify the MHC and BUAR.

i. The prospective applicant will notify the SHPO and BUAR to identify any previously recorded cultural resources. Applicants shall mail a completed Project Notification Form[18], project narrative, location (coordinates), plans, soil maps, and information on known cultural resources to the MHC. The MHC does not accept submissions via email. Applicants shall email or mail this information to the BUAR when the activity is located in lakes, ponds, rivers, and/or navigable waters in MA. Emailed file attachments should be <10MB. Any files >10MB shall be delivered via a file exchange system or the hard copy documents shall be mailed. Preferred contact information is listed below.

ii. **When sending this information, applicants must also document proof of receipt OR proof the information was delivered.** Proof of receipt constitutes a certified mail receipt, read email receipt, or other mail/email/online tracking services that document the information has reached the intended recipient(s). Proof the information was delivered constitutes a certificate of mailing, email delivery receipt, or other mail/email/online services that document the information was sent at a particular time. When using proof of delivery such (e.g., certificate of mailing), applicants should add 5 days to the 30-day notification period so the mail has time to reach its intended recipient. When using proof of receipt, the applicant may begin the 30-day notification period from the date received by the intended recipient.

iii. When mailing or emailing the application materials, applicants should include the following statement: “Please send responses to this notification directly to the USACE via email: cenae-r-ma@usace.army.mil or address regular mail responses to: Regulatory Division, U.S. Army Corps of Engineers, New England District, 696 Virginia Road, Concord, Massachusetts 01742-2751.” Email responses to the USACE are strongly preferred. The SHPO and BUAR will contact the USACE and cc the applicant(s) within 30 days of receiving the notification if their records indicate that historic properties are located in the project vicinity, and if additional review and/or surveys are recommended to ensure NHPA compliance. If the SHPO and/or BUAR do not respond within 30 days of receiving the notification, is it presumed that no known historic properties are present.

b. Previously Unidentified Historic Properties: The prospective applicant shall evaluate the project site and determine the sensitivity for the presence of historic properties if the project site has not been previously surveyed for cultural resources within the last 10 years. If the sensitivity is determined to be moderate to high, an intensive archaeological and/or architectural survey is required to investigate the potential presence of historic properties. The individual conducting this survey must meet the Secretary of the Interior’s Standards for Professional Qualifications (48 FR 44738-44739) in the discipline relevant to a particular resource type. For example, archeologists should not document and evaluate buildings or structures and architectural historians should not document and evaluate archaeological sites. The identification and qualifications for those participating in any survey and evaluation of resources should be included with the survey results. The criteria listed below are indicators of low sensitivity for the presence of historic properties for consideration when determining if an archaeological or architectural survey is needed.

Low sensitivity indicators:

- Previous archaeological and/or architectural survey within the last 10 years with negative results.
- In a location created in modern times (i.e., built on fill placed within the last 45 years or within an area excavated within the last 45 years).
- USACE has reviewed the project description and determined that a survey is not warranted based on the proposed activity and its location.

State survey guidance and standards are provided in the September 1995 Historic Properties Survey Manual Guidelines for the Identification of Historical and Archaeological Resources in Massachusetts available. State survey guidance and standards for underwater surveys are provided

[18] https://www.sec.state.ma.us/mhc/mhcform/formidx.htm

in the Board of Underwater Archaeological Resources' 2022 Policy Guidance on Archaeological Investigations and Related Survey Standards for the Discovery of Underwater Archaeological Resources. This guidance is available on the NAE Regulatory website: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/.

Please note, a negative result from MHC and/or BUAR does not necessarily mean no historic properties are present. Often proposed project sites have not been previously subject to a survey, so historic properties which may be present have not been previously recorded.

4. Tribal Coordination

Prospective applicants shall mail the Project Notification Form, project narrative, location (coordinates), plans with locus map, soil maps, and information on cultural resources to the Wampanoag Tribe of Gay Head (Aquinnah), Mashpee Wampanoag Tribe, Narragansett Indian Tribe, and/or Stockbridge-Munsee Community Band of Mohican Indians with interests in the project location. Preferred tribal contact information, including their respective areas of interest, can be found below. Applicants shall follow the same procedures as identified in Section 3(a)i-iii above when notifying Tribes of the proposed activity. Applicants shall provide the USACE with any responses received from the tribe(s) with their PCN application. If a tribe does not respond within 30 days of receiving the notification, the applicant shall provide USACE with all documentation of tribal outreach with their SV or PCN submission (e.g., emails, letters, phone call log, etc.). If the tribe indicates the presence of a previously unrecorded cultural resource, including a traditional cultural property (TCP) or traditional cultural landscape (TCL), a PCN is required.

5. Effect Determination

The project may have the potential to affect historic properties and/or tribal resources if 1) notification recipients respond within 30 calendar days of notification with concerns, 2) historic properties eligible for listing, or potentially eligible for listing in the NRHP, are present or 3) tribal resources are known to be present. The USACE may need to further review the project to confirm potential effects to historic properties and/or tribal resources. A PCN is required for any activity that may affect a historic property.

The USACE may determine the project will have 'no effect' on historic properties (i.e., no historic properties affected) when procedures outlined in Section 3 above are followed and no cultural resources are identified. Similarly, if historic properties are identified and will be completely avoided, the USACE may determine 'no effect.'

6. Contact Information:

Massachusetts Historical Commission

The Massachusetts Archives Building
220 Morrissey Boulevard
Boston, Massachusetts 02125

No email. Applicants or their representatives must send project information via certified mail and submit the certified mail receipt to the USACE or send via regular mail and submit proof of delivery.

Area of concern: All of Massachusetts.

Massachusetts Board of Underwater Archaeological Resources (BUAR)

100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Email: david.s.robinson@mass.gov

Applicants or their representatives must send project information via email (***strongly preferred***) or regular mail and provide proof of receipt or proof of delivery.

Area of concern: All waterbodies in Massachusetts.

Wampanoag Tribe of Gay Head (Aquinnah)

Bettina Washington
Tribal Historic Preservation Officer (THPO)
20 Black Brook Road
Aquinnah, Massachusetts 02535
Email: thpo@wampanoagtribe-nsn.gov

Applicants or their representative must send project information via email (***preferred***) or regular mail and provide proof of receipt or proof of delivery.

Area of concern: All of Massachusetts.

Mashpee Wampanoag Tribe

ATTN: David Weeden
Tribal Historic Preservation Officer (THPO)
483 Great Neck Road South
Mashpee, Massachusetts 02649
Email: 106review@mwtribe-nsn.gov
Cc: David.weeden@mwtribe-nsn.gov

Applicants or their representative must send project information via email (***preferred***) or regular mail and provide proof of receipt or proof of delivery.

Area of concern: All of Massachusetts.

Narragansett Indian Tribe

ATTN: John Brown
Tribal Historic Preservation Officer (THPO)
Narragansett Indian Longhouse
4425 South County Trail
Charlestown, Rhode Island 02813
Email: tashtesook@aol.com

Applicants or their representative must send project information via email (***preferred***) or regular mail and provide proof of receipt or proof of delivery.

Area of concern: Massachusetts east of the Connecticut River.

Stockbridge-Munsee Community Band of Mohican Indians

ATTN: Jeff Bendremer
Tribal Historic Preservation Manager
Stockbridge-Munsee Community
Tribal Historic Preservation Extension office
86 Spring Street
Williamstown, Massachusetts 01267
Email: thpo@mohican-nsn.gov

Applicants or their representative must send project information via email (***preferred***) or regular mail and provide proof of receipt or proof of delivery.

Area of concern: West of the Connecticut River and Northfield, Montague, Miller's Falls, Turner's Falls, Sunderland, Amherst, Hadley, South Hadley, Chicopee, Springfield and Longmeadow.

APPENDIX B PRE-CONSTRUCTION NOTIFICATION

U.S. Army Corps of Engineers (USACE), New England District (NAE)

PRE-CONSTRUCTION NOTIFICATION (PCN)

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332.

Principal Purpose The information provided will be used in evaluating activities under Pre-Construction Notification procedures within New England.

Routine Uses This information may be shared with other federal, state, and local government agencies during the application review process. Submission

Disclosure of requested information is voluntary. However, if information is not provided the PCN application cannot be fully evaluated nor can USACE render a permit decision.

Instructions The applicant must complete ALL required sections of this document before their submission to USACE. The PCN submission to USACE shall include one set of drawings which show the location and character of the proposed activity, statements that address each required field below, and documentation that supports each field (e.g., emails, letters, description/narrative, phone calls, surveys, reports, etc.). Electronic submissions to the following address are strongly preferred: cenae-r-ma@usace.army.mil. The email subject line shall contain the following: General Permit #, PCN, City/Town, and date submitted. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY USACE)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (*agent is not required*)
First - Middle - Last -	First - Middle - Last -
Company -	Company -
E-mail Address -	E-mail Address -
6. APPLICANT'S ADDRESS:	9. AGENT'S ADDRESS:
Address-	Address-
City - State - Zip - Country -	City - State - Zip - Country -
7. APPLICANT'S PHONE NOs. with AREA CODE	10. AGENT'S PHONE NOs. with AREA CODE
a. Residence b. Business c. Fax d. Mobile	a. Residence b. Business c. Fax d. Mobile

STATEMENT OF AUTHORIZATION

11. I hereby authorize, _____ to act on my behalf as my agent in the processing of this general permit PCN application and to furnish, upon request, supplemental information in support of this general permit PCN application.

_____ _____

SIGNATURE OF APPLICANT DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME or TITLE (*see instructions*)

13. NAME OF WATERBODY, IF KNOWN (*if applicable*)	14. PROPOSED ACTIVITY STREET ADDRESS (*if applicable*)
15. LOCATION OF PROPOSED ACTIVITY (*see instructions*)	City: State: Zip:
Latitude: °N Longitude: °W	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (*see instructions*)

State Tax Parcel ID: Municipality:

Section: Township: Range:

17. DIRECTIONS TO THE SITE.

18. IDENTIFY THE SPECIFIC GENERAL PERMIT(S) YOU PROPOSE TO USE:

19. DESCRIPTION OF PROPOSED GENERAL PERMIT ACTIVITY (*see instructions*)

20. DESCRIPTION OF PROPOSED MITIGATION MEASURES (*see instructions*)

21. PURPOSE OF GENERAL PERMIT ACTIVITY (*Describe the reason or purpose of the project, see instructions*)

22. Quantity of Wetlands, Streams, or Other Types of Waters Directly Affected by Proposed General Permit Activity (*see instructions*)

Area (square feet)	Length (linear feet)	Volume (cubic yards)	Duration	Purpose

Each PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site.

23. List any other GP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project on any related activity (*see instructions*)

24. If the proposed activity will result in the loss of aquatic resources that exceed those identified in the New England District Compensatory Mitigation Thresholds, explain how the compensatory mitigation requirement will be satisfied. (*see instructions*)

25. Is Any Portion of the General Permit Activity Already Complete? ☐ Yes ☐ No If Yes, describe the completed work:

26. List the name(s) of any species listed as endangered or threatened under the Endangered Species Act that might be affected by the proposed GP activity or utilize the designated critical habitat that might be affected by the proposed GP activity. (*see instructions*)

27. List any historic properties that have the potential to be affected by the proposed GP activity or include a vicinity map indicating the location of the historic property or properties. Attach relevant project information, along with any responses received from project notifications to this submittal. (*see instructions*)

28. For a proposed GP activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, identify the Wild and Scenic River or the "study river":

29. If the proposed GP activity also requires permission from the USACE pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, have you submitted a written request for section 408 permission from the USACE district having jurisdiction over that project? ☐ Yes ☐ No

If "yes", please provide the date your request was submitted to the USACE District:

30. Does the activity require a 401 Water Quality Certification (WQC)? If so, specify the type of 401 WQC that is required (general or individual). In cases where an individual 401 WQC is required, provide the date the 401 WQC certification request was submitted to the certifying authority and their contact information.

31. If the terms of the GP(s) you want to use require additional information to be included in the PCN (i.e. sampling and analysis plan), please include that information in this space or provide it on an additional sheet of paper marked Block 30. (*see instructions*)

32. I certify that the information in this pre-construction notification is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

The Pre-Construction Notification must be signed by the person who desires to undertake the proposed activity (applicant) and, if the statement in block 11 has been filled out and signed, the authorized agent.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Instructions for Preparing a

Department of the Army

General Permit (GP) Pre-Construction Notification (PCN)

Blocks 1 through 4. To be completed by the U.S. Army Corps of Engineers.

Block 5. Applicant' Name. Enter the name and the e-mail address of the responsible party or parties. If the responsible party is an agency, company, corporation, or other organization, indicate the name of the organization and responsible officer and title. If more than one party is associated with the PCN, please attach a sheet of paper with the necessary information marked Block 5.

Block 6. Address of Applicant. Please provide the full address of the party or parties responsible for the PCN. If more space is needed, attach an extra sheet of paper marked Block 6.

Block 7. Applicant Telephone Number(s). Please provide the telephone number where you can usually be reached during normal business hours.

Blocks 8 through 11. To be completed, if you choose to have an agent.

Block 8. Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer, consultant, or any other person or organization. Note: An agent is not required.

Blocks 9 and 10. Agent's Address and Telephone Number. Please provide the complete mailing address of the agent, along with the telephone number where they can be reached during normal business hours.

Block 11. Statement of Authorization. To be completed by the applicant, if an agent is to be employed.

Block 12. Proposed General Permit Activity Name or Title. Please provide a name identifying the proposed GP activity, e.g., Windward Marina, Rolling Hills Subdivision, or Smith Commercial Center.

Block 13. Name of Waterbody. Please provide the name (if it has a name) of any stream, lake, marsh, or other waterway to be directly impacted by the GP activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 14. Proposed Activity Street Address. If the proposed GP activity is located at a site having a street address (not a box number), enter it in Block 14.

Block 15. Location of Proposed Activity. Enter the latitude and longitude of where the proposed GP activity is located. Indicate whether the project location provided is the center of the project or whether the project location is provided as the latitude and longitude for each of the "corners" of the project area requiring evaluation. If there are multiple sites, please list the latitude and longitude of each site (center or corners) on a separate sheet of paper and mark as Block 15.

Block 16. Other Location Descriptions. If available, provide the Tax Parcel Identification number of the site, Section, Township, and Range of the site (if known), and / or local Municipality where the site is located.

Block 17. Directions to the Site. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site. You may also provide a description of the location of the proposed GP activity, such as lot numbers, tract numbers, or you may choose to locate the proposed GP activity site from a known point (such as the right descending bank of Smith Creek, one mile downstream from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed GP activity site if known. If there are multiple locations, please indicate directions to each location on a separate sheet of paper and mark as Block 17.

Block 18. Identify the Specific General Permit(s) You Propose to Use. List the number(s) of the General Permit(s) you want to use to authorize the proposed activity (e.g., GP 4).

Block 19. Description of the Proposed General Permit Activity. Describe the proposed GP activity, including the direct and indirect adverse environmental effects of the proposed activity. The description of the proposed activity should be sufficiently detailed for USACE to determine that the adverse environmental effects of the activity will be no more than minimal. Identify the materials to be used in construction, as well as the methods by which the work is to be done.

Provide drawings to show that the proposed GP activity complies with the terms of the applicable GP(s). Drawings should contain sufficient detail to provide an illustrative description of the proposed GP activity, but do not need to be detailed engineering plans. The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked Block 19.

Block 20: Description of Proposed Mitigation Measures. Describe any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed GP activity. The description of any proposed mitigation measures should be sufficiently detailed for USACE to determine how the measures would avoid and minimize adverse environmental effects. If adverse effects exceed the New England District compensatory mitigation thresholds, you must document how compensatory mitigation would be satisfied in Block 24.

Block 21. Purpose of General Permit Activity. Describe the purpose and need for the proposed GP activity. What will it be used for and why? Also include a brief description of any related activities associated with the proposed project. Provide the approximate dates you plan to begin and complete all work.

Block 22. Quantity of Wetlands, Streams, or Other Types of Waters Directly Affected by the Proposed General Permit Activity. For discharges of dredged or fill material into Waters of the U.S., provide the amount of wetlands, streams, or other types of waters filled, flooded, excavated, or drained by the proposed GP activity. For structures or work in Navigable Waters of the U.S. subject to Section 10 of the Rivers and Harbors Act of 1899, provide the amount of navigable waters filled, dredged, occupied by one or more structures (e.g., aids to navigation, mooring buoys) by the proposed GP activity. The area of impact includes the structures or fills with direct or indirect effects to waters of the U.S. The length of impact includes the length of a stream, including is banks, that are directly affected by the structures or fills. The duration of impact should be identified as temporary (xx days) or permanent. The impact purpose should briefly describe what structure or fill is responsible for the impact.

Block 23. Identify Any Other General Permit(s), Regional General Permit(s), or Individual Permit(s) Used to Authorize Any Part of Proposed Activity or Any Related Activity. List any other GP(s) or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. For linear projects, list other separate and distant crossings of waters and wetlands authorized by these GPs that do not require PCNs. If more space is needed, attach an extra sheet of paper marked Block 23.

Block 24. Compensatory Mitigation Statement for Losses Greater Than the New England District Compensatory Mitigation Thresholds. New England District requires compensatory mitigation at a minimum one for one replacement ratio or greater for all aquatic resource losses that require a PCN and exceed the New England District Compensatory Mitigation Thresholds, unless USACE determines in writing that either some other form of mitigation is more environmentally appropriate or the adverse environmental effects of the proposed GP activity are no more than minimal without compensatory mitigation, and provides an activity specific waiver of this requirement. Describe the proposed compensatory mitigation for wetland losses greater than the New England District Compensatory Mitigation Thresholds or provide an explanation of why USACE should not require wetland compensatory mitigation for the proposed GP activity. If more space is needed, attach an extra sheet of paper marked Block 24.

Block 25. Is Any Portion of the General Permit Activity Already Complete? Describe any work that has already been completed for the GP activity.

Block 26. List the Name(s) of Any Species Listed As Endangered or Threatened under the Endangered Species Act that Might be Affected by the General Permit Activity. If you are not a federal agency, and if any listed species or designated critical habitat might be affected or is in the vicinity of the proposed GP activity, or if the proposed GP activity is located in designated critical habitat, list the name(s) of those endangered or threatened species that might be affected by the proposed GP activity or utilize the designated critical habitat that might be affected by the proposed GP activity. If you are a Federal agency, and the proposed GP activity requires a PCN, you must provide documentation demonstrating compliance with Section 7 of the Endangered Species Act.

Block 27. List Any Historic Properties that Have the Potential to be Affected by the General Permit Activity. If you are not a federal agency, and if any historic properties have the potential to be affected by the proposed GP activity, list the name(s) of those historic properties that have the potential to be affected by the proposed GP activity. Provide all relevant documentation about these historic properties in the PCN submittal. If you are a Federal agency, and the proposed GP activity requires a PCN, you must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

Block 28. List the Wild and Scenic River or Congressionally Designated Study River if the General Permit Activity Would Occur in such a River. If the proposed GP activity will occur in a river in the National Wild and Scenic River System or in a river officially designated by Congress as a “study river” under the Wild and Scenic Rivers Act, provide the name of the river. For a list of Wild and Scenic Rivers and study rivers, please visit http://www.rivers.gov/

Block 29. General Permit Activities that also Require Permission from the USACE Under 33 U.S.C. 408. If the proposed GP activity also requires permission from the USACE under 33 U.S.C. 408 because it will temporarily or permanently alter, occupy, or use a USACE federal authorized civil works project, indicate whether you have submitted a written request for section 408 permission from the USACE district having jurisdiction over that project.

Block 30. 401 Water Quality Certification. As described above, specify if the activity requires a 401 WQC from the certifying authority.

Block 31. Other Information Required For General Permit Pre Construction Notifications. The terms of some of the General Permits include additional information requirements for preconstruction notifications:

* Maintenance – information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals.
* Temporary Construction, Access, and Dewatering – a restoration plan showing how all temporary fills and structures will be removed and the area restored to pre-project conditions.
* Repair of Uplands Damaged by Discrete Events – documentation, such as a recent topographic survey or photographs, to justify the extent of the proposed restoration.
* Commercial Shellfish Aquaculture Activities – (1) a map showing the boundaries of the project area, with latitude and longitude coordinates for each corner of the project area; (2) the name(s) of the species that will be cultivated during the period this GP is in effect; (3) whether canopy predator nets will be used; (4) whether suspended cultivation techniques will be used; and (5) general water depths in the project area (a detailed survey is not required).Dredging – (1) a proposed sampling and analysis plan shall be provided to USACE for approval prior to its execution. Pre-application meetings are encouraged.
* Beach Nourishment – sediment grain size should be determined for the length of the beach where nourishment is proposed. The frequency and locations of sediment sampling shall be sufficient to identify the sediment composition of the beach profile. This data shall be consolidated to generate a sediment gradation curve for each sampled transect. Each sampled transect should also be identified on the project plans (drawings).

If more space is needed, attach an extra sheet of paper marked Box 31.

Block 32. Signature of Applicant or Agent. The PCN must be signed by the person proposing to undertake the GP activity, and if applicable, the authorized party (agent) that prepared the PCN. The signature of the person proposing to undertake the GP activity shall be an affirmation that the party submitting the PCN possesses the requisite property rights to undertake the GP activity (including compliance with special conditions, mitigation, etc.).

DELINEATION OF WETLANDS, OTHER SPECIAL AQUATIC SITES, AND OTHER WATERS

Each PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current wetland delineation manual and regional supplement published by the USACE. The permittee may ask the USACE to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the USACE does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. The 60-day PCN review period will not start until a delineation has been completed.

DRAWINGS AND ILLUSTRATIONS

General Information.

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a Vicinity Map, a Plan View or a Typical Cross Section Map. Identify each illustration with a figure or attachment number. For linear projects (e.g. roads, subsurface utility lines, etc.) gradient drawings should also be included. Please submit one copy of all drawings on 8½ x 11 inch plain white paper (electronic submissions preferred). Use the fewest number of sheets necessary for your drawings or illustrations. Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view, or cross section). While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate, and contain all necessary information.

ADDITIONAL INFORMATION AND REQUIREMENTS

For proposed GP activities that involve discharges into waters of the United States, water quality certification from the State, Tribe, or EPA must be obtained or waived. Some States, Tribes, or EPA have issued water quality certification for one or more GPs. Please check the New England District website to see if water quality certification has already been issued for the GP(s) you wish to use. For proposed GP activities in coastal states, state Coastal Zone Management Act consistency concurrence must be obtained, or a presumption of concurrence must occur. Some States have issued Coastal Zone Management Act consistency concurrences for one or more GPs. Please check the New England District website to see if Coastal Zone Management Act consistency concurrence has already been issued for the GP(s) you wish to use.

APPENDIX C SELF-VERIFICATION NOTIFICATION

U.S. Army Corps of Engineers (USACE)

SELF-VERIFICATION NOTIFICATION (SVN)

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332.

Principal Purpose This information will be used in evaluating activities under Self-Verification procedures within Massachusetts.

Routine Uses Routine uses will include: (1) Documenting compliance with the terms and conditions of the General Permit (GP) for activities that may require authorization pursuant to one or more of USACE's Regulatory authorities. (2) Records may be referred to other Federal, State, and local agencies for evaluation and enforcement purposes.

Disclosure Failure to fully comply and abide by the GP terms and conditions prior to commencing work and after completion project may result in formal enforcement action, up to and including monetary penalties and/or legal action, pursuant to 33 CFR Part 326.

Instructions The permittee must complete ALL required sections of this document before commencing USACE-regulated activities. A copy of this completed SVN must be kept on site during construction and be made available for review by USACE and other Federal, State, & Local regulatory authorities at any time. Within 30 days of initiating project construction, the permittee shall submit the completed SVN to USACE. The SVN shall be submitted to USACE as **ONE signed document** that includes project plans and documentation that supports each field (e.g., emails, letters, description, phone calls, surveys). Electronic submissions to the following address are strongly preferred: cenae-r-ma-sv@usace.army.mil. The email subject line shall contain the following: GP #, SVN, City/Town, and date submitted.

(ITEMS 1 THRU 3 TO BE FILLED BY USACE)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED

APPLICANT AND AGENT INFORMATION

4. APPLICANT'S NAME	7. AGENT'S ADDRESS:
First - Middle - Last -	First - Middle - Last -
Company -	Company -
E-mail Address -	E-mail Address -
5. APPLICANT'S ADDRESS:	8. AGENT'S ADDRESS:
Address-	Address-
City - State - Zip - Country -	City - State - Zip - Country -
6. APPLICANT'S PHONE NOs. w/AREA CODE	9. AGENTS PHONE NOs. w/AREA CODE
a. Residence b. Business c. Fax	a. Residence b. Business c. Fax

NAME, LOCATION, AND DESCRIPTION OF PROJECT SITE

10. PROJECT NAME OR TITLE

11. FILE NUMBER(S) OF PREVIOUS USACE ACTIONS ON THE SITE (if applicable)	12. NAME OF WATERBODY
13. PROJECT COORDINATES (in decimal degrees)	14. PROJECT STREET ADDRESS (if applicable)
Latitude: ◦N Longitude: ◦W	Address
	City - State - Zip -

ACTIVITY TYPE, PROJECT IMPACTS, AVOIDANCE & MINIMIZATION

15. GENERAL PERMIT ACTIVITIES (CHECK ALL THAT APPLY)

1 ☐	6 ☐	11 ☐	16 ☐	21 ☐
2 ☐	7 ☐	12 ☐	17 ☐	22 ☐
3 ☐	8 ☐	13 ☐	18 ☐	23 ☐
4 ☐	9 ☐	14 ☐	19 ☐	24 ☐
5 ☐	10 ☐	15 ☐	20 ☐	25 ☐

16. SUMMARY OF PROJECT IMPACTS (*see instructions*)

Area (square feet)	Length (linear feet)	Volume (cubic yards)	Duration

17. PROJECT PLANS (BY CHECKING THE BOXES BELOW, YOU CERTIFY THESE ITEMS ARE COMPLETE) (*see instructions*)

- ☐ a. Plans shall at least contain the following: Vicinity Map, Plan View, and Typical Cross Section View of the proposed activity.
- ☐ b. All direct, indirect and secondary impacts from USACE regulated activities are shown on the project plans.
- ☐ c. The size of the impact area for each activity (acre, square feet, linear feet) are shown on the project plans.
- ☐ d. For discharges of fill material (§404), the volume of fill material is identified on the project plans.
- ☐ e. The duration of each impact, permanent or temporary (X days), is identified on the project plans.
- ☐ f. Do activities with permanent impacts result in the loss of waters? If so, this is identified on the project plans.
- ☐ g. All aquatic resources in the vicinity of the USACE regulated activities are delineated on the project plans.

18. AVOIDANCE & MINIMIZATION (BY CHECKING THE BOXES BELOW, YOU CERTIFY THESE CRITERIA ARE MET) (*see instructions*)

- ☐ a. The project has been designed to avoid and minimize impacts to aquatic resources.
- ☐ b. The footprint of activities in waters of the U.S. has been reduced to only what is necessary to achieve the overall project purpose.
- ☐ c. All practicable measures have been taken to avoid and minimize impacts to aquatic resources through construction techniques and site access (e.g., Best Management Practices, Time of Year Restrictions).
- ☐ d. All temporary impacts from USACE regulated activities will be restored upon completion of construction and the project area will be returned to pre-construction contours and conditions.

COMPLIANCE WITH FEDERAL REGULATIONS & SUPPLEMENTAL INFORMATION

19. DUE DILIGENCE (*see instructions*)

Complete the entries below to document compliance with the following Federal requirements. Construction may NOT begin if a PCN is/may be required, and you must contact USACE to determine permitting requirements. Documentation that demonstrates how the activity complies with each field below shall be submitted to the USACE as noted in the instructions block. See each General Condition (GC) in the GP for how to comply with each requirement.

a. State Historic Preservation Officer	Select Option
b. Massachusetts BUAR	Select Option
c. Tribal Historic Preservation Officers	Select Option
d. Endangered Species Act - NOAA	Select Option
e. Endangered Species Act - USFWS	Select Option
f. Northern Long Eared Bat (ESA)	Select Option
g. Essential Fish Habitat	Select Option
h. Wild & Scenic Rivers	Select Option
i. 401 Water Quality Certification 401	Select Option
	401 WQC/OOC File Number: OOC issued: 401 issued:
j. Section 408 Permission	Select Option
k. Coastal Zone	Select Option
l. Construction Mats	Select Option
m.Time of Year Restrictions	Select Option
n. Vernal Pools	Select Option
o. Sediment & Erosion Controls	Select Option
p. Stream/Wetland Crossings	Select Option

20. AQUACULTURE ACTIVITIES - GP 18 (*see instructions*)

- ☐ a. If required, an Aquaculture Certification from the Massachusetts Division of Marine Fisheries was obtained prior to commencing work.
- ☐ b. Coordination with the U.S. Coast Guard pursuant to Private Aids to Navigation has occurred prior to commencing work.
- ☐ c. If required, a MEPA Certificate was obtained from the Massachusetts Environmental Protection Agency prior to commencing work. Select Option
- ☐ d. The prospective permittee contacted local authorities (e.g. harbormaster, select board, shellfish constable) for authorization of their facility prior to commencing work.

21. ADDITIONAL INFORMATION/ATTACHMENTS (*see instructions*)

- ☐ a. The project plans are enclosed in this SVN submittal (see block 17).
- ☐ b. The activity Select Option funded through the Bipartisan Infrastructure Bill (also known as the Infrastructure Investment and Jobs Act).
- ☐ c. All required state, local and federal approvals were acquired prior to starting construction in USACE jurisdiction.
- ☐ d. After construction of the activity is completed, a complete Certificate of Compliance will be submitted to USACE.

22. IS THERE ANOTHER LEAD FEDERAL AGENCY:

☐ YES ☐ NO

23. STATEMENT OF AUTHORIZATION *(see instructions)*

I certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

24. SIGNATURES *(see instructions)*

I hereby certify that the information in this Self-Verification Notification is complete and accurate. As the applicant or their duly authorized agent, I certify the activity was completed in accordance with the terms and conditions of the GP. This includes all applicable terms, general conditions, and activity-specific GP criteria. I agree to allow the duly authorized representatives of the Corps of Engineers Regulatory Program and other regulatory or advisory agencies to enter upon the premises of the project site at reasonable times to evaluate inspect and photograph site conditions. This consent to enter the property is superior to, takes precedence over, and waives any communication to the contrary. For example, if the property is posted as “no trespassing” this consent specifically supersedes and waives that prohibition and grants permission to enter the property despite such posting.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Instructions for Preparing a
Department of the Army
General Permit (GP) Self-Verification

Blocks 1 through 3. To be completed by the Corps of Engineers.

Block 4. Applicant' Name. Enter the name and the e-mail address of the responsible party or parties. If the responsible party is an agency, company, corporation, or other organization, indicate the name of the organization and responsible officer and title. If more than one party is associated with the self-verification, please attach a sheet of paper with the necessary information marked Block 4.

Block 5. Address of Applicant. Please provide the full address of the party or parties responsible for the self-verification. If more space is needed, attach an extra sheet of paper marked Block 5.

Block 6. Applicant Telephone Number(s). Please provide the telephone number where you can usually be reached during normal business hours.

Blocks 7 through 9. To be completed, if you choose to have an agent.

Block 7. Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer, consultant, or any other person or organization. Note: An agent is not required.

Blocks 8 and 9. Agent's Address and Telephone Number. Please provide the complete mailing address of the agent, along with the telephone number where they can be reached during normal business hours.

Block 10. Proposed General Permit Activity Name or Title. Please provide a name identifying the proposed GP activity, e.g., Windward Marina, Rolling Hills Subdivision, or Smith Commercial Center.

Block 11. File Number(s) of Previous USACE Actions on the Site Please provide any known USACE file number. If the activity does not have a known USACE file number, you may state N/A.

Block 12. Name of Waterbody. Please provide the name (if it has a name) of any stream, lake, marsh, or other waterway to be directly impacted by the GP activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 13. Proposed Activity Coordinates. Please enter the latitude and longitude of where the proposed GP activity is located. Indicate whether the project location provided is the center of the project or whether the project location is provided as the latitude and longitude for each of the "corners" of the project area. If there are multiple sites, please list the latitude and longitude of each site (center or corners) on a separate sheet of paper and mark as Block 13.

Block 14. Proposed Activity Street Address. If the proposed activity is located at a site having a street address (not a box number), enter it in Block 14.

Block 15. General Permit Activity Type. Please select all GP activity types that apply to the proposed activity. A list of GP activity types can be found in Section III of the GP.

Block 16. Summary of Project Impacts. Please provide ALL proposed impacts, both temporary and permanent in duration, that are located in Waters of the United States. The area of impact shall be provided in square feet (SF). When applicable, impacts that result in conversion of stream bank or shoreline must also be identified in linear feet (LF). Dredging or the discharge of dredged or fill material shall also include the volume, cubic yards (CY), of material removed from or placed into Waters of the U.S. If more entries are required, please attach a table matching the desired format in Block 16.

Block 17. Project Plans. Please verify that items a-g are included in the project plans. Three types of illustrations are necessary to properly depict the proposed work. These illustrations or drawings are identified as a Vicinity Map, a Plan View (Aerial view) and a Cross Section Map. For linear projects (e.g. roads, subsurface utility lines, etc.) gradient drawings (longitudinal profile) should also be included. Plans must accurately depict the existing conditions and all aspects of the proposed activity located in waters of the U.S. Please submit one copy of all drawings formatted to print on 8½ x 11 inch or 11 x 17 inch plain white paper. Use the fewest number of sheets necessary for your drawings or illustrations. Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view, or cross section). While illustrations need not be certified engineering sheets; they should be clear, accurate, contain all necessary information, and depict all proposed work. Each submission must also include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current wetland delineation manual and regional supplement published by USACE.

Block 18. Avoidance & Minimization. Please verify that items a-d have been implemented for the proposed activity.

Block 19. Due Diligence. Please complete all the fields and submit documentation to USACE to demonstrate compliance with the above requirements. This Documentation may include emails, letters, meeting notes, phone call log, project narrative, project plans, a species list from the NOAA Section 7 Mapper, a completed copy of the IPAC determination keys, etc. Documentation should be limited to what is necessary to demonstrate how the proposed activity meets each requirement. Refer to the MA GP, Appendix A, for specific guidance on the identification of previously identified historic properties and previously unidentified historic properties. Endangered Species: *The applicant must be designated as the non-federal representative for the purposes of Section 7 consultation to select the Rangewide D-Key options. Otherwise, the applicant shall select the following option when IPAC indicates the NLEB is present: "The activity IS located within the NLEB Species Range (PCN Required)."

Block 20. Aquaculture Activities. Please verify that items a-d have been obtained or completed prior to commencing work in waters of the U.S.

Block 21. Additional Information/Attachments. Please verify that items a-d have been completed prior to commencing work in waters of the U.S.

Block 22. Lead Federal Agency. Please identify if there is another lead federal agency involved with the proposed activity. Enter the lead federal agency name (e.g., the Federal Emergency Management Agency, FEMA) and the agency's designated person of contact for the activity.

Block 23. Statement of Authorization. The applicant shall sign this section for all activities. If an agent is to be employed, the agent shall sign this section.

Block 24. Signatures. The SVN must be signed by the person proposing to undertake the GP activity, and if applicable, the authorized party (agent) that prepared the SVN. The signature of the person proposing to undertake the GP activity shall be an affirmation that the party submitting the SVN possesses the requisite property rights to undertake the GP activity.

US Army Corps of Engineers®
New England District

APPENDIX D: PCN APPLICATION CHECKLIST

The following information shall be submitted for all PCNs for USACE to properly evaluate your application. Some applications may require more information and this checklist is offered as a tool to assist applicants with submitting a complete application.

SECTION 1: GENERAL APPLICATION INFORMATION

1. ☐ Complete the Pre-Construction Notification document (Appendix B).
2. ☐ Specify which local/state/federal authorizations are required for the project and if any have been obtained or applied for at the time of USACE application submittal.
3. ☐ Identify all funding sources the project will receive or has received to date. Provide any relevant information in the application submission.
4. ☐ Is this part of a larger project that is being implemented in phases? If so, describe the project schedule and how each phase will be implemented.
5. ☐ Describe the existing conditions on the site and the general land use in the vicinity of the project at the time application submittal.
6. ☐ Provide any historic information available that you may have of project area, e.g., existing USACE permit numbers, the names under which the permits were obtained if the permit numbers are unknown, construction dates and proof of prior existence (aerials, photos, town hall records, affidavits, state or local permits, etc.) to verify that the project predates regulation and is "vested".[19]
7. ☐ The anticipated start and end dates for construction.

SECTION 2: WETLAND DELINEATION

8. ☐ Data used to support aquatic resource boundary determinations (delineation forms, delineation map(s) that show the locations of each aquatic resource in the project area, aerial and ground photographs, LIDAR imagery, national wetland inventory maps, soil maps, national hydrography dataset maps, floodplain maps, historical imagery, etc.).
9. ☐ Photographs of the wetland(s) and/or waterway(s) where impacts are proposed. Photos at low tide are preferred for work in tidal waters.
10. ☐ Indicate the relationship of the project area to waters of the U.S., i.e., adjacent wetlands, tidal influence or hydraulic connectivity through culverts, or other conveyances, etc.
11. ☐ At minimum the delineation map/figure should include the following:
    a. Contour lines showing topography.
    b. North arrow.
    c. Bar and text scale.
    d. Legend.
    e. Drawn project boundary.
    f. High tide line, mean high water, mean low water, ordinary high water mark, and/or wetland boundaries.
    g. Captions with a unique name for each aquatic resource and the area or length of the aquatic resource within the project area.

[19] Vested is exempt (someone or something) from a new law or regulation.

h. Appropriate landmarks and features (e.g., culverts, special aquatic sites, etc.).
i. Points showing the paired upland and wetland delineation locations for tidal and non-tidal wetlands only.

SECTION 3: AVOIDANCE & MINIMIZATION

12. ☐ Describe specific measures taken to avoid impacts to aquatic resources or describe why aquatic resources could not be avoided while achieving the project purpose and need.
13. ☐ For impacts to aquatic resources that could not be avoided, describe specific considerations/ measures taken to minimize the area of proposed impacts to aquatic resources in designing the project.
14. ☐ Describe specific measures taken to avoid and minimize the proposed direct, indirect, and secondary impacts to aquatic resources and their functions through construction techniques and timing.
15. ☐ If applicable, provide a restoration plan that describes how all temporary fills and structures will be removed and the area restored to pre-impact conditions (see GC 22).
16. ☐ If applicable, provide an Invasive Species Control Plan (see GC 29). For sample control plans, see www.nae.usace.army.mil/missions/regulatory/invasive-species.
17. ☐ If applicable, describe how the proposed wetland/waterbody crossing is compliant with GC 31, Stream Work and Crossings, and Wetland Crossings.

SECTION 4A: PROJECT IMPACTS

18. ☐ Describe the overall project and the activities located in Waters of the U.S. (WOTUS) that you are seeking authorization for.
19. ☐ Identify the following for project impacts in WOTUS:
    a. ☐ Direct, indirect, secondary impacts[20] within WOTUS.
    b. ☐ The size of each impact (square feet or acres, or linear feet).
    c. ☐ For discharges of fill material (§404), specify the volume of fill material to be discharged (cubic yards).
    d. ☐ The impact duration from each activity, permanent or temporary (X days).

SECTION 4B: PROJECT PLANS

20. ☐ Submit project plans that depict all impacts in WOTUS. On the project plans, applicants shall provide:

General Information

    a. ☐ Plan view and typical cross-section view sheets that show the existing and proposed conditions. These illustrations should each be identified with a figure number, date of the map, the project title, the name of the applicant and the type of illustration (vicinity map, plan view, or cross section).
    b. ☐ Drawings, sketches, or plans that are legible, reproducible (color is encouraged, but features must be distinguishable in black and white), drawn to scale, and no larger than 11”x17” and 10 MB when submitted in digital format. Numeric and graphic/bar scales must agree, and plan details must be measurable using a standard engineer’s scale on printed plans. Reduced plans are not acceptable.
    c. ☐ The north arrow and remove miscellaneous non-wetland or water project related features such as conduits, utility poles, guardrails, etc.

[20] See definitions section for the definitions of direct, indirect, secondary impacts.

d. ☐ Clearly draw the overall limits of work, staging areas, disposal sites, access routes, and any permittee responsible mitigation sites. These areas may include both aquatic resources and upland areas.
e. ☐ Names or numbers of all roads in the site's vicinity and ownership and numbers of abutting parcels.
f. ☐ Datum in plan and elevation views. The horizontal datum shall be in the NAD 83 Massachusetts State Plane Coordinate System (INSERT) in U.S. survey feet. The vertical data in coastal projects shall be referenced to either MLLW or the North American Vertical Datum of 1988 (NAVD 88). Both the distance and depth units shall be U.S. survey feet and specified on the project plans.

Aquatic Resources & Project Impacts

g. ☐ Delineation of all aquatic resource types on site including salt marsh; other special aquatic sites (vegetated shallows, mudflats, riffles and pools, coral reefs, and sanctuaries and refuges); other waters, such as lakes, ponds, vernal pools, natural rocky habitat (tidal only), and perennial, intermittent, and ephemeral streams.
h. ☐ Identify the substrate type (cobble/gravel, organic detritus, sand/shell, silt, mud) and the approximate percentage of each substrate type on site. Grain sizes shall be based on Wentworth grain size classification scale for granules, pebbles, cobbles, and boulders. Sediment samples with a content of 10% or more of pebble-gravel-cobble and/or boulder in the top layer (6-12 inches) should be delineated and material with epifauna/macroalgae should be differentiated from bare pebble-gravel-cobble and boulder.
i. ☐ The direction of ebb and flood in tidal waters and direction of flow in non-tidal waters.
j. ☐ In tidal waters, the project boundary distance from special aquatic sites identified in 20g above if within 25 feet from that resource.
k. ☐ USACE jurisdictional boundaries including ordinary high-water mark (OHWM), high tide line (HTL), mean high water (MHW). Other boundaries include mean low water (MLW), mean lower low water (MLLW), as applicable.
   - Non-tidal: OHWM and/or wetland boundaries.
   - Tidal (structures/work only): MHW, MLW.
   - Tidal (Fill and Structures/work): HTL, MHW, MLW.
   - Tidal (Dredging/Beach Nourishment): HTL, MHW, MLW, MLLW.
l. ☐ Identification of each aquatic resource with a unique name (ex. Wetland 1, Wetland 2, Tributary 1, Beaver Brook, Atlantic Ocean) and the size of each aquatic resource within the project area (square feet or acres).
m. ☐ Impacts to each aquatic resource with captions denoting the size of each impact (square feet, acres, or linear feet) and the duration of the impact (ex. Permanent, Temporary (X days).

SECTION 4C: PROJECT PLANS - SPECIFIC PROJECT INFORMATION

21. ☐ For projects involving Navigation, Structures, Dredging, and/or Beach Nourishment, the applicant shall also address the following:

Navigation

a. ☐ Identify the locations of adjacent Federal navigation project (FNP) and/or state/local navigation projects on the project plans.
b. ☐ Specify the distance between the FNP and proposed project boundary, the authorized depths of the FNP, and state plane coordinates of seaward end(s) of project structures near an FNP.

Structures

a. ☐ Identification of the piling type (steel, timber, concrete) and diameter to be removed and/or installed.
b. ☐ Specify the minimal height of the structures' frame over saltmarsh. To meet the SV threshold, piers must be ≤4 feet in width and this minimal height must achieve a 1.5:1 ratio (i.e., a 4-foot-wide pier is 6 feet above a saltmarsh).
c. ☐ For floats, the methods of securing them (piles, bottom anchors) and for keeping them off substrate (skids, stops) at low water. To meet the SV threshold, a minimum depth of 18-inches of water should be maintained below a floating dock/structure at lower tide levels.

Dredging

a. ☐ The area (SF, acre) and volume (CY) of material to be dredged waterward of MHW for each dredge location.
b. ☐ Dredge boundaries.
c. ☐ Bathymetry for existing, proposed, and historical (include dates and USACE permits) dredge depths.
d. ☐ The likely final angle of repose of the side cuts based on the physical characterization of the material to be dredged and based upon the high/ medium/low, wave or current energy of the location.
e. ☐ Label area whether the dredging is new, maintenance, improvement, or a combination.
f. ☐ Location of the disposal site (include location sheet). NOTE: For projects proposing open water, nearshore disposal, or beach nourishment, contact USACE as early as possible for sampling and testing protocols. Sediment testing, including physical (e.g., grain-size analysis), chemical and biological testing may be required. Sampling/testing of sediments without such contact should not occur and if done, will be at the applicant's risk.
g. ☐ The methods and areas used to retain or prevent dredged material from running back into the wetland or waterway. Provide the capacity of the storage area and points of runback, including the overflow route, into the aquatic system.
h. ☐ For open-water disposal, explain why inland or beneficial reuse sites are not practicable.
i. ☐ Show the finished top elevation of the disposal site.

Beach Nourishment

a. ☐ For beach nourishment, identify the disposal footprint, existing and proposed nourishment profiles (multiple profiles are appropriate if the site is more than 150 feet long or non-contiguous), total fill area (SF) and volume (CY), fill area and volume waterward of the HTL, and delineation of dunes, banks, existing beach vegetation, and contours.
b. ☐ For beach nourishment identify the substrate type (fine sand, sand, cobble, boulder) and/or grain-size of existing material.

SECTION 5: STRUCTURES

22. ☐ For projects with the removal of existing pilings identify the number, type (steel, timber, concrete) and diameter of pilings to be removed and the methodology for removal (cut off at mud line, pulling, vibratory, etc.).
23. ☐ For projects with the installation of new pilings identify the number, type (steel, timber, concrete) and diameter of pilings to be installed and the methodology for installation (vibratory hammer, impact hammer etc.).
24. ☐ Identify any existing structures and moorings in waters adjacent to the proposed activity, their dimensions, and the distance to the limits and coordinates of any proposed mooring field or reconfiguration zone. For reconfiguration zone and mooring fields, provide the coordinates for all

corners based on the Massachusetts State Plane Coordinate System. Specify the maximum number of slips and/or moorings within proposed reconfiguration zones or anchorage areas.

25. ☐ The dimensions of the structure or work and extent of encroachment waterward of MHW and from affixed point on the shoreline or upland.
26. ☐ Shoreline of adjacent properties and property boundary offset for structures. In narrow waterbodies, the distance to opposite shoreline, waterway width, and structures across from proposed work.
27. ☐ For new commercial boating facilities, anchorage areas or reconfiguration zones, provide a description of the type of vessels that would use the facility, and any plans for sewage pump-out facilities, fueling facilities and contingency plans for oil spills.
28. ☐ See Sections 4A-C above.

SECTION 6: AQUACULTURE

29. ☐ Identify the coordinates for lease area corners and gear configuration area on the project plans.
30. ☐ Identify the proposed aquaculture gear type (buoys, floats, racks, trays, nets, lines, tubes, cages, containers, and other structures). Provide the impacts for each aquaculture gear type (see Section 4A 19a-d).
31. ☐ For a GP 18 to be valid, applicants must have (a) their MA DMF Aquaculture Certification letter for licensed shellfish aquaculture sites, (b) documentation that the applicant has coordinated with the U.S. Coast Guard regarding USCG Private Aids to Navigation standards, (c) their MEPA Certificate (if required), and (d) documentation that the applicant has contacted their local authorities (ex. harbormaster, select board, shellfish constable) for authorization of their facility.
32. Provide information on site the operation, maintenance, and access. Will the site be accessed via boat, kayak, etc.? Will cages be removed in the winter? How often will gear be checked on? Is there an operations plan for the proposed aquaculture area?
33. ☐ See Sections 4A-C above.

SECTION 7: DREDGING

34. ☐ Sampling plan requests for new, improvement or maintenance dredging must submit completed **Dredged Material Evaluation checklist found at Dredged Material Evaluation Checklist, Sampling and Analysis Plan Requirements from Applicant (army.mil)** and identify the method of handling/transporting the dredged material.
35. ☐ Identify grain-size of material to be dredged (e.g., silty sand) and provide any existing sediment grain size and bulk sediment chemistry data from the proposed project or nearby projects. Include information on any recent spills of oil and/or other hazardous materials and/or nearby outfalls. Document the information source, e.g., EPA database, the harbormaster or fire chief. If there are none, state “none”.
36. ☐ See Section 4A, 4B and 4C, Dredging 21(a-i) above.

SECTION 8: WETLAND/WATERBODY CROSSINGS

37. ☐ For the stream crossing, identify the crossing methodology on the project plan (e.g., dam and pump, dry, wet, etc.). Submit a waterway crossing sequencing plan with the application.
38. ☐ If the project includes a permanent crossing of a tidal waterway, your project design should be modified to match the velocity, depth, cross-sectional area, and substrate of the existing waterbody adjacent to the crossing and provide documentation (hydraulic analysis including low lying property analysis) that the size of the crossing will not restrict tidal flow over the full natural tide range and will not adversely affect abutting infrastructure.

39. ☐ If the work includes a permanent crossing of a non-tidal stream, your project design should be modified to match the culvert gradient of the existing stream channel profile, provide clearance for ≥1.2 times bank full width and conveyance should be embedded ≥1-2 feet for box culverts and pipe arches or ≥1-2 feet and at least 25 percent for rounded pipes/culverts in accordance with the Massachusetts Stream Crossing Standards. Provide the basis for any variation to this requirement.
40. ☐ If the work includes a permanent crossing of a non-tidal stream, the structure should be designed to include a natural bottom substrate within the conveyance that matches the characteristics of the substrate in the natural stream channel and the character of the banks (mobility, slope, stability, confinement, grain and rock size). The conveyance should be designed with a minimum openness ratio ≥0.82-feet (0.25-meters). For how to calculate openness ratio and stream simulation ecological approach for road and stream crossings, see https://www.nae.usace.army.mil/Missions/Regulatory/Stream-and-River-Continuity/.

SECTION 9: COMPENSATORY MITIGATION

41. ☐ Does the project require Compensatory Mitigation[21] for impacts to Waters of the U.S.? (See Section V in the 2023 Massachusetts General Permit)
42. ☐ If the project requires mitigation, does the selected compensatory mitigation option (i.e., In-Lieu Fee, permittee-responsible mitigation) deviate from the order of the options presented in §332.3(b)(2)-(6)? If so, please explain why. https://www.ecfr.gov/current/title-33/chapter-II/part-332/section-332.3
43. ☐ For any compensatory mitigation that involves preservation, the applicant must use a site protection instrument to preserve the parcel in perpetuity. (Conservation Easement, Deed Restriction, etc.) https://www.mass.gov/service-details/conservation-restriction-review-program.

SECTION 10: HISTORIC PROPERTIES & NOTIFICATIONS TO SHPO, THPOs, BUAR

44. ☐ Notify the SHPO, Massachusetts Historical Commission, of the Project via Certified Mail and include proof of delivery or receipt in the application package (See Appendix A).
45. ☐ As applicable, notify the THPOs, Narragansett Indian Tribe, Wampanoag Tribe of Gay Head (Aquinnah), and Mashpee Wampanoag Tribe, of the Project via email OR mail and include proof of delivery or receipt in the application package (See Appendix A).
46. ☐ As applicable, notify the BUAR via email (*strongly preferred*) OR mail and include proof of delivery or receipt in the application package (See Appendix A).
47. ☐ Include responses to this notification in the permit application.
48. ☐ As applicable, information on historic properties (Tribal and Archaeological) within the project area should be provided in the permit application.

SECTION 11: ENDANGERED SPECIES & ESSENTIAL FISH HABITAT

49. ☐ Provide a USFWS Information for Planning and Consultation (IPaC) Official Species List from https://ecos.fws.gov/ipac and the email of the individual who generated the list (see GC 10 of the 2023 Massachusetts General Permit for more information).
50. ☐ Provide a species list from the NMFS Section 7 Endangered Species Act mapper at https://noaa.maps.arcgis.com/apps/webappviewer/index.html.
51. ☐ Provide a species list from the NMFS Essential Fish Habitat Mapper at https://www.habitat.noaa.gov/apps/efhmapper/?page=page_3.

[21] Your mitigation proposal must be consistent with the December 29, 2020 Compensatory Mitigation Standard Operating Procedures at https://www.nae.usace.army.mil/Portals/74/docs/regulatory/Mitigation/Compensatory-Mitigation-SOP-2020.pdf and 2008 Mitigation Rule.

52. ☐ If the project will generate turbidity, describe the extent of turbidity and if erosion controls will be used to contain turbidity. If turbidity controls are not operationally feasible, explain the basis for your conclusion and identify any other measures that you will implement to minimize resuspension of sediment.
53. ☐ Identify the substrate type and any aquatic resources that will be affected by the proposed action. (SAV, salt marsh, sand, silt/clay, rocky/hard bottom)
54. ☐ For projects which will include the installation of pilings/sheet-piles, identify the substrate at the project site (sand, cobble, silt/mud/clay), the installation method (vibratory hammer, impact hammer, combination) and indicate whether the following “soft start” procedures at beginning of the workday and after a 30-minute period of rest will be deployed:
    a. ☐ Vibratory Pile Installation: pile driving will be initiated for 15 seconds at reduced energy followed by a one-minute waiting period. This sequence of 15 seconds of reduced energy driving, one-minute waiting period will be repeated two additional times, followed immediately by pile-driving at full rate and energy.
    b. ☐ Impact Pile Installation: pile driving will commence with an initial set of three strikes by the hammer at 40% energy, followed by a one-minute wait period, then two subsequent 3-strike sets at 40% energy, with one-minute waiting periods, before initiating continuous impact driving.
55. ☐ If the project involves dredging, describe any dredge history, number of dredge events to be covered by the permit, erosion/sediment controls, dredge type, intake structures (mesh screen size), dredged material disposal site.
56. ☐ For project activities associated with structures, identify the number, type (drill barge, work boat, tugboat, etc.), and size of any temporary vessels that will be used. Specify measures that will be implemented to ensure vessels are not berthed in shallow water or will “ground out” at low tide.
57. ☐ For aquaculture projects identify whether any component of the gear is seasonal (will be removed annually) or will be in place year-round. If gear will be present year-round and will be variably managed (e.g., floating in summer, bottom in winter) identify month/date for such configurations.
58. ☐ For aquaculture projects identify whether the project will involve use of an existing vessel or new vessel. Identify the length for all work vessels and identify the distance round trip from vessel berthing location and aquaculture area.
59. ☐ For project activities associated with docking structures (either commercial, industrial, or recreational) identify the number, type (motorized/non-motorized, jet-ski, sailboat, kayak, canoe, other that will be berthed there and the sizes of each.
60. ☐ Information required for Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act:
    a. Results of an eelgrass survey completed per the INSERT.
    b. Essential Fish Habitat Assessment to determine project-related impacts to essential fish habitat, using guidance developed by the National Marine Fisheries Service.
61. ☐ A document containing the following information (requirements of 50 CFR §600.920(e)(3)):
    a. Description of proposed action.
    b. Analysis of potential adverse effects on essential fish habitat.
    c. Conclusions regarding the effects of the action on essential fish habitat.
    d. If applicable, proposed mitigation.
    e. Analysis of alternatives to the proposed action.
    f. Other:

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DOCUMENT A00832

Massachusetts Department of Environmental Protection

401 Water Quality Certification
Administrative Completeness Review

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Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
100 Cambridge Street Suite 900 Boston, MA 02114 • 617-292-5500

Maura T. Healey
Governor

Kimberley Driscoll
Lieutenant Governor

Rebecca L. Tepper
Secretary

Bonnie Heiple
Commissioner

March 29, 2024

Massachusetts Department of Transportation Highway Division
Ten Park Plaza, Suite 4160
Boston, MA 02116
ATTN: Courntney Walker

RE: 401 WATER QUALITY CERTIFICATION
Administrative Completeness Review
401 WQC Application No: 24-WW11-0033-APP

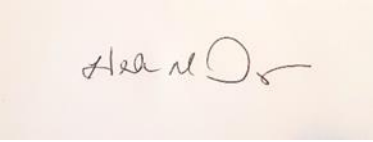
AT: North Poland Road Bridge Replacement over Poland Brook (Bridge No. C-20-004)
Conway, MA

Dear Ms. Walker:

The Massachusetts Department of Environmental Protection (MassDEP) has completed its Administrative Completeness Review of the application for the above-referenced application. The application still requires proof of public notice in a newspaper of general circulation within the area and the Environmental Monitor to be administratively complete.

Should you have any questions relative to this letter, please contact me at heidi.davis@mass.gov or Tyler Lewis at tyler.lewis@mass.gov.

Sincerely,



Heidi M. Davis
Highway Unit Supervisor

Ecc: DEP WERO – Michael McHugh
MassDOT – Kylie Abouzeid
MassDOT – Melissa Lenker
USACE – Dan Vasconcelos
Conway Conservation Commission – Grace Larson - concomm@conwayma.gov

DOCUMENT A00833

Massachusetts Department of Environmental Protection

401 Water Quality Certification Administrative Completeness and Technical Deficiency Review

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Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
100 Cambridge Street Suite 900 Boston, MA 02114 • 617-292-5500

Maura T. Healey
Governor

Kimberley Driscoll
Lieutenant Governor

Rebecca L. Tepper
Secretary

Bonnie Heiple
Commissioner

April 8, 2024

Massachusetts Department of Transportation Highway Division
Ten Park Plaza, Suite 4160
Boston, MA 02116
ATTN: Courtney Walker

RE: 401 WATER QUALITY CERTIFICATION
Administrative Completeness and Technical Deficiency Review
401 WQC Application No: 24-WW11-0033-APP

AT: North Poland Road Bridge (No. C-20-004) over Poland Brook
Conway, MA

Dear Ms. Walker:

MassDEP has completed its Technical Review of the application for the above-referenced application and is requesting that you submit the following additional information:

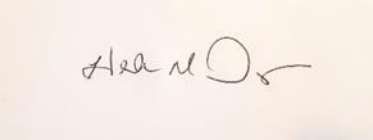
1. At the pre-application site visit of March 12, 2024, it was observed that there was a major slope failure just downstream of the river. Will this slope failure potentially impact the design and/or construction of this project?

2. On sheet 4 of the plans, it appears there is proposed stone or riprap close to STA 11+50. Please clarify the function of this stone.

Upon receipt of all requested supplemental information, MassDEP has 30 calendar days in which to issue or deny a certification.

Should you have any questions relative to this letter, please contact me at heidi.davis@mass.gov or Tyler Lewis at tyler.lewis@mass.gov.

Sincerely,



Heidi M. Davis
Highway Unit Supervisor

Ecc: DEP WERO – Michael McHugh
MassDOT – Kylie Abouzeid
MassDOT – Melissa Lenker
USACE – Dan Vasconcelos
BETA-Inc, - Laura Krause - lkrause@beta-inc.com
Conway Conservation Commission – Grace Larson - concomm@conwayma.gov

DOCUMENT A00834

401 Water Quality Certification
Response to Comments

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IMPROVING COMMUNITIES TOGETHER

MEMORANDUM

Date:	April 19, 2024	Job No.:	22.10326.12
To:	Heidi M. Davis, Highway Unit Supervisor (MassDEP)		
Cc:	Tyler Lewis (MassDEP) Ryan Hale (MassDEP) Courtney Walker (MassDOT) Melissa Lenker (MassDOT) Dan Vasconcelos (USACE) Grace Larson (Conway Conservation Commission)		
From:	Laura Krause, Senior Project Manager (BETA) Chris Jones, Vice President (BETA)		
Subject:	**North Poland Road Bridge (No. C-20-004) over Poland Brook – 401 Water Quality Certification**		

INTRODUCTION

The purpose of this memorandum is to provide responses to comments provided by Heidi M. Davis (MassDEP) received via email on April 8, 2024, associated with the 401 WQC submitted for the North Poland Road Bridge Replacement located over Poland Brook in Conway, Massachusetts. The comments provided by MassDEP (shortened to "DEP") are quoted below in *italics*, with BETA's responses provided in **bold**.

COMMENTS

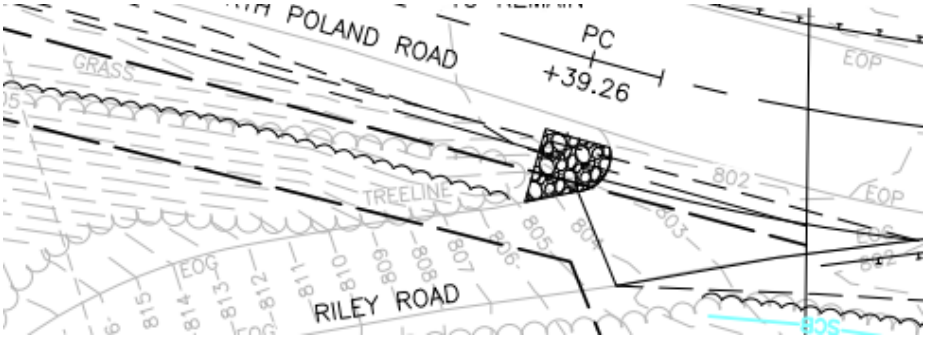
North Poland Road Bridge (No. C-20-004)

1. *DEP: At the pre-application site visit of March 12, 2024, it was observed that there was a major slope failure just downstream of the river/ Will this slope failure potentially impact the design and/or construction of this project?*

   BETA: Slope failure is downgradient of the Project and is not anticipated to impact the design or construction of the Project.

2. *DEP: On sheet 4 of the plans, it appears there is proposed stone or riprap close to STA 11+50. Please clarify the function of this stone.*

   BETA: Gutter flow from Riley Road is being directed onto the proposed riprap stone to mitigate existing problems with slope erosion at the base of Riley Road.



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Massachusetts Department of Environmental Protection

401 Water Quality Certification

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Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
100 Cambridge Street Suite 900 Boston, MA 02114 • 617-292-5500

Maura T. Healey
Governor

Kimberley Driscoll
Lieutenant Governor

Rebecca L. Tepper
Secretary

Bonnie Heiple
Commissioner

May 17, 2024

Massachusetts Department of Transportation
Highway Division
10 Park Plaza
Boston, MA 02116
ATTN: Courtney Walker

RE: 401 WATER QUALITY CERTIFICATION
BRP WW 11, Minor Fill Project
Bridge Replacement over Poland Brook (C-20-004)
Conway, Massachusetts

401 WQC Application Number: 24-WW11-0033-APP
USACE Application No. NAE-2024-00661 (Self-Verification)

Dear Ms. Walker:

The Massachusetts Department of Environmental Protection (MassDEP) has reviewed your application for a Water Quality Certification (WQC), as referenced above; this application was deemed complete on April 19, 2024. In accordance with the provisions of MGL Ch. 21, §§26-53 and Section 401 of the Federal Clean Water Act as amended (33 U.S.C. §1251 et seq.), it has been determined there is reasonable assurance the proposed project will be conducted in a manner which will not violate applicable water quality standards (314 CMR 4.00) and other applicable requirements of state law.

The proposed project consists of the replacement of the existing bridge structure (Bridge No. C-20-004) that carries North Poland Road over Poland Brook in Conway, removal of the temporary bridge structure constructed atop the existing bridge, removal of the bridge piers, stormwater drainage improvements, and streambed restoration. The bridge structure is stated as needing replacement due to its poor condition and various structural deficiencies.

The existing bridge is a single-lane bridge accommodating two directions of traffic; it consists of two concrete abutments, two concrete piers, and a concrete deck. The existing bridge was closed to traffic in November 2022, and in February 2023, the superstructure was removed. A temporary steel truss superstructure was installed to allow the bridge to remain in service until the bridge replacement project was completed. The bridge spans Poland Brook with a length of 65 feet and a width of 22 feet. The abutments of the original bridge are located above the Ordinary High Water (OHW) elevation, but

the two piers are within the brook. The bankfull width of Poland Brook is 35 feet, 10 inches. There are currently has no stormwater structures and all stormwater flows via country drainage.

A portion of the project is located within Natural Heritage and Endangered Species Program (NHESP) mapped priority habitat for wood turtle (*Glyptemys insculpta*) and longnose sucker (*Catostomus Catostomus*) habitat. In addition, Poland Brook is a mapped Coldwater Fishery Resource and is a tributary to the Deerfield River which is mapped Essential Fish Habitat for Atlantic salmon. The project is within the Federal Emergency Management Agency 1% annual chance of flooding zone. The project has received a conditional "No Take" letter from NHESP which requires a wood turtle protection plan and Time of Year restrictions.

The project will remove the temporary steel truss bridge, demolish, and remove the existing bridge superstructure, abutments, and piers. New concrete abutments will be constructed upgradient from the existing structures, outside of the channel of Poland Brook. The abutments and piers being demolished will be cut two feet below grade. The proposed bridge will be constructed with a span of 83 feet and a width of 27 feet. Approximately 250 linear feet of the roadway will be repaved on each approach of the bridge. A deep sump catch basin will be installed along with three leaching catch basins to treat stormwater.

Removal of piers will require dewatering. In total, 872 square feet (sf) (687 sf temporary and 185 sf permanent) of LUW impacts are required for the project. Temporary impacts are primarily due to work associated with the removal of the piers. The permanent impacts to LUW are a result of the installation of riprap for scour protection. Removal of the two piers will create 45 sf of streambed within Poland Brook. A total of 34 cubic yards (cy) of dredging in Poland Brook is required for the removal of the two piers and streambed restoration. Temporary cofferdams will be installed around the piers to create dry working conditions. The project will not result in any impacts to BVW.

Demolition, staging and construction will be conducted from the existing paved surface of North Poland Road, upgradient of the Poland Brook channel. No equipment will be staged within the channel itself.

The streambed and the areas of riprap installation will be restored with 24 inches of natural streambed material under the supervision of a Fluvial Geomorphologist (FGM). Installation of riprap along the streambed and bank is necessary to prevent future scour.

The Project will result in a 2,275-sf increase in impervious surface due to the widening of the bridge from 22 feet to 27 feet. Through a complete evaluation, it was determined that the only feasible structural Stormwater Control Measures (SCMs) to provide total suspended solids removal to the maximum extent practicable (MEP) are leaching basins. Due to adjacent private property and steep grades on the south side of the project area, additional SCMs were not considered practicable. Existing conditions will be improved by installing the deep sump catch basin and three leaching basins to treat what was originally country drainage on the north side of the bridge. These improvements will allow the project to fully comply with stormwater standards 1 and 3, and standards 2, 6, and 4 to MEP.

The proposed span will fully comply with all stream crossing standards. The proposed 83-foot span between the abutments will be 2.3 times the 35-foot 10-inch bankfull width of Poland Brook.

Based on a review of information provided by the applicant, MassDEP finds that this project complies with the standards described under 314 CMR 9.06. Public notice was provided in the Greenfield Recorder on March 22, 2024. No comment letters were received during the public comment period.

Therefore, based on information currently in the record, MassDEP grants a WQC for this project subject to the following conditions to maintain water quality, to minimize impact on waters and wetlands, and to ensure compliance with appropriate state law. The Department further certifies in accordance with 314 CMR 9.00 that there is reasonable assurance the project or activity will be conducted in a manner which will not violate applicable water quality standards (314 CMR 4.00) and other applicable requirements of state law. Finally, the Department has determined that upon satisfying the conditions and mitigation requirements of this approval, the project provides a level of water quality necessary to protect existing uses and accordingly finds that the project to be implemented satisfies the Surface Water Quality Standards at 314 CMR 4.00.

An alternatives analysis was completed in accordance with 314 CMR 9.00. The bridge is required to be replaced as the no-build alternative would result in continued deterioration of the bridge which would pose a safety hazard.

Pursuant to 314 CMR 9.09(1)(d); 314 CMR 9.06(6)(a); 310 CMR 9.06(2); 314 CMR 9.07; 314 CMR 9.07(1); 314 CMR 9.09(7)(5)(c); 314 CMR 9.11; and 314 CMR 9.09(1)(e), the following Special Conditions are necessary to ensure that construction practices and stormwater controls are implemented in such a manner as to prevent degradation to wetlands and waters; ensure that practicable steps have been taken which will avoid and minimize impacts to wetlands and waters; minimize turbidity and sediment caused by construction activities; ensure that water quality is not degraded, and that biology of the waters are not negatively impacted by potential discharges; and/or maintain a record of the dredged material for reference and to ensure accountability in its transportation.

Those Special Conditions that require direct submittals to MassDEP for either review, or review and approval, are denoted by the following notation (Submittal) at the end of the condition and are summarized in Attachment A. In addition, those conditions with the (Submittal) designation shall be included in the Special Provisions and, as applicable, reviewed at the Pre-Construction Meeting.

1. All work shall be performed in accordance with the following documents and plans:

    - Water Quality Certification (WQC) Application North Poland Road Bridge Replacement. Prepared by BETA on behalf of MassDOT, dated March 19, 2024, with cover letter and attachments. 401 WQC Application Number: 24-WW11-0033-APP.
    - MassDOT Responses to MassDEP Administrative Completeness Technical Review. Prepared by BETA on behalf of MassDOT. North Poland Road Bridge Replacement. Dated April 19, 2024.

Pre-Construction

2. As specified in the application and Specification Item 151.9, a qualified **Fluvial Geomorphologist** (FGM) with a minimum of five years of relevant professional experience in stream replacement and restoration projects shall be employed to oversee all LUW replacement and restoration

activities. The name, contact information, and qualifications of the FGM shall be provided to MassDEP for approval with a copy to the Conway Conservation Commission prior to the Pre-Construction Meeting. In the event of a conflict between the application and Specification 151.9, the commitment in the application shall apply. **(Submittal)**

3. Prior to the Pre-Construction Meeting, the applicant shall provide MassDEP with the name and contact information of the Resident Engineer (RE) responsible for ensuring that all work complies with the conditions of this WQC. **(Submittal)**

4. A minimum of 21 days prior to the start of work, MassDOT shall contact MassDEP to schedule an onsite Pre-Construction Meeting to review the approved plans and terms and conditions of this WQC. The RE, the construction contractor, the FGM, a representative from the MassDOT Environmental Section and/or the District Environmental Engineer shall attend the Pre-Construction Meeting.

5. MassDEP shall be copied on applicable submittals to the U.S. Army Corps of Engineers (USACE). These include but are not limited to: Self-Verification Notification Form (SVNF); Pre-Construction Notification (PCN); Work-Start Notification Form; Mitigation Work-Start Notification Form; and Compliance Certification Form. The Work-Start Notification Form shall be submitted at least 14 days before the anticipated start of work and the Compliance Certification Form shall be submitted within 30 days following the completion of the authorized work. **(Submittal)**

6. A construction period erosion, sedimentation, and pollution prevention plan (CP/PP) shall be developed and implemented as required by 314 CMR 9.06(6)(a)8. A minimum of 14 days prior to the start of work, MassDOT shall submit the CP/PP for review and approval. If the U.S. Environmental Protection Agency (EPA) Construction General Permit (CGP) applies, the Stormwater Pollution Prevention Plan (SWPPP) may serve as the CP/PP, providing it includes the measures required to be in the CP/PP per these Special Conditions, in addition to the measures specifically required by the CGP. Any subsequent changes to the approved CP/PP (defined herein as including the construction period SWPPP) must be approved by MassDEP. **(Submittal)**

7. Training regarding erosion and sedimentation controls is required. The RE, CP/PP Inspector, and any other relevant personnel responsible for erosion and sedimentation controls shall complete the EPA CGP Inspector Training, or other training that meets the CGP requirements, as well as complete a comprehensive review of the approved CP/PP. Verification of proof of completion training of the shall be submitted to MassDEP prior to the start of work. **(Submittal)**

8. The CP/PP shall identify, but shall not be limited to, staging and laydown areas in relation to BVWs and LUW, proposed dewatering locations, proposed stockpile locations and their proximity to catch basins or other drainage conveyances that discharge to wetland resource areas, and the location of construction-period erosion and sedimentation controls.

9. A minimum of 21 days prior to the start of work, MassDOT shall submit a Water Management Plan for review and approval. The Plan shall include proposed methods to manage construction-period water including but not limited to dewatering methods and locations, specifications for any water bypass systems, and dredge and debris material dewatering prior to shipment off site,

as applicable. The plan shall meet requirements of the CP/PP and be specific to the Project. Dewatering and water bypasses shall be conducted under the supervision of the RE and comply with the applicable conditions identified herein. **(Submittal)**

10. Prior to the start of work, approved erosion and sedimentation control measures shall be installed per the approved CP/PP and as applicable, the manufacturer specifications. Erosion and sedimentation control measures may consist of, but are not limited to, silt fence, staked straw bales, silt/turbidity curtains, compost filter tubes, etc.

11. Prior to the Pre-Construction Meeting, the boundaries of BVWs and LUW shall be re-flagged where they are within 50 feet of the limits of work. In the event BVWs and LUW boundaries overlap, the outermost boundary (i.e., closest to the proposed work) shall be flagged. All boundary markers, once in place, shall remain in place throughout construction until all disturbed surfaces have been permanently stabilized. Boundary markers shall be fully evaluated annually and refreshed where needed. Implementation of and compliance with this requirement shall be documented by the RE. All construction personnel shall be made aware of these markers.

12. A Flood Contingency Plan shall be submitted to MassDEP for review and approval that addresses areas that fall within the 1% annual chance of flooding zone within project limits. The Plan shall address the potential need for temporary relocation of construction and auxiliary equipment during flood events to designated upland locations above the Base Flood Elevation. The Plan shall be approved by MassDEP prior to any work within the 1% annual chance of flooding zone, including mobilization or storage of equipment and materials. **(Submittal)**

13. Final Construction Plans (the plans provided to the contractor) shall be submitted for review at least 30 days prior to the Pre-Construction Meeting. Once MassDEP provides written approval, the updated set of plans shall become the "Final Plan of Record." The Plan shall be prepared and signed by a Professional Engineer in the Commonwealth of Massachusetts and shall incorporate all revisions and additions to the original plans that have been approved as discussed herein as well as any other changes from the permit plans in jurisdictional wetland areas. **(Submittal)**

14. A minimum of 21 days prior to the start of work, a Demolition Plan shall be submitted for review and approval describing how the existing bridge will be demolished and what measures will be taken to assure that demo material is properly contained and does not enter the Winnetuxet River. **(Submittal)**

15. Prior to the start of work (including vegetation clearing or soil disturbance), a copy of the Wood Turtle Protection Plan required for submittal and approval by the MA Division of Fisheries and Wildlife in accordance with the No-Take letter of September 14, 2023, shall be provided to MassDEP. The approved Wood Turtle Protection Plan shall be implemented. **(Submittal)**

Construction Period

16. No more than **872 sf of impacts to LUW (687 sf temporary and 185 sf permanent)** shall occur. All work shall avoid unapproved impacts to BVW and LUW.

17. CP/PP inspections shall occur at least once every seven calendar days and within 24 hours of a storm event that produces 0.5 inches or more of rain within a 24-hour period, or at a more stringent frequency if the CP/PP requires.

18. Copies of CP/PP Inspection and Maintenance Log Forms shall be submitted to MassDEP within 14 days upon request.

19. Inspection and maintenance of erosion and sediment controls in active work areas shall be the responsibility of both the Contractor and RE. The project team shall include an individual with at least three-years' experience with construction period erosion and sedimentation control. The RE shall be ultimately responsible for inspection and maintenance of site controls. The RE, and/or contractor shall immediately notify MassDEP and the Conway Conservation Commission if any unauthorized discharges to BVWs or LUW occur.

20. Disturbed areas shall be stabilized immediately after activities have permanently ceased or will be temporarily inactive for 14 or more calendar days. The installation of stabilization measures shall be implemented as soon as practicable, but no later than 14 calendar days after stabilization has been initiated.

21. Work within LUW shall be conducted in low or no-flow conditions to the extent practicable. Notice shall be provided to MassDEP and the Conway Conservation Commission within 24 hours prior to the commencement of dewatering. Dewatering methods and location(s) shall be approved by the RE prior to use, and shall be documented in the CP/PP. There shall be no discharge of untreated dewatered stormwater or groundwater to BVWs or LUW. Any discharges shall be visibly free of sediment.

22. Additional erosion and sedimentation control materials shall be stored on-site at all times for emergency and routine replacement. Materials shall be kept covered, dry, and accessible at all times. The RE shall be responsible for anticipating the need for and installation of additional erosion and sedimentation controls and shall have the authority to require additional erosion control measures to protect wetland resource areas beyond what is shown on the plans if field conditions, or professional judgment dictate that additional protection is necessary.

23. The RE shall monitor the National Weather Service forecast for updates, and upon issuance of a flood watch for the 1% annual chance of flooding zone, shall implement the flood contingency plan referenced in Condition 12.

24. Any storm drains with potential to receive discharge from stockpiled materials or construction operations shall be managed to inhibit the inflow of sediment while not increasing the likelihood of roadway flooding during periods of precipitation. Stockpiles shall be located no less than 50 feet from BVWs, LUW, catch basins, or other drainage conveyances that discharge to BVWs or LUW. The CP/PP shall specify measures to implement this. Filter fabric stretched under storm drain inlet grates are not acceptable for this purpose.

25. The contractor shall have designated washout areas for concrete equipment that will be comprised of impermeable material and sized to contain project concrete wastes and wash

water. Concrete wash out areas shall be located no less than 50 feet from BVWs, LUW, and catch basins or other drainage conveyances that discharge directly or indirectly to BVWs or LUW.

26. Refueling, washing, and cleaning of vehicles and other construction equipment shall not take place within 50 feet of BVWs or LUW and any wash water shall be contained such that it does not drain toward BVWs or LUW. MassDEP shall explicitly approve in writing any deviation to this condition for oversized stationary vehicles.

27. The contractor shall have spill containment kits on site. In the event of a release of fuels and/or oils, the local fire department and MassDEP shall be notified.

28. A temporary shielding system shall be in place beneath the bridge structure prior to removal and concrete excavation to prevent debris from falling into the water below. If any debris accidentally enters Poland Brook, it shall be immediately retrieved. Notice shall be provided to MassDEP if debris enters the river and photo documentation (if practicable) provided that it has been removed submitted by email.

29. In order to protect rare species habitat (longnose sucker), no in-water, silt-producing work shall occur during the Time of Year (TOY) restriction between the dates of April 1st to July 31st. Work may proceed behind dewatered cofferdams at any time, provided they are installed and removed outside of the TOY restriction.

Stream Mitigation

30. The FGM shall oversee all LUW replication and restoration in accordance with MassDOT Specification Item 151.9 as applicable. Placement of streambed materials shall take place in no- or low-flow conditions. The Water Management Plan required in Condition 9 shall include measures to create no-flow conditions for this work such as a pump bypass system or other dewatering method, if needed. Placement of streambed materials during greater than low-flow conditions shall require a placement plan, with a narrative describing turbidity control measures, submitted to MassDEP for review and approval. In the event of a conflict between the application and Specification 151.9, the commitment in the application shall apply.

31. A monitoring report shall be submitted by the FGM no later than 30 days following stream restoration. The report shall include an assessment of the stream restoration success, representative photos, and recommended corrective actions as needed. **(Submittal)**

32. Water shall be slowly introduced back into the restored and dewatered LUW work areas as to not cause erosion and sedimentation. This work shall be overseen by the FGM.

33. MassDEP reserves the right to determine the success or failure of the LUW replication and restoration areas and reserves the right to require additional measures deemed necessary to promote success.

Post-Construction

34. All temporary erosion controls shall be removed at the conclusion of work once the surrounding area has achieved final stabilization.

General Conditions

35. Any proposed alterations, minor plan changes, or amendment requests, as well as any required submittals shall be sent by email for review and approval to heidi.davis@mass.gov and tyler.lewis@mass.gov. **(Submittal)**

36. This WQC remains in effect for the same duration as the Section 404 permit that requires it.

37. No Special Condition set forth herein shall be construed or operate to prohibit MassDEP from taking enforcement against the MassDOT or its contractors for any failure to comply with the terms and requirements of this WQC.

38. No activity authorized by this WQC may begin prior to expiration of the 21-day appeal period, or until a final decision is issued by MassDEP in the event of an appeal.

Failure to comply with this Certification is grounds for enforcement, including civil and criminal penalties, under MGL Ch. 21 §42, MGL Ch. 21A §16, or other possible actions/penalties as authorized by the General Laws of the Commonwealth.

This Certification does not relieve the applicant of the obligation to comply with other appropriate state or federal statutes or regulations.

NOTICE OF APPEAL RIGHTS

a.) Appeal Rights and Time Limits

Certain persons shall have a right to request an adjudicatory hearing concerning certifications by MassDEP when an application is required: (a) the applicant or property owner; (b) any person aggrieved by the decision who has submitted written comments during the public comment period; (c) any ten (10) persons of the Commonwealth pursuant to M.G.L. c.30A where a group member has submitted written comments during the public comment period; or (d) any governmental body or private organization with a mandate to protect the environment which has submitted written comments during the public comment period. Any person aggrieved, any ten (10) persons of the Commonwealth, or a governmental body or private organization with a mandate to protect the environment may appeal without having submitted written comments during the public comment period only when the claim is based on new substantive issues arising from material changes to the scope or impact of the activity and not apparent at the time of public notice. To request an adjudicatory hearing pursuant to M.G.L. c.30A, § 10, a Notice of Claim must be made in writing, provided that the request is made by certified mail or hand delivery to MassDEP, with the appropriate filing fee specified within 310 CMR 4.10 along with a DEP Fee Transmittal Form within twenty-one (21) days from the date of issuance of this Certificate, and addressed to:

Case Administrator
Department of Environmental Protection
100 Cambridge Street, 9th Floor
Boston, MA 02114

A copy of the request shall at the same time be sent by certified mail or hand delivery to the Department of Environmental Protection at:

Department of Environmental Protection
Commissioner's Office
100 Cambridge Street, Suite 900
Boston, MA 02114

b.) Contents of Hearing Request

A Notice of Claim for Adjudicatory Hearing shall comply with MassDEP's Rules for Adjudicatory Proceedings, 310 CMR 1.01(6), and shall contain the following information pursuant to 314 CMR 9.10(3):

1. the 401 Certification Transmittal Number;
2. the complete name of the applicant and address of the project;
3. the complete name, address, and fax and telephone numbers of the party filing the request, and, if represented by counsel or other representative, the name, fax and telephone numbers, and address of the attorney;
4. if claiming to be a party aggrieved, the specific facts that demonstrate that the party satisfies the definition of "aggrieved person" found at 314 CMR 9.02;
5. a clear and concise statement that an adjudicatory hearing is being requested;
6. a clear and concise statement of (1) the facts which are grounds for the proceedings, (2) the objections to this Certificate, including specifically the manner in which it is alleged to be inconsistent with the MassDEP's Water Quality Regulations, 314 CMR 9.00, and (3) the relief sought through the adjudicatory hearing, including specifically the changes desired in the final written Certification; and
7. a statement that a copy of the request has been sent by certified mail or hand delivery to the applicant, the owner (if different from the applicant), the conservation commission of the city or town where the activity will occur, the Department of Conservation and Recreation (when the certificate concerns projects in Areas of Critical Environmental Concern), the public or private water supplier where the project is located (when the certificate concerns projects in Outstanding Resource Waters), and any other entity with responsibility for the resource where the project is located.

c.) Filing Fee and Address

The hearing request along with a DEP Fee Transmittal Form and a valid check or money order payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100) must be mailed to:

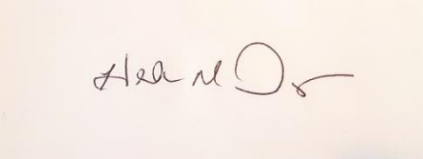
Commonwealth of Massachusetts
Department of Environmental Protection
Commonwealth Master Lockbox

PO Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid unless the appellant is exempt or granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. MassDEP may waive the adjudicatory hearing filing fee pursuant to 310 CMR 4.06(2) for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.

Should you have any questions relative to this permit, please contact myself or Tyler Lewis at tyler.lewis@mass.gov.

Very truly yours,



Heidi M. Davis
Highway Unit Supervisor

Ecc: DEP WERO – Michael McHugh
MassDOT – Melissa Lenker
MassDOT – Kylie Abouzeid
MassDOT District 1– Amer Raza
USACE – Dan Vasconcelos
BETA-Inc, - Laura Krause - lkrause@beta-inc.com
Conway Conservation Commission – Grace Larson - concomm@conwayma.gov

ATTACHMENT A
Bridge Replacement over Conant Brook (M-27-015)
Monson, MA

PRE-CONSTRUCTION SUBMITTAL CHECKLIST

THIS CHECKLIST MUST BE COMPLETED PRIOR TO THE START OF WORK; NOTE THAT SOME CONDITIONS REQUIRE THAT INFORMATION BE SUBMITTED A SPECIFIC NUMBER OF DAYS PRIOR TO THE START OF WORK OR THE PRE-CONSTRUCTION MEETING.

Condition	Required Submittal	Due Date	Date Submitted	Date Approved
PRE-CONSTRUCTION SUBMITTAL REQUIREMENTS				
2	Name, contact information, and qualifications of the FGM, including specific experience and years to meet requirements	Prior to Pre-Construction Meeting		
3	Name and contact information of the RE	Prior to Pre-Construction Meeting		
5	USACE Work-Start Notification Form	14 days prior to work start		
6	CP/PP	14 days prior to work start		
7	Verification of Erosion and Sedimentation Controls Training	Prior to work start		
9	Water Management Plan	21 days prior to work start		
12	Flood Contingency Plan	Prior to in water work		
13	Final Construction Plans	30 days prior to Pre-Construction Meeting		
14	Demolition Plan	21 days prior to work start		
15	Wood Turtle Protection Plan	Prior to Work Start		

重要 महत्वपूर्ण σημαντικός Important կարեւոր quan trọng مهم

Communication for Non-English-Speaking Parties

This document is important and should be translated immediately.

If you need this document translated, please contact MassDEP's Director of Environmental Justice at the telephone number listed below.

Español Spanish

Este documento es importante y debe ser traducido inmediatamente. Si necesita traducir este documento, póngase en contacto con el Director de Justicia Ambiental de MassDEP (*MassDEP's Director of Environmental Justice*) en el número de teléfono que figura más abajo.

Português Portuguese

Este documento é importante e deve ser traduzido imediatamente. Se você precisar traduzir este documento, entre em contato com o Diretor de Justiça Ambiental do MassDEP no número de telefone listado abaixo.

繁體中文 Chinese Traditional

本文檔很重要，需要即刻進行翻譯。
如需對本文檔進行翻譯，請透過如下列示電話號碼與 MassDEP 的環境司法總監聯絡。

简体中文 Chinese Simplified

这份文件非常重要，需要立即翻译。
如果您需要翻译这份文件，请通过下方电话与 MassDEP 环境司法主任联系。

Ayisyen Kreyòl Haitian Creole

Dokiman sa a enpòtan epi yo ta dwe tradui l imedyatman. Si w bezwen tradui dokiman sa a, tanpri kontakte Direktè. Jistis Anviwònmantal MassDEP a nan nimewo telefòn ki endike anba a.

Việt Vietnamese

Tài liệu này và quan trọng và phải được dịch ngay. Nếu quý vị cần bản dịch của tài liệu này, vui lòng liên hệ với Giám Đốc Phòng Công Lý Môi Trường của MassDEP theo số điện thoại được liệt kê bên dưới.

ប្រទេសកម្ពុជា Khmer/Cambodian

ឯកសារនេះមានសារៈសំខាន់
ហើយគប្បីត្រូវត្រូវបានបកប្រែភ្លាមៗ។.
ប្រសិនបើអ្នកត្រូវការអោយឯកសារនេះបកប្រែ
សូមទាក់ទងនាយកផ្នែកយុត្តិធម៌បរិស្ថានរបស់
MassDEPតាមរយៈលេខទូរស័ព្ទដែលបានរាយដូចខាងក្រោម។

Kriolu Kabuverdianu Cape Verdean

Es dokumentu sta important i tenki ser tradusidu immediatamenti. Se nho ta presisa ke es dokumentu sta tradisidu, por favor kontata O Diretor di Justisia di Environman di DEP ku es numero di telifoni menxionadu di baixo.

Contact Deneen Simpson 857-406-0738
Massachusetts Department of Environmental Protection
100 Cambridge Street 9th Floor Boston, MA 02114
TTY# MassRelay Service 1-800-439-2370 • https://www.mass.gov/environmental-justice
(Version revised 8.2.2023) 310 CMR 1.03(5)(a)

Русский Russian

Это чрезвычайно важный документ, и он должен быть немедленно переведен. Если вам нужен перевод этого документа, обратитесь к директору Департамента экологического правосудия MassDEP (MassDEP's Director of Environmental Justice) по телефону, указанному ниже.

العربية Arabic

هذه الوثيقة مهمة وتجب ترجمتها على الفور.

إذا كنت بحاجة إلى ترجمة هذه الوثيقة، فيرجى الاتصال بمدير العدالة البيئية في MassDEP على رقم الهاتف المذكور أدناه.

한국어 Korean

이 문서는 중대하므로 즉시 번역되어야 합니다.
본 문서 번역이 필요하신 경우, 매사추세츠 환경보호부의 "환경정의" 담당자 분께 문의하십시오. 전화번호는 아래와 같습니다.

հայերեն Armenian

Այս փաստաթուղթը կարևոր է, և պետք է անհապաղ թարգմանել այն:
Եթե Ձեզ անհրաժեշտ է թարգմանել այս փաստաթուղթը, դիմեք Մասաչուսեթսի շրջակա միջավայրի պահպանության նախարարության (MassDEP) Բնապահպանական հարցերով արդարադատության ղեկավարին (Director of Environmental Justice)՝ ստորև նշված հեռախոսահամարով

فارسی Farsi Persian

این نوشتار بسیار مهمی است و باید فوراً ترجمه شود.
اگر نیاز به ترجمه این نوشتار دارید لطفاً با مدیر عدالت محیط زیستی MassDEP در شماره تلفن ذکر شده زیر تماس بگیرید.

Français French

Ce document est important et doit être traduit immédiatement. Si vous avez besoin d'une traduction de ce document, veuillez contacter le directeur de la justice environnementale du MassDEP au numéro de téléphone indiqué ci-dessous.

Deutsch German

Dieses Dokument ist wichtig und muss sofort übersetzt werden. Wenn Sie eine Übersetzung dieses Dokuments benötigen, wenden Sie sich bitte an MassDEP's Director of Environmental Justice *(Direktor für Umweltgerechtigkeit in Massachusetts)* unter der unten angegebenen Telefonnummer.

Ελληνική Greek

Το έγγραφο αυτό είναι πολύ σημαντικό και πρέπει να μεταφραστεί αμέσως. Αν χρειάζεστε μετάφραση του εγγράφου αυτού, παρακαλώ επικοινωνήστε με τον Διευθυντή του Τμήματος Περιβαλλοντικής Δικαιοσύνης της Μασαχουσέτης στον αριθμό τηλεφώνου που αναγράφεται παρακάτω

Italiano Italian

Questo documento è importante e deve essere tradotto immediatamente. Se hai bisogno di tradurre questo documento, contatta il Direttore della Giustizia Ambientale di MassDEP al numero di telefono sotto indicato.

Język Polski Polish

Ten dokument jest ważny i powinien zostać niezwłocznie przetłumaczony. Jeśli potrzebne jest tłumaczenie tego dokumentu, należy skontaktować się z dyrektorem ds. sprawiedliwości środowiskowej MassDEP pod numerem telefonu podanym poniżej.

हिन्दी Hindi

यह दस्तावेज महत्वपूर्ण है और इसका अनुवाद तुरंत किया जाना चाहिए। यदि आपको इस दस्तावेज का अनुवाद कराने की जरूरत है, तो कृपया नीचे दिए गए टेलीफोन नंबर पर MassDEP के पर्यावरणीय न्याय निदेशक से संपर्क करें।

Contact Deneen Simpson 857-406-0738
Massachusetts Department of Environmental Protection
100 Cambridge Street 9th Floor Boston, MA 02114
TTY# MassRelay Service 1-800-439-2370 • https://www.mass.gov/environmental-justice
(Version revised 8.2.2023) 310 CMR 1.03(5)(a)

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Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
100 Cambridge Street Suite 900 Boston, MA 02114 • 617-292-5500

Maura T. Healey
Governor

Kimberley Driscoll
Lieutenant Governor

Rebecca L. Tepper
Secretary

Bonnie Heiple
Commissioner

August 12, 2024

BETA Group Inc.
89 Shrewsbury Street
Suite 300
Worcester, MA 01604
ATTN: Laura Krause

RE: **AMENDED** 401 Water Quality Certification
BRP WW 11, Minor Fill Project
Bridge Replacement over Poland Brook (C-20-004)
Conway, MA

401 WQC Filing Number: 24-WW11-0033-APP
USACE Application No. NAE-2024-00661

Dear Ms. Krause:

On May 17, 2024, the Massachusetts Department of Environmental Projection (MassDEP) issued a Water Quality Certification (WQC) to the Massachusetts Department of Transportation (MassDOT) for the reconstruction of the North Poland Road bridge, roadway reconstruction, stormwater drainage system improvements, and stream mitigation. The WQC contained 38 conditions and addressed impacts to Land Under Water (LUW). BETA Group Inc. requested a modification of the WQC on behalf of MassDOT in a letter dated July 12, 2024.

The WQC amendment request addresses a plan change along North Poland Road associated with the stormwater management design. An additional deep sump catch basin will be installed at STA 14+80 to prevent ponding at a low point in the roadway. The proposed deep sump catch basin will no longer be connected to the proposed leaching basins as originally designed out of concern for surcharge during larger storm events. This catch basin will convey stormwater back toward Poland Brook via a new outfall. The 38 foot, 10-inch diameter, ductile iron pipe will outlet to a riprap pad approximately 48 feet upgradient of Poland Brook. This addition to the stormwater system will cause no additional impacts to LUW.

In accordance with the provisions of MGL c. 21, s. 26-53 and Section 401 of the Federal Clean Water Act as amended (33 U.S.C. s. 1251 et seq.), MassDEP has reviewed this project change request and has

determined that there is reasonable assurance that the project change will not violate applicable water quality standards. MassDEP hereby approves of the above-mentioned project changes and amends the WQC dated May 17, 2024, by referencing the following documents and subject to the following Special Conditions:

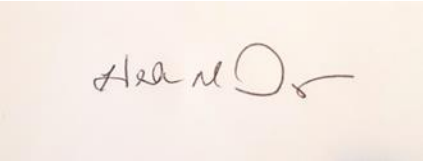
Reference Documents:

1) Request for Amended Water Quality Certification: North Poland Road Bridge Replacement Project; Conway, Massachusetts. 401 WQC Application Number 24-WW11-0033-APP. Prepared by BETA Group Inc. on behalf of MassDOT. Dated July 12, 2024.

All WQC Special Conditions remain in effect as applicable.

Should you have any questions relative to this permit, please contact me at heidi.davis@mass.gov or Tyler Lewis at tyler.lewis@mass.gov.

Very truly yours,



Heidi M. Davis
Highway Unit Supervisor

Ecc: DEP WERO – Michael McHugh
MassDOT – Melissa Lenker
MassDOT – Kylie Abouzeid
MassDOT District 1– Amer Raza
USACE – Dan Vasconcelos
BETA-Inc, - Laura Krause - lkrause@beta-inc.com
Conway Conservation Commission – Grace Larson - concomm@conwayma.gov

Failure to comply with this amended certification is grounds for enforcement, including civil and criminal penalties, under MGL Ch. 21 §42, MGL Ch. 21A §16, or other possible actions/penalties as authorized by the General Laws of the Commonwealth.

This amended certification does not relieve the applicant of the obligation to comply with other appropriate state or federal statutes or regulations.

NOTICE OF APPEAL RIGHTS

A) Appeal Rights and Time Limits

Certain persons shall have a right to request an adjudicatory hearing concerning certifications by MassDEP when an application is required: (a) the applicant or property owner; (b) any person aggrieved by the decision who has submitted written comments during the public comment period; (c) any ten (10) persons of the Commonwealth pursuant to M.G.L. c.30A where a group member has submitted written comments during the public comment period; or (d) any governmental body or private organization with a mandate to protect the environment which has submitted written comments during the public comment period. Any person aggrieved, any ten (10) persons of the Commonwealth, or a governmental body or private organization with a mandate to protect the environment may appeal without having submitted written comments during the public comment period only when the claim is based on new substantive issues arising from material changes to the scope or impact of the activity and not apparent at the time of public notice. To request an adjudicatory hearing pursuant to M.G.L. c.30A, § 10, a Notice of Claim must be made in writing, provided that the request is made by certified mail or hand delivery to MassDEP, with the appropriate filing fee specified within 310 CMR 4.10 along with a DEP Fee Transmittal Form within twenty-one (21) days from the date of issuance of this Certificate, and addressed to:

Case Administrator
Department of Environmental Protection
100 Cambridge Street, Suite 900
Boston, MA 02108

A copy of the request shall at the same time be sent by certified mail or hand delivery to the Department of Environmental Protection at:

Department of Environmental Protection
Commissioner's Office
100 Cambridge Street, Suite 900
Boston, MA 02108

B) Contents of Hearing Request

A Notice of Claim for Adjudicatory Hearing shall comply with MassDEP's Rules for Adjudicatory Proceedings, 310 CMR 1.01(6), and shall contain the following information pursuant to 314 CMR 9.10(3):

a.) the 401 Certification Transmittal Number;
b.) the complete name of the applicant and address of the project;
c.) the complete name, address, and fax and telephone numbers of the party filing the request, and, if represented by counsel or other representative, the name, fax and telephone numbers, and address of the attorney;
d.) if claiming to be a party aggrieved, the specific facts that demonstrate that the party satisfies the definition of "aggrieved person" found at 314 CMR 9.02;
e.) a clear and concise statement that an adjudicatory hearing is being requested;
f.) a clear and concise statement of (1) the facts which are grounds for the proceedings, (2) the objections to this Certificate, including specifically the manner in which it is alleged to be inconsistent with the MassDEP's Water Quality Regulations, 314 CMR 9.00, and (3) the relief sought through the adjudicatory hearing, including specifically the changes desired in the final written Certification; and

g.) a statement that a copy of the request has been sent by certified mail or hand delivery to the applicant, the owner (if different from the applicant), the conservation commission of the city or town where the activity will occur, the Department of Environmental Management (when the certificate concerns projects in Areas of Critical Environmental Concern), the public or private water supplier where the project is located (when the certificate concerns projects in Outstanding Resource Waters), and any other entity with responsibility for the resource where the project is located.

C) Filing Fee and Address

The hearing request along with a DEP Fee Transmittal Form and a valid check or money order payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
Commonwealth Master Lockbox
PO Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid unless the appellant is exempt or granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. MassDEP may waive the adjudicatory hearing filing fee pursuant to 310 CMR 4.06(2) for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.

DOCUMENT A00870

MASSACHUSETTS
DIVISION OF FISHERIES & WILDLIFE

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MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

September 14, 2023

Julia Hoogeboom
Massachusetts Department of Transportation - Highway Division, Environmental Services
10 park plaza
Boston, MA 02116

RE: Applicant: Julia Hoogeboom
Project Location: NORTH POLAND ROAD OVER POLAND BROOK
Project Description: 609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK
NHESP File No.: 23-8600

Dear Applicant:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the "Division") received the MESA Project Review Checklist and supporting documentation for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

The MESA is administered by the Division, and prohibits the Take of state-listed species. The Take of state-listed species is defined as "in reference to animals…harm…kill…disrupt the nesting, breeding, feeding or migratory activity…and in reference to plants…collect, pick, kill, transplant, cut or process…Disruption of nesting, breeding, feeding, or migratory activity may result from, but is not limited to, the modification, degradation, or destruction of Habitat" of state-listed species (321 CMR 10.02).

The Division has determined that this Project, as currently proposed, will occur **within** the actual habitat of the following species:

Scientific Name	Common Name	Taxonomic Group	State Status
Glyptemys insculpta	Wood Turtle	Reptile	Special Concern
Catostomus catostomus	Longnose Sucker	Fish	Special Concern

These species and their habitats are protected in accordance with the MESA.

Based on the information provided and the information contained in our database, the Division finds that a

portion of this project, as currently proposed, **must be conditioned** to avoid a prohibited Take of state-listed species (321 CMR 10.18(2)(a)). **To avoid a prohibited Take of state-listed species, the conditions attached to this letter must be met.**

Provided the attached conditions are fully implemented and there are no changes to the project plans, this project will not result in a Take of state-listed species. We note that all work is subject to the anti-segmentation provisions (321 CMR 10.16) of the MESA. This determination is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Melany Cheeseman, Endangered Species Review Assistant, at Melany.Cheeseman@mass.gov, (508) 389-6357.

Sincerely,

Everose Schlüter, Ph.D.
Assistant Director

cc: David Paulson, Massachusetts Department of Transportation
Julia Hoogeboom, Massachusetts Department of Transportation

Attachment: List of Conditions

List of Conditions

Applicant: Julia Hoogeboom
Project Location: NORTH POLAND ROAD OVER POLAND BROOK
Project Description: 609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK
NHESP File No.: 23-8600
Heritage Hub Form ID: RC-65297
Approved Plan: Plan and Profile of North Poland Road
Plan date: 7/21/23 Revised Date: N/A

To avoid a prohibited Take of state-listed species, the following condition(s) must be met:

1. **Turtle Protection Plan:** Prior to the start of work (including vegetation clearing or soil disturbance), the Applicant shall submit Wood Turtle Protection Plan to the Division for review and written approval. Said Plan shall detail procedures for protecting state-listed turtles during construction, and be prepared and implemented by a qualified, Division-approved wildlife biologist. The Division is available for consultation on Plan development and can provide contact information for qualified biologists. The Division-approved Plan shall be implemented as written; any proposed changes to the Plan must be submitted to the Division for review and written approval prior to implementation of said changes. Please note that protective measures for state-listed turtles are required for any construction activities occurring between April 15 and October 15 of any year unless otherwise approved by the Division. By December 31st of any year in which work occurs, the qualified biologist shall submit: a) a summary report to the Division detailing project status and compliance with the Plan; and b) any observations of state-listed turtles at https://www.mass.gov/how-to/report-rare-species-vernal-pool-observations.
2. **Fisheries Protection:** In order to avoid impacts to state-listed fishes, no in water work shall occur during the period of April 1 - July 31.

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DOCUMENT A00871

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
(USFWS NLAA)
CONCURRENCE VERIFICATION LETTER

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: June 01, 2023
Project code: 2023-0052649
Project Name: 609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK

Subject: Concurrence verification letter for the '609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK' project under the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (NLEB).

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated June 01, 2023 to verify that the **609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK** (Proposed Action) may rely on the concurrence provided in the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures, and may affect, but is not likely to adversely affect (NLAA) the endangered Indiana bat (*Myotis sodalis*) and/or the endangered northern long-eared bat (*Myotis septentrionalis*). Consultation with the Service pursuant to section 7(a)(2) of ESA (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*.) is required.

The Service has 14 calendar days to notify the lead Federal action agency or designated non-federal representative if we determine that the Proposed Action does not meet the criteria for a NLAA determination under the PBO. If we do not notify the lead Federal action agency or designated non-federal representative within that timeframe, you may proceed with the Proposed Action under the terms of the NLAA concurrence provided in the PBO. This verification period allows Service Field Offices to apply local knowledge to implementation of the PBO, as we may identify a small subset of actions having impacts that were unanticipated. In such instances,

Service Field Offices may request additional information that is necessary to verify inclusion of the proposed action under the PBO.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities: If your initial bridge/culvert or structure assessment documented signs of bat use or occupancy, or an assessment failed to detect Indiana bats and/or NLEBs, yet are later detected prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office within 2 working days of any potential take. In these instances, potential incidental take of Indiana bats and/or NLEBs is covered under the Incidental Take Statement in the 2018 FHWA, FRA, FTA PBO (provided that the take is reported to the Service).

If the Proposed Action is modified, or new information reveals that it may affect the Indiana bat and/or northern long-eared bat in a manner or to an extent not considered in the PBO, further review to conclude the requirements of ESA Section 7(a)(2) may be required.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities:
If your initial bridge/culvert or structure assessments failed to detect Indiana bats and/or NLEB use or occupancy, yet bats are later detected prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office within 2 working days of the incident. In these instances, potential incidental take of Indiana bats and/or NLEBs may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species, and/or any designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please contact this Service Office.

The following species may occur in your project area and **are not** covered by this determination:

- Monarch Butterfly *Danaus plexippus* Candidate

PROJECT DESCRIPTION

The following project name and description was collected in IPaC as part of the endangered species review process.

NAME

609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK

DESCRIPTION

609082 - CONWAY- BRIDGE REPLACEMENT, C-20-004, NORTH POLAND ROAD OVER POLAND BROOK

This municipally owned one-lane bridge is a stringer/multi-beam or girder type structure built in 1940. It has a length of 70 feet and a curb-to-curb width of 14 feet. The bridge is structurally deficient. MassDOT’s Bridge Database indicates an ADT of 800 vpd with 6% trucks. The proposed project calls for complete replacement of this structure.

Monarch Butterfly: Candidate Species only, no conservation measures at this time.

DETERMINATION KEY RESULT

Based on your answers provided, this project(s) may affect, but is not likely to adversely affect the endangered Indiana bat and/or the endangered northern long-eared bat, therefore, consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required. However, also based on your answers provided, this project may rely on the concurrence provided in the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

QUALIFICATION INTERVIEW

1. Is the project within the range of the Indiana bat[1]?

   [1] See Indiana bat species profile

   Automatically answered
   No

2. Is the project within the range of the northern long-eared bat[1]?

   [1] See northern long-eared bat species profile

   Automatically answered
   Yes

3. Which Federal Agency is the lead for the action?

   A) Federal Highway Administration (FHWA)

4. Are *all* project activities limited to non-construction[1] activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

   [1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

   No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces[1]?

   [1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

   No

6. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum[1]?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

7. Is the project located **within** a karst area?

   Yes

8. Will the project include *any* type of activity that could impact a **known** hibernaculum[1], or impact a karst feature (e.g., sinkhole, losing stream, or spring) that could result in effects to a **known** hibernaculum?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

9. Is there *any* suitable[1] summer habitat for Indiana Bat or NLEB **within** the project action area[2]? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   [2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the User's Guide for the Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat.

   Yes

10. Will the project remove *any* suitable summer habitat[1] and/or remove/trim any existing trees **within** suitable summer habitat?

    [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

    Yes

11. Will the project clear more than 20 acres of suitable habitat per 5-mile section of road/rail?

    No

12. Have presence/probable absence (P/A) summer surveys[1][2] been conducted[3][4] **within** the suitable habitat located within your project action area?

    [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

    [2] Presence/probable absence summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate distance from hibernacula) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

    [3] For projects within the range of either the Indiana bat or NLEB in which suitable habitat is present, and no bat surveys have been conducted, the transportation agency will assume presence of the appropriate species. This assumption of presence should be based upon the presence of suitable habitat and the capability of bats to occupy it because of their mobility.

    [4] Negative presence/probable absence survey results obtained using the summer survey guidance are valid for a minimum of two years from the completion of the survey unless new information (e.g., other nearby surveys) suggest otherwise.

    Yes

    SUBMITTED DOCUMENTS

    - *609082_Conway_Report_compiled.pdf https://ipac.ecosphere.fws.gov/project/QCZMHQDBXZCJLIWJIWL7TW6ICY/projectDocuments/123265399*

13. Did the presence/probable absence (P/A) summer surveys detect Indiana bats and/or NLEB[1]?

    [1] P/A summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate home range) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

    No

14. Were the P/A summer surveys conducted **within** the fall swarming/spring emergence range of a documented Indiana bat hibernaculum[1]?

    [1] Contact the local Service Field Office for appropriate distance from hibernacula.

    No

15. Does the project include activities **within documented NLEB habitat**[1][2]?

    [1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

    [2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

    No

16. Will the removal or trimming of habitat or trees occur **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors?

    Yes

17. What time of year will the removal or trimming of habitat or trees **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors occur?

    C) During both the active and inactive seasons

18. Will *any* tree trimming or removal occur **within** 100 feet of existing road/rail surfaces?

    Yes

19. Will *any* tree trimming or removal occur **between** 100-300 feet of existing road/rail surfaces?

    No

20. Are *all* trees that are being removed clearly demarcated?

    Yes

21. Will the removal of habitat or the removal/trimming of trees involve the use of **temporary** lighting?

    Yes

22. Will the removal of habitat or the removal/trimming of trees include installing new or replacing existing **permanent** lighting?

    No

23. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?

    No

24. Does the project include slash pile burning?

    No

25. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?

    Yes

26. Is there *any* suitable habitat[1] for Indiana bat or NLEB **within** 1,000 feet of the bridge? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

    [1] See the Service's current summer survey guidance for our current definitions of suitable habitat.

    Yes

27. Has a bridge assessment[1] been conducted **within** the last 24 months[2] to determine if the bridge is being used by bats?

    [1] See User Guide Appendix D for bridge/structure assessment guidance

    [2] Assessments must be completed no more than 2 years prior to conducting any work below the deck surface on all bridges that meet the physical characteristics described in the Programmatic Consultation, regardless of whether assessments have been conducted in the past. Due to the transitory nature of bat use, a negative result in one year does not guarantee that bats will not use that bridge/structure in subsequent years.

    Yes

    SUBMITTED DOCUMENTS

    - *609082_Conway_Report_compiled.pdf https://ipac.ecosphere.fws.gov/project/QCZMHQDBXZCJLIWJIWL7TW6ICY/projectDocuments/123265399*

28. Did the bridge assessment detect *any* signs of Indiana bats and/or NLEBs roosting in/under the bridge (bats, guano, etc.)[1]?

    [1] If bridge assessment detects signs of *any* species of bats, coordination with the local FWS office is needed to identify potential threatened or endangered bat species. Additional studies may be undertaken to try to identify which bat species may be utilizing the bridge prior to allowing *any* work to proceed.

    Note: There is a small chance bridge assessments for bat occupancy do not detect bats. Should a small number of bats be observed roosting on a bridge just prior to or during construction, such that take is likely to occur or does occur in the form of harassment, injury or death, the PBO requires the action agency to report the take. Report all unanticipated take within 2 working days of the incident to the USFWS. Construction activities may continue without delay provided the take is reported to the USFWS and is limited to 5 bats per project.

    No

29. Will the bridge removal, replacement, and/or maintenance activities include installing new or replacing existing **permanent** lighting?

    No

30. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)

    No

31. Will the project involve the use of *any* **temporary** lighting in addition to the lighting already indicated for habitat removal (including the removal or trimming of trees), or bridge/structure removal, replacement or maintenance activities?

    Yes

32. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **temporary** lighting (other than the lighting already indicated for habitat removal (including the removal or trimming of trees) or bridge/structure removal, replacement or maintenance activities) will be used?

    Yes

33. Will the project install new or replace existing **permanent** lighting?

    No

34. Does the project include percussives or other activities (**not including tree removal/ trimming or bridge/structure work**) that will increase noise levels above existing traffic/ background levels?

    Yes

35. Will the activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the active season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

36. Will *any* activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the inactive season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

37. Are *all* project activities that are **not associated with** habitat removal, tree removal/ trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives, limited to actions that DO NOT cause any additional stressors to the bat species?

    Examples: lining roadways, unlighted signage , rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.

    Yes

38. Will the project raise the road profile **above the tree canopy**?

    No

39. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the active season within undocumented habitat.

40. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) and/or increase noise levels above existing traffic/background levels consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the inactive season

41. Is the location of this project consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because no bats were detected during presence/probable absence surveys conducted during the summer survey season and outside of the fall swarming/spring emergence periods. Additionally, all activities were at least 0.5 miles from any hibernaculum.

42. Is the bridge removal, replacement, or maintenance activities portion of this project consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the bridge has been assessed using the criteria documented in the BA and no signs of bats were detected

43. **General AMM 1**
    Will the project ensure *all* operators, employees, and contractors working in areas of known or presumed bat habitat are aware of *all* FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable Avoidance and Minimization Measures?

    Yes

44. **Hibernacula AMM 1**
    Will the project ensure that on-site personnel will use best management practices[1], secondary containment measures, or other standard spill prevention and countermeasures to avoid impacts to possible hibernacula?

    [1] Coordinate with the appropriate Service Field Office on recommended best management practices for karst in your state.

    Yes

45. **Hibernacula AMM 1**
    Will the project ensure that, where practicable, a 300 foot buffer will be employed to separate fueling areas and other major containment risk activities from caves, sinkholes, losing streams, and springs in karst topography?

    Yes

PROJECT QUESTIONNAIRE

1. Have you made a No Effect determination for *all* other species indicated on the FWS IPaC generated species list?

   N/A

2. Have you made a May Affect determination for *any* other species on the FWS IPaC generated species list?

   N/A

3. How many acres[1] of trees are proposed for removal between 0-100 feet of the existing road/rail surface?

   [1] If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   0.5

4. Please describe the proposed bridge work:

   The proposed project will be the replacement of the existing North Poland Road bridge (Bridge No. C-20-004) over the Poland Brook. Included in the work will be full depth construction approximately 100 feet from the proposed bridge along both approaches, as well as milling and overlay another 100 feet. The existing bridge is being widened from 14-feet to 24-feet, and the roadway approaches are being widened from 19-feet and 22-feet to 24-feet. The existing structure is a single lane that allows two-way traffic and the existing roadway approaches have two travel lanes. The proposed cross section will be two 10-foot travel lanes and two 2-foot shoulders.

5. Please state the timing of all proposed bridge work:

   Fall 2024 - Fall 2025

6. Please enter the date of the bridge assessment:

   July 12, 2022

AVOIDANCE AND MINIMIZATION MEASURES (AMMS)

This determination key result includes the committment to implement the following Avoidance and Minimization Measures (AMMs):

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

HIBERNACULA AMM 1

For projects located within karst areas, on-site personnel will use best management practices, secondary containment measures, or other standard spill prevention and countermeasures to avoid impacts to possible hibernacula. Where practicable, a 300 foot buffer will be employed to separate fueling areas and other major containment risk activities from caves, sinkholes, losing streams, and springs in karst topography.

DETERMINATION KEY DESCRIPTION: FHWA, FRA, FTA PROGRAMMATIC CONSULTATION FOR TRANSPORTATION PROJECTS AFFECTING NLEB OR INDIANA BAT

This key was last updated in IPaC on April 13, 2023. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which may require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the endangered **northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

IPAC USER CONTACT INFORMATION

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LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Highway Administration

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DOCUMENT A00872

APPENDIX
GEOTECHNICAL REPORT

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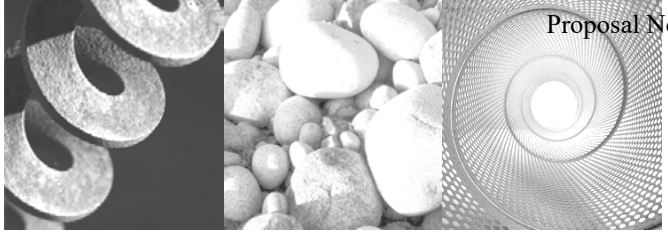

Proposal No. 609082-127511

GEI Consultants

Consulting
Engineers and
Scientists

Geotechnical Report

North Poland Road Bridge over North Poland Brook Bridge No. C-20-4

Conway, Massachusetts

Submitted to:
BETA Group, Inc.
315 Norwood Park South
Norwood, MA 02062

Submitted by:
GEI Consultants, Inc.
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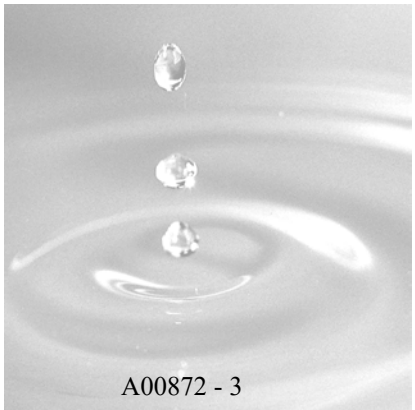
July 2022

Project 2004115



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Stephen J. Sarandis, P.E.
Project Manager

David R. Shields, P.E.
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Executive Summary

This report presents the results of the subsurface explorations and our geotechnical recommendations for the proposed new replacement bridge that will carry North Poland Road over the North Poland Brook in Conway, Massachusetts.

The new bridge will have a single span of about 80 to 95 feet and will be about 27 feet wide. The roadway grades will remain roughly the same. The existing bridge abutments will be demolished, and new bridge abutments will be constructed behind the locations of the former abutments. The abutment wingwalls are short and will be supported on pile supported foundations that are integral with the bridge abutment foundations.

MassDOT performed a previous investigation for the proposed bridge replacement in 2003. One of the previous borings performed in 2003 encountered artesian conditions at a depth of 65 feet and was immediately backfilled with cement grout. The embedment depths of new pile foundations will have to be limited to avoid encountering this artesian condition.

Subsurface Conditions

Two new borings and four pavement cores were drilled for the proposed bridge replacement. The borings encountered 5 to 7 feet of fill overlying 25 to 35 feet of loose to medium dense fine sand and silt. Below the sand and silt layer, the borings encountered a dense to very dense glacial till. Bedrock was not encountered. Groundwater was measured in the completed borings at depths of about 8.3 and 9.5 feet. Piezometers were installed in the borings upon completion.

Recommendations

We recommend that the new bridge abutments and wingwalls be supported on driven piles bearing in the sand and silt and glacial till layers, similar to the existing bridge. We also recommend that the new pile foundations be limited to a 10 ft embedment in the glacial till to avoid encountering the artesian conditions that were encountered in the 2003 borings. We performed calculations for six potential pile types and sizes to estimate the vertical pile capacities that could be obtained with this embedment limitation. Based on these calculations, we concluded that the H-piles typically used for integral abutments would not provide adequate vertical capacity and we recommend that integral abutments be eliminated from further consideration. Recommended pile types and sizes for conventional abutments with and without battered piles are provided. From these remaining options, pile foundations consisting of vertical 14-inch-square prestressed-precast concrete piles without batter piles was selected as the preferred option.

Based on discussions with MassDOT, the following design provisions were selected for scour protection:

- Maintain the bottom of pile cap elevation as shallow as possible to minimize the need for construction dewatering.
- Provide conventional riprap protection for abutment scour.
- Provide additional abutment scour protection consisting of permanent steel sheet piles designed to retain the soil between the bottom of the pile cap and the abutment scour level.

We performed preliminary sheet pile analyses and foundation pile lateral load analyses (LPILE analyses) to evaluate the lateral load capacity of the proposed 14-inch concrete piles and sheet piles under the design abutment scour condition.

Construction Considerations

The currently proposed elevation for the bottom of the abutments is at El. 791.5. This elevation is roughly at the groundwater level measured in the 2020 borings and about 2 feet below the groundwater level measured in the 2003 borings. At this elevation, we expect that the abutment foundations can be constructed in open excavations with groundwater control provided by pumping from filtered sumps if the contractor follows the recommendations in Section 5.1.

1. Introduction

1.1 Purpose

This report presents the results of the subsurface explorations and our geotechnical recommendations for the proposed new replacement bridge that will carry North Poland Road over North Poland Brook in Conway, Massachusetts.

1.2 Scope

Our scope of work included:

- Conducted a site visit to observe site conditions.
- Reviewed available published geologic data and record drawings for the existing bridge.
- Performed 2 borings and 4 pavement cores. Provided full-time observation of the borings and classified soil samples in general accordance with MassDOT procedures.
- Installed four vibrating wire piezometers in the completed borings. Two piezometers were installed in each boring.
- Collected one sample of sediment from the bottom of the North Poland Brook and sent it to a chemical testing lab for analyses required for a Water Quality Certificate per 314 CMR 9.00. A grain size test was also performed on the sediment sample.
- Collected three additional sediment samples (Scour-1, -2, and -3) from the Poland Brook channel and upland bank areas to support the preparation of the Hydraulic Study Report. Grain size tests were performed on the sediment samples.
- Reviewed the results of the geotechnical exploration program and developed soil properties for analysis.
- Evaluated foundation types, performed geotechnical analyses, and developed foundation recommendations for the proposed bridge replacement.
- Prepared this report to present the results of the subsurface explorations and our geotechnical design and construction recommendations.

1.3 Authorization

Mr. Christopher W. Jones of BETA Group, Inc. authorized our work by a subconsultant agreement dated May 31, 2020.

1.4 Project Personnel

The following personnel at GEI were involved with the field explorations, evaluations, and preparation of this report:

- Stephen J. Sarandis, P.E. — Project Manager
- Michael Paster, P.E. — In-House Reviewer
- David Shields, P.E. — Senior Consultant
- Rihabe Oulal — Geotechnical Engineer
- Hassan Ghiye — Geotechnical Engineer

2. Site and Project Description

2.1 Site and Project Description

The project site is located where North Poland Road crosses over North Poland Brook in Conway, Massachusetts (Fig. 1).

The existing bridge was constructed in 1940 and the original design drawings for the bridge are available. The existing bridge has a total length of about 70 feet and a width of 20 feet. It has three spans supported on two abutments and two piers. The design drawings indicate that the existing abutments and piers are founded on 10-inch steel H-piles with a design capacity of 15 tons. The drawings do not show estimated or as-driven pile lengths.

We understand that MassDOT is planning to construct a new single-span replacement bridge that will be supported on new abutments constructed behind the existing abutments. The new bridge will have a span of about 80 to 95 feet and will be about 27 feet wide. The existing abutments will be demolished and the existing piles supporting the current bridge will be cut down approximately 1 foot below grade. The roadway grades will be raised approximately 1 foot at the bridge and the new bridge will be widened to the west to accommodate two lanes of traffic.

The wingwalls for the new bridge will be short and we understand that the plan is to support the short wingwall sections on pile supported foundations that are integral with the bridge abutment foundations.

2.2 Previous Reports and Artesian Conditions

In 2003, MassDOT performed two borings at the bridge and prepared a geotechnical report to support design and construction of a replacement bridge. One of the borings encountered artesian conditions at a depth of 65 feet and was immediately backfilled with cement grout. The report recommended supporting the replacement bridge on drilled shafts bearing in the top of the dense sand and gravel layer (glacial till). This foundation option was recommended to avoid encountering the artesian conditions that were observed in the boring.

In 2006, MassDOT prepared a follow up memorandum and draft design drawings that proposed changing the foundations from drilled shafts to driven pipe piles. The memorandum recommended 12- or 16-inch-diameter pipe piles bearing in the top of the dense sand and gravel layer. The 2006 memorandum and drawings also recommended supporting new wingwalls on shallow foundations bearing in the existing granular fill.

2.3 Project Design Basis

Our recommendations conform to the AASHTO LRFD Bridge Design Specifications, 9th Edition (2020), and AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2nd Edition (2011), with interim revisions through 2015. Our recommendations are also based on the Massachusetts Department of Transportation (MassDOT) LRFD Bridge Manual, 2020 Edition.

2.4 Elevation Datum

Elevations in this report are in feet and are referenced to the 1988 North American Vertical Datum (NAVD 88). Elevations in the 1940 drawings for the original bridge construction are referenced to the National Geodetic Vertical Datum of 1929 (NGVD29). Elevations in the 2006 memorandum and drawings appear to be referenced to NAVD 88.

3. Subsurface Conditions

3.1 Site Geology

The site is located in a valley surrounded by hills rising to about El. 1200 to El. 1500 feet. The surficial geology maps of the area indicate the surficial soils at the site are valley-floor fluvial deposits consisting of stratified layers of sand, gravel, and silt.

The USGS "Mineral Resources Online Spatial Data" identifies the bedrock in the project vicinity as Schist and Marble from the Waits River Formation.

3.2 Previous Geotechnical Exploration

Previous subsurface explorations consist of four borings for the original bridge construction in 1940 and two borings in 2003 to support design and construction of a replacement bridge.

Boring logs and boring locations for the 1940 borings are shown on the original bridge drawings titled "Proposed Bridge – Conway No. 7 (Bridge No. C-20-4), North Poland Road Bridge over Poland Brook" dated 1940 and are provided in Appendix A of this report.

The locations of the 2003 borings are shown in Fig. 2 and logs for these borings are provided in Appendix A of this report.

3.3 Subsurface Exploration Program

Seaboard Drilling Inc. of Chicopee Massachusetts drilled two borings (BB-101 and BB-102) and four pavement cores (PC-1 through PC-4) between October 20 and October 22, 2020. The locations of these explorations are shown in Fig. 2. A GEI engineer logged the explorations and collected samples. GEI logs for the borings and pavement cores are provided in Appendix B.

Borings BB-101 and BB-102 were terminated at depths of 56 and 50.1 feet, respectively. The explorations were performed using driven flush joint steel casing and rotary wash drilling techniques. Standard Penetration Testing (SPT) with split-spoon sampling was performed using an automatic hammer at about 5-foot intervals in the borings. Ground surface elevations at the boring locations were estimated based on the topographical contours in Fig. 2. Estimated ground surface elevations are reported on the exploration logs.

Upon completion of the borings, two piezometers were installed in each of the borings. The boreholes were backfilled with 50 psi grout to a depth of 10 to 8 feet and topped with soil cuttings. GEI piezometer installation logs are provided in Appendix C.

Pavement cores PC-1 to PC-4 were advanced to a depth of 2.1 to 3.8 feet. Upon completion of the pavement cores, the core holes were backfilled with sand and the road surface was repaired using asphalt cold patch.

We also obtained a hand sample of sediment from the banks of North Poland Brook near the southern wingwall upstream of the bridge on October 21, 2020 (sample SS-1), and three additional sediment samples from the Poland Brook channel and upland bank areas on November 20, 2020 (samples Scour-1, -2, and -3). The approximate locations of these samples are shown in Fig. 2.

3.4 Sample Review

The samples from the borings and asphalt cores were examined at GEI's offices. Based on our review, it is our opinion that the descriptions in the boring logs in Appendix B are a reasonable characterization of the conditions encountered.

3.5 Laboratory Testing

We performed grain-size analyses on three soil samples collected from BB-101 and BB-102 and on the four sediment samples collected by hand from the Poland Brook channel and banks. Individual test results are presented in Appendix D. Grain-size tests were performed in general accordance with ASTM D6913.

A portion of the sediment sample (SS-1) taken from the bank of North Poland Brook was sent to ESS Laboratory in Cranston, RI for chemical testing. Chemical analysis was performed for a Water Quality Certificate (WQC) per 314 CMR 9.00. The ESS Laboratory results are presented in our scour evaluation and WQC letter titled "Soil Sample Test Results" dated January 6, 2021, which we sent to you in a separate transmittal.

3.6 Subsurface Conditions

The soil layers encountered in the borings are described below in order of increasing depth. The approximate layer boundary depths are shown in the subsurface profile in Fig. 3. Conditions are known only at the boring locations and conditions between borings may differ from those indicated below and shown in the profile.

The soil descriptions below refer to N_{60}, which is the measured N-value corrected to a 60 percent hammer efficiency. SPT tests from the GEI 2020 borings were performed with an automatic hammer having an assumed efficiency of 80 percent. The corrected N_{60} values for these borings are 1.33 times the N-value measured in the field. The hammer type was not indicated on the MassDOT 2003 boring logs and therefore a correction for hammer

efficiency has not been applied for these borings. All N-values reported on the boring logs are uncorrected.

Asphalt: Asphalt cores were drilled on North Poland Road, which is paved with about 2 to 3.875 inches of asphalt. One of the asphalt cores had a horizontal fracture. A photo log of the asphalt cores is attached in Appendix B.

Fill: An approximately 5- to 10-foot-thick layer of fill was encountered at the ground surface or directly beneath the asphalt. The fill generally consisted of fine to coarse sand or fine to coarse sand and gravel with varying amounts of inorganic silt. Wood was present in the fill in BB-102. The top of the fill in BB-101 and BB-102 was observed to consist of topsoil with roots present. The fill encountered beneath the asphalt in the pavement cores consisted of fine to coarse gravel with varying amounts of fine to coarse sand and inorganic silt. N_{60} values in the fill ranged from 1 to 16 blows per foot (bpf) with an average N_{60} value of 8 bpf, indicating loose soil.

Sand and Silt: Below the Fill layer, a 32.5- to 38-foot-thick layer of natural sand and silt was encountered. This layer consisted of mostly fine sand with some inorganic silt and trace fine to medium gravel, varying to an inorganic silt with some sand. N_{60} values in this layer ranged from 3 to 20 bpf with an average N_{60} value of 12 bpf, indicating loose to medium dense soil.

Glacial Till: Below the Sand and Silt layer, the borings encountered a layer of Glacial Till. The top of the glacial till was encountered at depths between approximately El. 756 and El. 760. The till consisted of a widely graded mixture of fine to coarse sand, gravel, and inorganic silt. N_{60} values in this layer ranged from 40 bpf to refusal with an average N_{60} value of 49 bpf, indicating dense to very dense soil.

3.7 Groundwater Levels

The depth to groundwater was measured in BB-101 and BB-102 at depths of 9.5 and 8.3 feet below ground surface, corresponding to approximately El. 791.5 and El. 791.7 feet, respectively. These measurements were made during drilling and may not be representative of the stabilized groundwater table, because water was added to the boreholes during drilling.

The logs for the MassDOT 2003 borings indicate that groundwater was encountered during drilling at about El. 793.3 feet). In boring B-2 artesian conditions were reportedly encountered at a depth of 65 feet (~El. 737) and the boring was immediately backfilled with cement grout.

Data tables and plots of the piezometric levels measured with the vibrating wire piezometers are presented in Appendix C. A summary of the piezometer data is presented in the table below:

Boring No.	Ground Surface Elevation (ft)	Piezometer No.	Piezometer Elevation (ft)	Soil Layer	Piezometric Elevation (ft)
BB-101	800.8	PZ-1	748.8	Glacial Till	795.03
		PZ-2	763.8	Sand and Silt	785.48
BB-102	800.1	PZ-3	752.1	Glacial Till	798.37
		PZ-4	762.1	Sand and Silt	793.54

The piezometer data indicate a general upward hydraulic gradient with water levels observed in the glacial till higher than those observed in the sand and silt layer. This is consistent with the artesian groundwater condition encountered by MassDOT in 2003, although we have not observed artesian conditions (defined as a piezometric level above the ground surface level) at the elevations where we installed our piezometers. Presumably the piezometric level continues to increase with depth below the piezometers until the piezometric level is above the ground surface.

It should be noted that the upper piezometer in B-101 shows a piezometric level that is lower than the shallow water level observed in Poland Brook, which is probably erroneous.

Groundwater level measurements represent conditions at the times and locations indicated. Significantly different groundwater levels may occur at other times and locations.

4. Design Recommendations

4.1 General

The geotechnical explorations, analyses and recommendations described in this report are provided to support a type study that BETA is currently performing for this bridge. In this section, we provide preliminary foundation recommendations based on preliminary pile capacity requirements developed by BETA for the various foundation options being considered in the type study. We understand that the bridge foundation options that are being considered include:

- Integral Abutment on HP10x57 or HP12x84 Steel Piles.
- Conventional Abutment with Vertical Piles and Battered Piles consisting of either Closed-end Steel Pipe Piles or Prestressed-precast Concrete Piles.
- Conventional Abutment with Vertical Piles only consisting of either Closed-end Steel Pipe Piles or Prestressed-precast Concrete Piles.

We anticipate that the pile sizes for the conventional abutment options will likely consist of 12- to 14-inch-diameter steel pipe piles or 12- to 14-inch-square concrete piles.

Based on the preliminary analyses performed by BETA, vertical pile load capacities (factored geotechnical resistance) in the range of 90 to 150 kips (45 to 75 tons) will be required for the options being considered. These capacities need to be obtained with a maximum penetration of about 10 feet into the glacial to avoid encountering the artesian conditions that were encountered in one of the 2003 borings.

In addition to evaluation of vertical pile capacities, we performed analyses to evaluate lateral pile capacity under scour conditions for the conventional abutment option using vertical piles only.

4.2 Soil Properties

Recommended soil properties for design are presented in Table 1. We selected these values based on published correlations to SPT N-values, our review of the soil descriptions, and our engineering judgment.

4.3 Foundation Design

4.3.1 Geotechnical Pile Capacity

We performed calculations to estimate the geotechnical capacities that likely could be obtained with a 10-foot pile embedment in the glacial till layer for six potential pile types. Pile capacities were calculated using the Nordlund/Thurman method performed in accordance with AASHTO recommendations and using a resistance factor of 0.45 per AASHTO Table 10.5.5.2.3-1. These calculations are contained in Appendix E and the results are summarized in the table below.

Pile Type	Nominal (Ultimate) Geotechnical Resistance (Kips)	Factored Geotechnical Resistance (Kips)
HP 10x57 Steel H-pile	140	63
HP 12x84 Steel H-pile	210	95
12-inch-diameter Closed-end Steel Pipe	230	104
14-inch-diameter Closed-end Steel Pipe	325	146
12-inch-square Prestressed-precast Concrete	350	158
14-inch-square Prestressed-precast Concrete	490	221

For the conventional abutment options, these calculations indicate that adequate vertical pile capacities can be obtained using either 14-inch closed-end pipe piles or 12-inch concrete piles.

For the integral abutment options, the calculations indicate that the H-piles will not provide adequate capacity. The required vertical capacities for three integral abutment options considered by BETA are 93, 110 and 121 kips. The estimated capacities for the H-piles in the above table are not adequate for two of the options and only marginally adequate for one of the options. Because the H-piles are non-displacement piles, there is greater uncertainty in predicting the geotechnical pile capacities. Based on our calculations, we recommend that the integral abutment options be eliminated from further consideration.

Based on the calculations described above, we recommend that the following pile foundation options be considered for preliminary design.

Integral Abutment	Not Recommended
Conventional Abutment with Batter Piles	12-inch-square Prestressed-precast Concrete Piles 14-inch-diameter Closed-end Steel Pipe Piles
Conventional Abutment with Vertical Piles Only	14-inch-square Prestressed-precast Concrete Piles 14-inch-diameter Closed-end Steel Pipe Piles

The concrete pile options are preferred because they have higher predicted vertical load capacities than the steel pile options, which reduces risk associated with the 10-ft embedment limitation in the glacial till.

4.3.2 Uplift Capacity

We understand that the piles may also have to resist some uplift loading. We calculated factored uplift resistances for the piles using the Nordlund/Thurman method with skin friction only and using a resistance factor of 0.35 per AASHTO Table 10.5.5.2.3-1. The results of these calculations are summarized in the table below.

Pile Type	Nominal (Ultimate) Uplift Resistance (Kips)	Factored Uplift Resistance (Kips)
12-inch-diameter Closed-end Steel Pipe	70	24
14-inch-diameter Closed-end Steel Pipe	110	38
12-inch-square Prestressed-precast Concrete	122	43
14-inch-square Prestressed-precast Concrete	200	70

4.3.3 Lateral Load Capacity with Scour

We performed analyses to evaluate lateral pile capacity under scour conditions for the conventional abutment option using vertical piles only. Based on discussions with MassDOT, the following design provisions were selected for scour protection:

- Maintain the bottom of pile cap elevation as shallow as possible to minimize the need for construction dewatering.
- Provide conventional riprap protection for abutment scour.
- Provide additional abutment scour protection consisting of permanent steel sheet piles designed to retain the soil between the bottom of the pile cap and the design abutment scour level (El. 781.74).

We performed preliminary sheet pile analyses and foundation pile lateral load analyses (LPILE analyses) to evaluate the lateral load capacity of 14-inch concrete piles with sheet pile scour protection under the design abutment scour condition. The sheet pile and LPILE analyses are included in Appendix E.

The results of the sheet pile and LPILE analyses indicate that a foundation consisting of 14-inch concrete piles can provide the required geotechnical lateral load capacity. The calculated pile top displacement for a free head condition (the most conservative assumption for displacement) is 1.60 inch and the calculated maximum bending moment is 79 kip-ft.

The 14-inch concrete pile has adequate structural capacity for combined axial load and bending moment.

4.3.4 Recommended Pile Foundation Option

Based on the vertical load capacity and lateral load capacity calculations described above, we recommend a foundation consisting of vertical 14-inch-square prestressed-precast concrete piles in conjunction with steel sheet piles for additional scour protection as described in Section 4.3.3 above.

We recommend that you assume a two-foot penetration into the glacial till layer for the estimated tip elevation (El. 755). We recommend that the piles should not be advanced below El. 747 to avoid encountering artesian conditions.

4.3.5 Pile Load Testing

The piles should be installed to a final driving resistance criterion that is based on wave equation analyses that model the actual pile driving system. The final driving resistance criterion should be verified by dynamic load testing. We recommend that a minimum of two dynamic load tests be performed, with one test located at each abutment. The dynamic testing should be performed on piles instrumented in accordance with ASTM D4945 using an analysis procedure that matches the force and velocity signals measured at the top of the pile (commonly referred to as a CAPWAP analysis). The dynamic testing should include measurements at both end-of-driving and at beginning of re-strike. Restrike testing should be performed a minimum of 24 hours after pile driving.

In accordance with AASHTO Table 10.5.5.2.3-1, the factored geotechnical pile capacity should be calculated by applying a resistance factor of 0.65 to the ultimate capacity determined by the dynamic load testing.

4.4 Lateral Earth Pressure

The lateral earth pressures on abutments and wingwalls should be calculated using the soil properties in Table 1.

Earth pressures should be applied as shown on Figs. 3.11.5.3-1 and C3.11.5.3-1 of the AASHTO Bridge Specifications. Design of abutments and walls should also include a live load surcharge, in accordance with AASHTO 3.11.6.4.

The passive resistance provided by any soils in front of constructed abutments and wingwalls should be ignored.

4.5 Seismic Design Information

Based on Section 3.1.2 of the MassDOT LRFD Bridge Manual this bridge is not considered critical or essential. Based on our review of the borings and our seismic design calculations (Appendix E), the foundation conditions for the proposed structure are representative of Site Class D. Site coefficients for peak ground acceleration [F_{PGA}], short-period range [F_A], and long-period range [F_v] are 1.6, 1.6, and 2.4, respectively.

Based on the maps in the AASHTO Guide Specifications for LRFD Seismic Bridge Design, we recommend the following parameters for seismic design based on a 7 percent probability of exceedance (PE) in 75 years (approximately 1,000-year return period):

- Horizontal Peak Ground Coefficient (PGA) = 0.060
- Horizontal Response Spectral Coefficient (period = 0.2 sec) (Ss) = 0.135
- Horizontal Response Spectral Coefficient (period = 1.0 sec) (S1) = 0.040

Application of the above site coefficients results in the following recommended coefficients for development of design response spectra:

- Response Spectral Acceleration, A_s = 0.096
- Design Spectral Acceleration Coefficient at 0.2 second period, S_{DS} = 0.216
- Design Spectral Acceleration Coefficient at 1.0 second period, S_{D1} = 0.096

Per Table 3.10.6-1 of the AASHTO LRFD Bridge Manual this site falls into Seismic Performance Zone 1 (formerly known as Site Design Class A). The 2020 MassDOT LRFD Bridge Manual (Section 3.4) indicates that conventional bridges classified as SDC A, and single-span bridges regardless of SDC, do not require a detailed seismic analysis to determine the design earthquake loading. However, minimum design and detailing requirements do apply and are listed in Section 3.4.3 of the Bridge Manual.

The AASHTO Seismic Guide Specifications (Section 6.8) state that liquefaction potential need not be evaluated for sites in SDC A.

5. Construction Recommendations

5.1 Excavation and Dewatering

The requirements for excavation support and construction dewatering will depend on the final design elevation selected for the bottom of the abutments. We understand that the currently proposed elevation for the bottom of the abutments is El. 791.5. This elevation is roughly at the groundwater level measured in the 2020 borings and about 2 feet below the groundwater level measured in the 2003 borings. At this elevation, we expect that the abutment foundations can be constructed in open excavations with groundwater control provided by pumping from filtered sumps.

We recommend that the contractor install the permanent scour protection sheet piles prior to excavating to construct the abutment pile caps so that the sheet piles can be used for temporary excavation support and groundwater control. We also recommend over-excavating the natural fine sand and silt layer and placing a minimum one-foot-thick layer of crushed stone for bridge foundations as a working pad. A filter layer consisting of a nonwoven geotextile should be placed below the crushed stone to separate it from the fine sand and silt below the working pad. If the over-excavation and placement of crushed stone extends below the groundwater level, construction of the working pad can be performed in an underwater condition. After the working pad is constructed, it can be drained by connecting it to the filtered sumps.

Any necessary excavation support or dewatering systems should be designed and stamped by an experienced Professional Engineer registered in the Commonwealth of Massachusetts engaged by the contractor. The designs should be submitted to the project engineer for review. All excavations should be made in accordance with OSHA standards.

5.2 Backfilling

Gravel Borrow backfill (MassDOT Standard Specification No. M1.03 Type b) should be placed behind the abutments and wingwalls, extending at least one foot beyond the back of the structure, as shown in Drawing No. 3.6.13 of the MassDOT "*LRFD Bridge Design Manual.*" Other backfill (e.g., to fill excavations associated with construction or removal of existing foundations or utilities) should consist of Ordinary Borrow (MassDOT Standard Specification No. M1.01.0) or Gravel Borrow.

In general, fill materials should be placed and compacted in accordance with MassDOT "*Standard Specifications for Highway and Bridges*," Section 150 (both the 1988 version and the 2015 and 2016 Supplemental provisions). However, we recommend that compaction in

areas too small for a smooth-drum vibratory compactor, within 5 feet of walls less than 15 feet high, or within 10 feet of walls greater than 15 feet high be performed using a vibratory walk-behind roller or plate compactor (weighing at least 200 lbs. imparting an impact load of at least 2.5 tons), with soil placed in maximum 6-inch loose lifts.

5.3 Re-Use of Existing Materials

Based on the soil descriptions on the boring logs, some of the existing on-site granular soils may meet the requirements for Ordinary Borrow. Suitability for reuse can be confirmed by testing samples during construction to evaluate if the soil in question meets the MassDOT requirements for Ordinary Borrow.

Suitability for reuse should be confirmed with grain size tests on samples taken from the site during construction.

5.4 Freezing Conditions

If construction is performed during freezing weather, special precautions will be required to prevent the soil subgrades from freezing. Freezing of the soil beneath foundations and pavements during construction may result in heave and subsequent settlement of the structure.

All soil subgrades should be free of frost before foundation construction. Frost-susceptible soils that have frozen should be removed and replaced with compacted Gravel Borrow or Gravel Borrow for Bridge Foundations, as appropriate. The foundation and the soil adjacent to the foundation should be insulated until they are backfilled.

Soil placed as fill should be free of frost, as should the ground on which it is placed.

6. Limitations

Our recommendations are based on the project information provided to us at the time of this report and may require modification if there are any changes in the nature, design, or location of the proposed construction. We recommend that GEI be engaged to review the final plans and specifications to judge whether changes in the project affect the validity of our recommendations and whether our recommendations have been properly implemented in the design.

The recommendations in this report are based in part on the data obtained from the borings. The nature and extent of variations between borings may not become evident until construction. If variations from the anticipated conditions are encountered, it may be necessary to revise the recommendations in this report. Therefore, we recommend that GEI be engaged to make site visits during construction to: a) check that the subsurface conditions exposed during construction are in general conformance with our design assumptions and b) ascertain that, in general, the geotechnical aspects of the work are being performed in compliance with the contract documents.

Our professional services for this project have been performed in accordance with generally accepted engineering practices; no warranty, express or implied, is made.

Tables

Table 1. Soil Properties
North Poland Road Bridge over North Poland Brook
Bridge No. C-20-4
Conway, Massachusetts

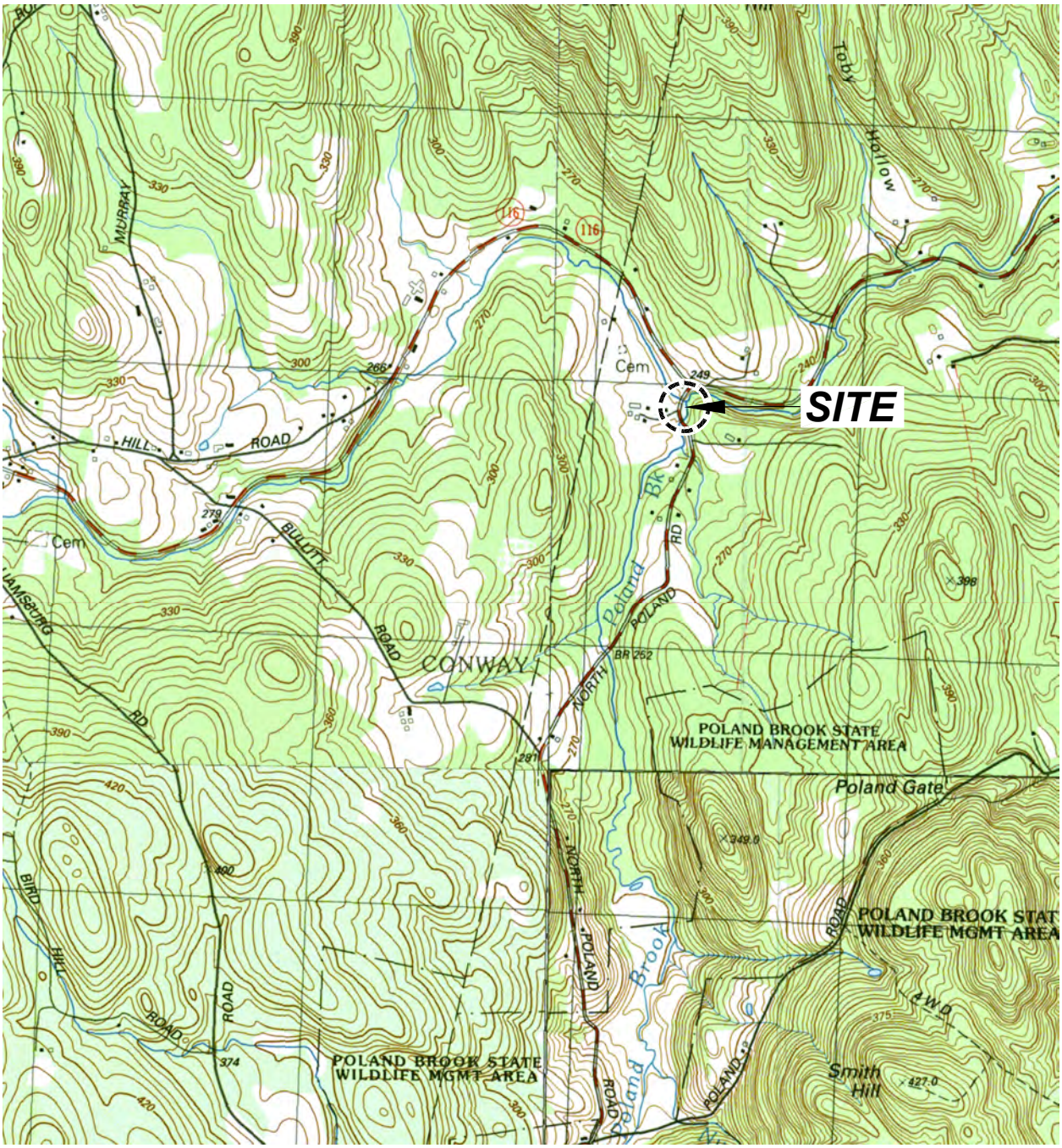
Layer/Soil Type	Unit Weight, γ (pcf)	Friction Angle, ϕ (deg)	Earth Pressure Coefficients[1,2]
Fill	115/120 above/below groundwater	30	Ka=0.30 Ko=0.50 Kp=4.8[3]
Sand and Silt	115/120 above/below groundwater	30	Ka=0.30 Ko=0.50 Kp=4.8(3)
Glacial Till	130	38	Ka=0.22 Ko=0.38 Kp=8.7[3]
Gravel Borrow	125/130 above/below groundwater	35	Ka=0.25 Ko=0.43 Kp=7.0[3]
Gravel Borrow for Bridge Foundations	130/135 above/below groundwater	37	Ka=0.23 Ko=0.40 Kp=8.3[3]
Retained Backfill (Ordinary Borrow)	120/130 above/below groundwater	32	Ka=0.28 Ko=0.47 Kp=5.5[3]

Notes:

1. Recommended earth pressure coefficients are associated with horizontal backfill in front and behind the walls with vertical back faces, and are in accordance with the recommendations of Section 3.1.6 of the MassDOT LRFD Bridge Design Manual. Section 3.1.6 provides guidelines on how to use the earth pressure coefficients in design.
2. Seismic earth pressure coefficients are not included because the bridge is classified under Seismic Design Category A, and seismic design is not necessary per the MassDOT LRFD Bridge Design Manual.
3. Passive pressure coefficients are intended for use in Support of Excavation design only.

Geotechnical Report
North Poland Road Bridge over North Poland Brook
Bridge No. C-20-4
Conway, Massachusetts
July 2022

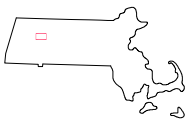
Figures



0 1000 2000 4000 6000

SCALE, FEET

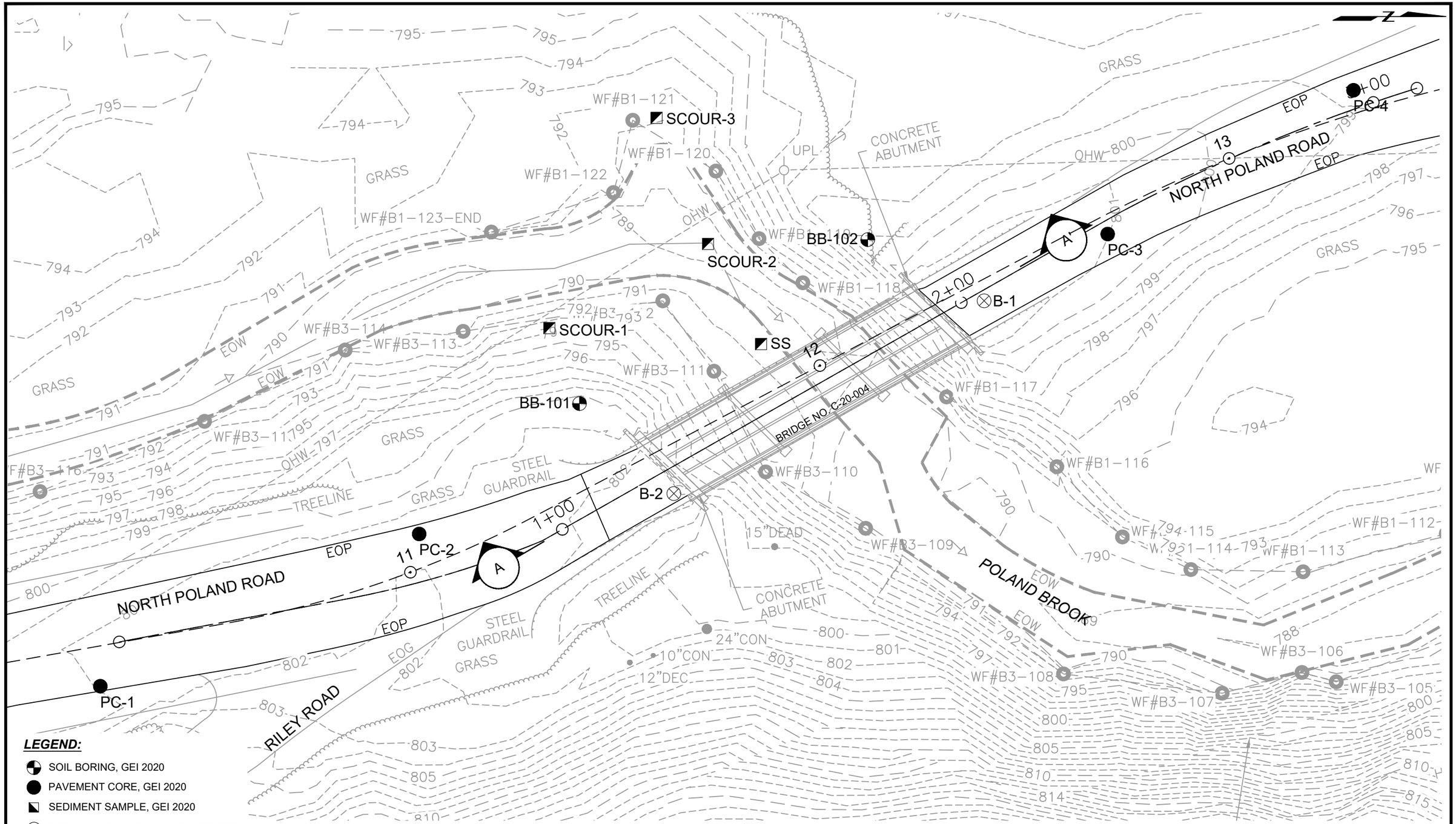
This Image provided by MassGIS is from U.S.G.S. Topographic
7.5 X 15 Minute Series
Greenfield, MA Quadrangle, 1988.
Datum is National Geodetic Vertical Datum of 1929 (NGVD29).
Contour Interval is 3 Meters.



MASSACHUSETTS
QUADRANGLE LOCATION

North Poland Road Over North Poland Brook Bridge No. C-20-004 Conway, Massachusetts	GEI Consultants	SITE LOCATION MAP
BETA Group, Inc. Norwood, Massachusetts	Project 2004115	July 2022 Fig. 1

B:\Working\BETA GROUP\2004115 North Poland Road Bridge\00_CAD\Figures\GT\fig 1 - site location



LEGEND:

- SOIL BORING, GEI 2020
- PAVEMENT CORE, GEI 2020
- SEDIMENT SAMPLE, GEI 2020
- PREVIOUS (2003) BORING BY OTHERS
- SUBSURFACE PROFILE LOCATION, SEE FIG. 3

SOURCE:

1. PLAN BASED ON MAP PROVIDED BY BETA ON 10/30/2020.
2. ELEVATION DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

0 20 40
SCALE, FEET

North Poland Road over North Poland Brook
Bridge No. C-20-004
Conway, Massachusetts

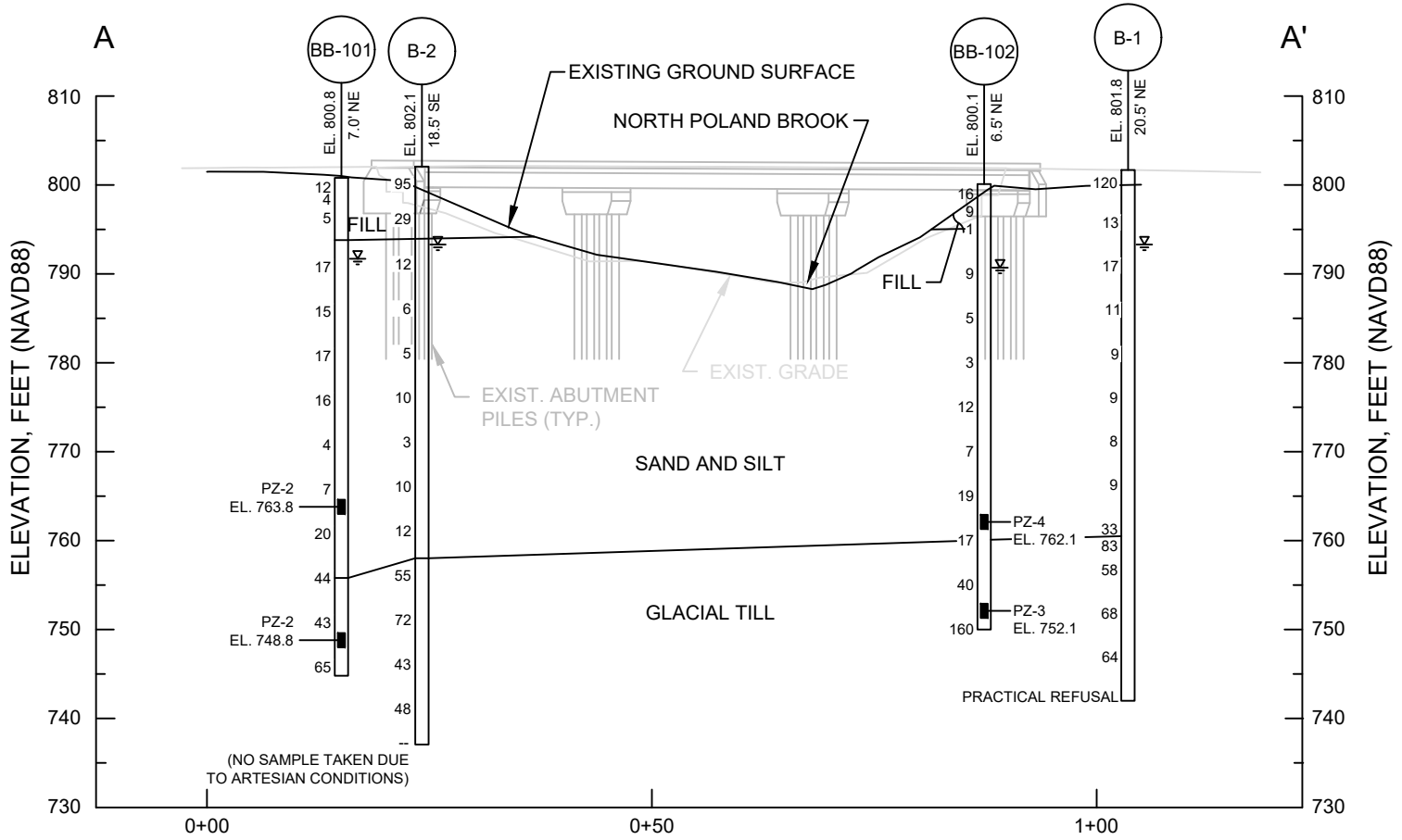
BETA Group, Inc.
Norwood, Massachusetts

GEI Consultants

BORING LOCATION PLAN

Project 2004115 | July 2022 | Fig. 2

\\geiconsulta B:\Working\BETA GROUP\2004115 North Poland Road Bridge\00_CAD\Figures\GT\2004115-04.dwg - 3/23/2021



SUBSURFACE PROFILE A - A'

0 20 40

SCALE: 1" = 20'

LEGEND:

B504 — BORING NUMBER

EL. 167.3 / 55' E — ELEVATION OF GROUND SURFACE AND OFFSET OF BORING FROM PROFILE LINE

EXISTING GROUND SURFACE

GROUNDWATER LEVEL MEASURED AT COMPLETION OF DRILLING

STRATUM BOUNDARY

VIBRATING WIRE PIEZOMETER

45 — N_{60} VALUE FROM SPT, BLOWS PER FOOT (2003 BORINGS)

107 — N-VALUE FROM SPT, BLOWS PER FOOT (2003 BORINGS)

NOTES:

1. PROFILE LOCATION IS SHOWN ON FIG. 2.

North Poland Road over North Poland Brook
Bridge No. C-20-004
Conway, Massachusetts

BETA Group, Inc.
Norwood, Massachusetts

GEI Consultants

SUBSURFACE PROFILE A-A'

Project 2004115 | July 2022 | Fig. 3

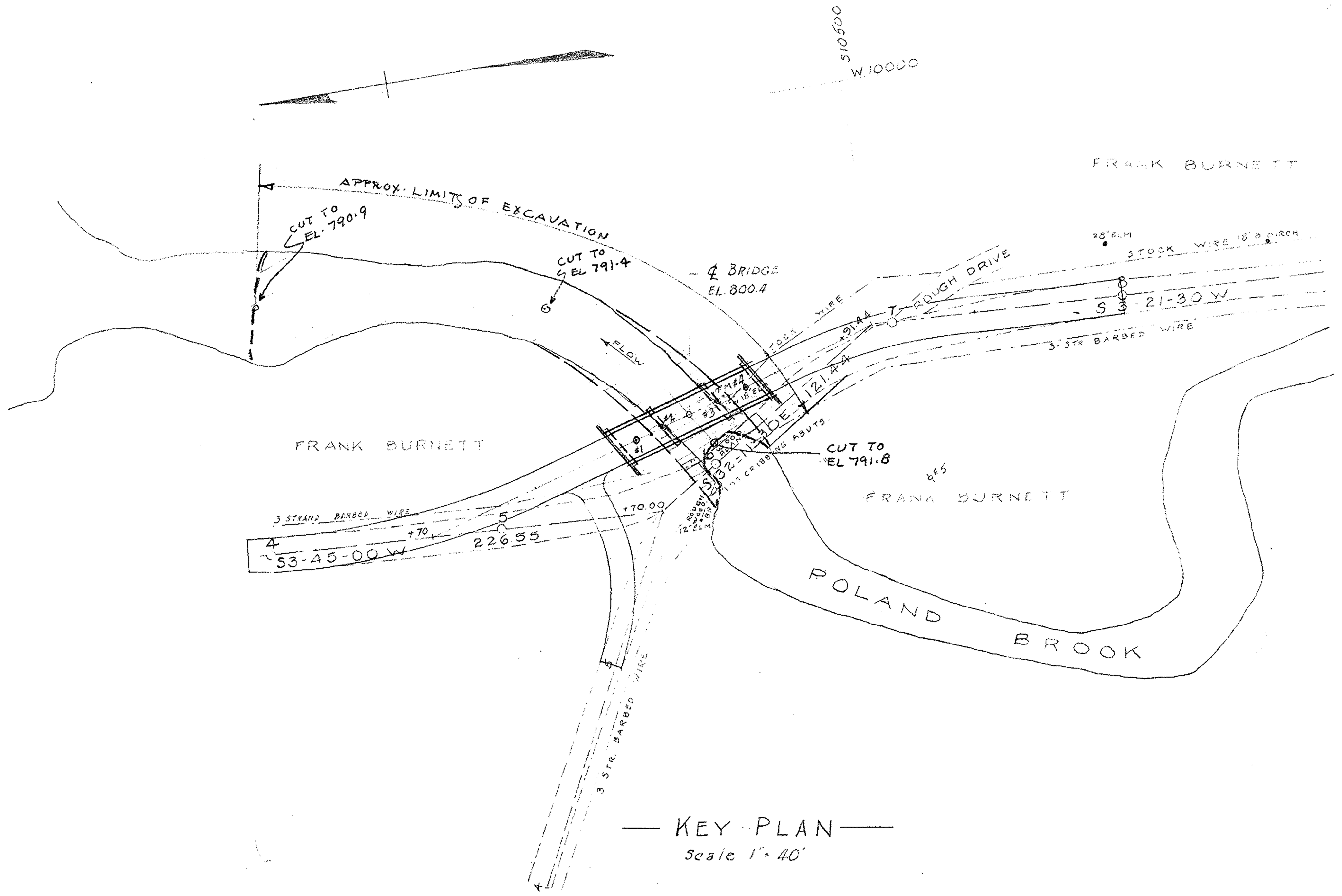
\\geiconsulta B:\Working\BETA GROUP\2004115 North Poland Road Bridge\00_CAD\Figures\GT\2004115-03.dwg - 6/29/2022

Geotechnical Report
North Poland Road Bridge over North Poland Brook
Bridge No. C-20-4
Conway, Massachusetts
July 2022

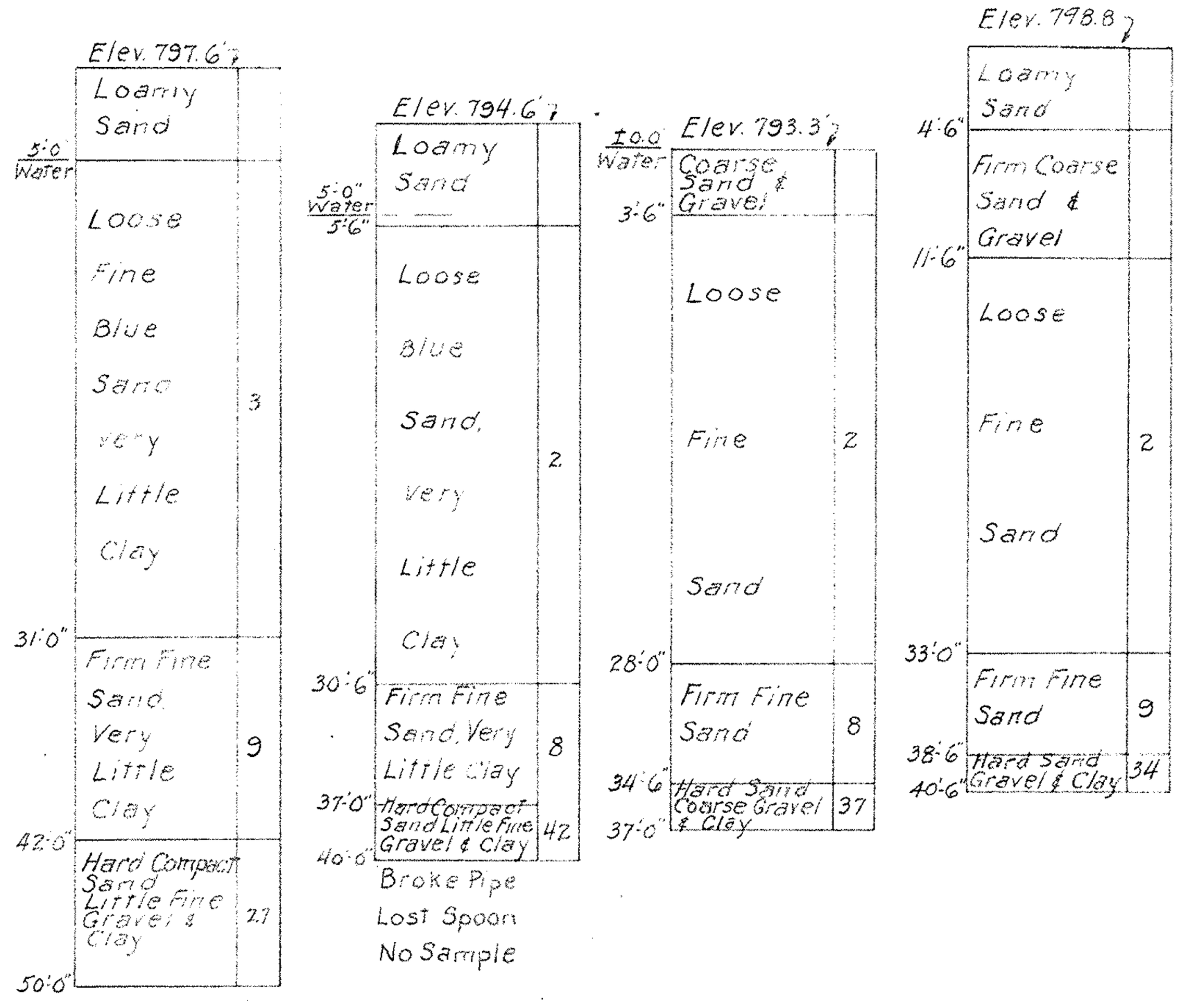
Appendix A

1940 Historic Bridge Drawings and Boring Logs

2003 Boring Logs



— KEY PLAN —
Scale 1" = 40'



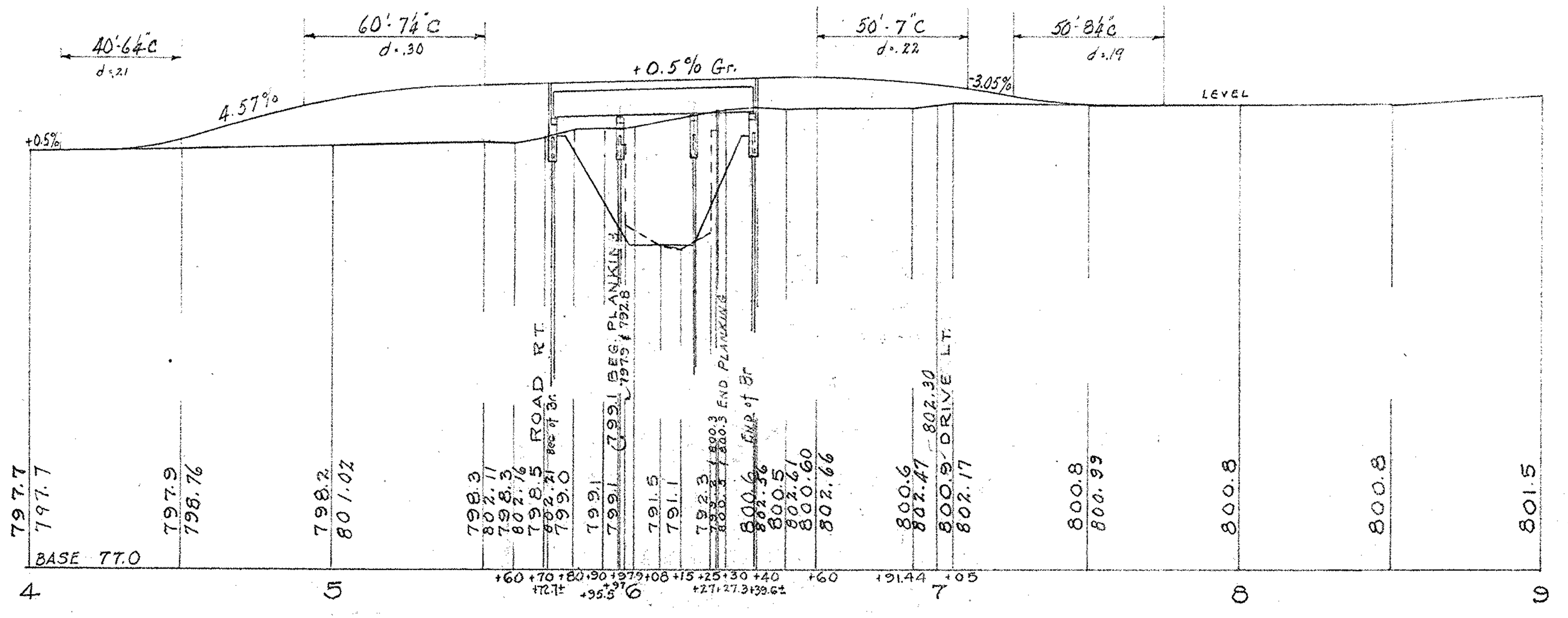
BORING DATA

SCALE 1" = 8'-0"

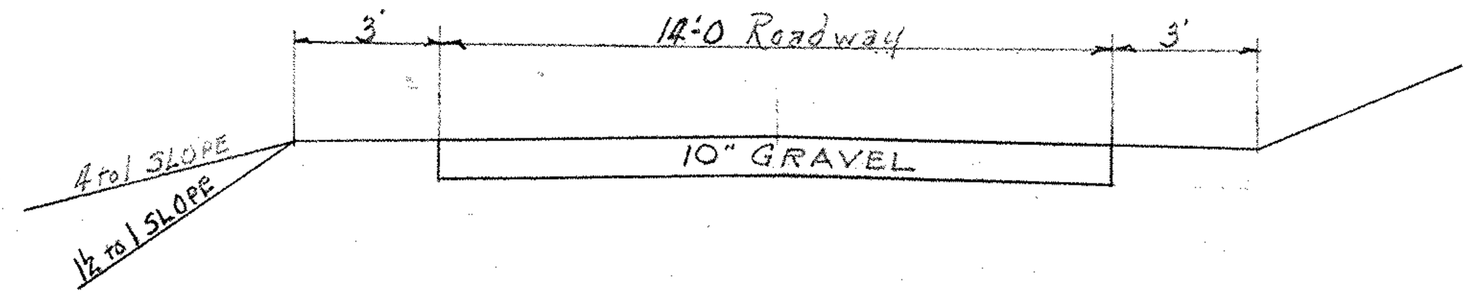
BORINGS TAKEN JAN. 29, 1940

BORING NOTES:

LOCATION OF BORINGS SHOWN ON KEY PLAN THUS ⊙
BORINGS TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW NATURE OF MATERIAL TO BE ENCOUNTERED IN CONNECTION WITH CONSTRUCTION OF THE BRIDGE.
FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE SAMPLING PIPE 1 FT. USING A 140 POUND WEIGHT FALLING 30 INCHES.
SAMPLES OBTAINED FROM TEST BORINGS ARE AVAILABLE AND MAY BE SEEN AT OFFICE OF BRIDGE ENGINEER, ROOM 609.



— PROFILE —
Hor. Scale 1" = 40'
Vert. Scale 1" = 80'



TYPICAL APPROACH SECTION
SCALE 1/4" = 1'-0"

GENERAL NOTES

FINISH: ALL EXPOSED CONCRETE SURFACES TO BE RUBBED SMOOTH WITH CORUNDUM BRICK AND LEFT FREE FROM ALL FORM MARKS AND IMPERFECTIONS.

DATE: TO BE PLACED IN CENTER OF OUTSIDE FACE OF BOTH COPINGS, FOR SIZE AND CHARACTER OF NUMERALS SEE DETAILS ON ANOTHER SHEET.

STRUCTURAL STEEL: TO HAVE A COLOR COAT OF STRUCTURAL GREEN PAINT.

DESIGN: ACCORDING TO SPECIFICATIONS OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS (1935 EDIT.) FOR H-15 LOADING.

BENCH MARK: STA. 7+95. LT. VERT. SPK. 30" ELM EL. = 802.02

CONCRETE: ALL CONCRETE TO BE CLASS "A".

LOCATION STR. STEEL: THE FOLLOWING STRUCTURAL STEEL AND PILES WILL BE FURNISHED BY THE COMMONWEALTH OF MASSACHUSETTS AND IS LOCATED AT THE FOLLOWING PLACES. 10"H 49# COLUMNS FROM ROUTE 116 2± MILES EAST OF DEERFIELD SUNDERLAND BRIDGE. 8-21" WF 59# BEAMS 21'6 LG. FROM FORBES BRIDGE STATE HIGHWAY STA. 202+ IN BUCKLAND. 4-21" WF 59# BEAMS FROM STATE HIGHWAY BRIDGE IN CONWAY STA. 288+ ROUTE 116.

ESTIMATED QUANTITIES
(NOT GUARANTEED)

ROADWAY EARTH EXCAVATION	10 CU. YDS.
UNCLASSIFIED EXCAVATION	500 CU. YDS.
GRAVEL BORROW	260 CU. YDS
STRIPPING GRAVEL PITS.	26 CU. YDS
FINE GRADING	1300 SQ. YDS
STEEL PILES	940 LIN. FT.
CEM. CONC. MASONRY CLASS A	60 CU. YDS.
STRUCTURAL STEEL (NEW)	2,500 POUNDS
STRUCTURAL STEEL (ERECTED)	16,000 POUNDS
BRIDGE RAILING	144 LIN. FT.
RIP RAP	40 CU. YDS
REMOVAL OF PRESENT BRIDGE	LUMP SUM
HIGHWAY GUARD TYPE W2C	40 LIN. FT
STEEL REINF. FOR STRUCTURES	11,500 POUNDS
TREES TO BE REMOVED	3 EACH
LEDGE EXCAVATION	20 CU. YDS.
ORDINARY BORROW	750 CU. YDS
PILE SPLICES	2 EACH
HIGHWAY GUARD POSTS W2C	4 EACH
FENCES REM. & RESET	300 LIN. FT
PILES LAGGED	2 EACH

GRADE REVISED 3/28/40

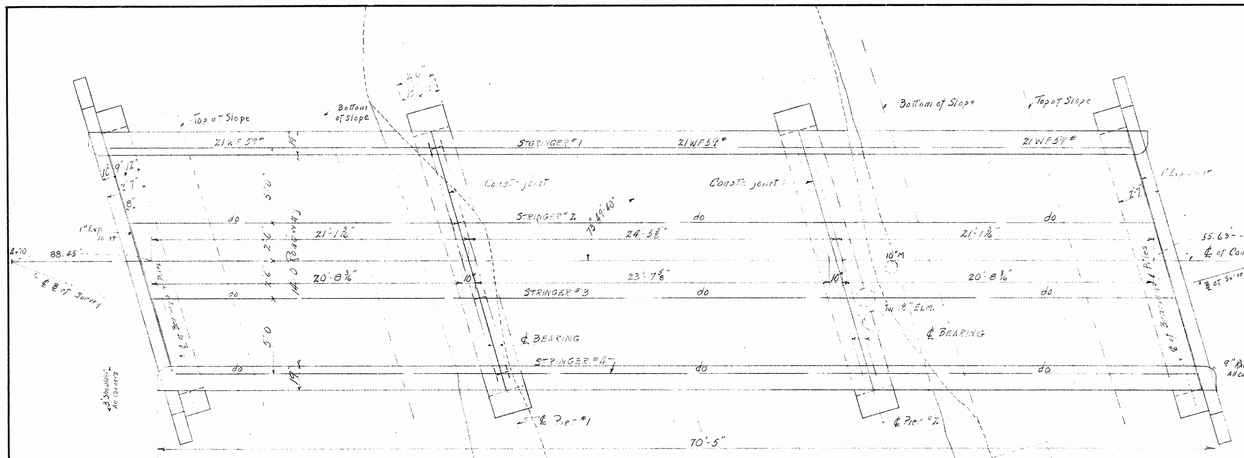
THE COMMONWEALTH OF MASSACHUSETTS
PROPOSED BRIDGE
CONWAY NO. 7
NORTH POLAND ROAD BRIDGE
OVER POLAND BROOK
SCALES AS NOTED
OFFICE OF
DEPARTMENT OF PUBLIC WORKS
100 NASHUA ST. — BOSTON, MASS
FEBRUARY 1940

G. E. Harkness — BRIDGE ENGINEER
R. W. Coburn — CHIEF ENGINEER

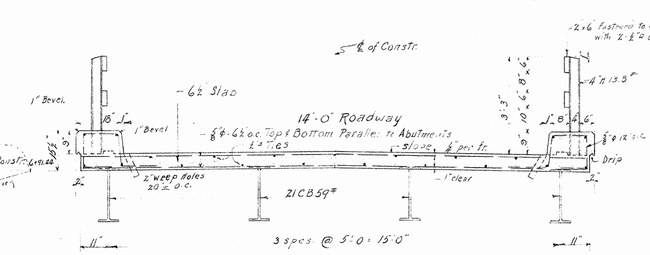
DESIGNED BY E.A.R. DRAWN BY E.A.R. CHECKED BY P.C.M.

DATE OF ISSUE				
ADVERTISING	CONSTRUCTION			
3/2/40	4-6-40			

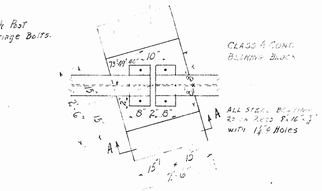
SHEET 1 OF 2 SHEETS BRIDGE No. C-20-4



PLAN
Scale ¼" = 1'-0"

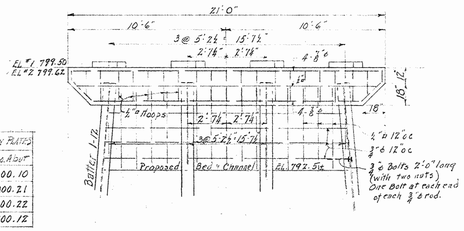


CROSS SECTION OF SUPERSTRUCTURE
Scale ½" = 1'-0"

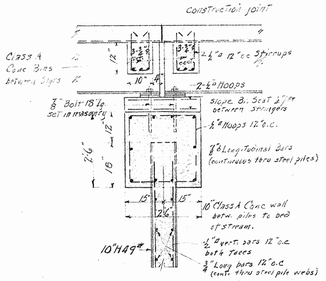


BEARING DETAILS
SLAB NOT SHOWN
Scale ½" = 1'-0"

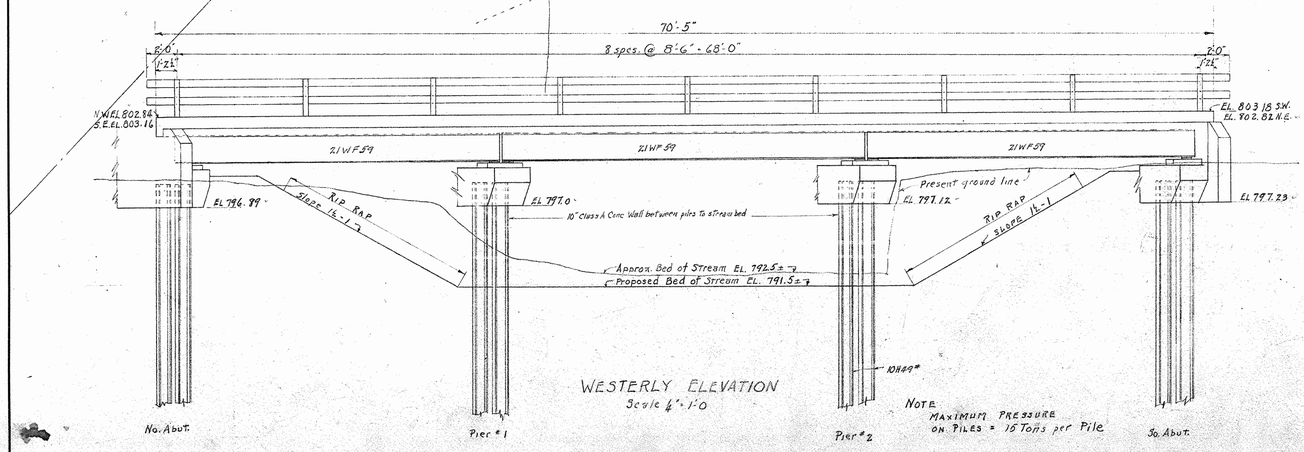
BRIDGE SEAT ELEVATIONS AT TOP OF MASONRY PLATES				
	No. Abut.	Pier #1	Pier #2	So. Abut.
BEAM 1	799.76	799.87	799.99	800.10
BEAM 2	799.87	799.98	800.10	800.21
BEAM 3	799.88	799.99	800.11	800.22
BEAM 4	799.76	799.89	800.01	800.12



TYPICAL ELEVATION OF PIER
Scale ¼" = 1'-0"

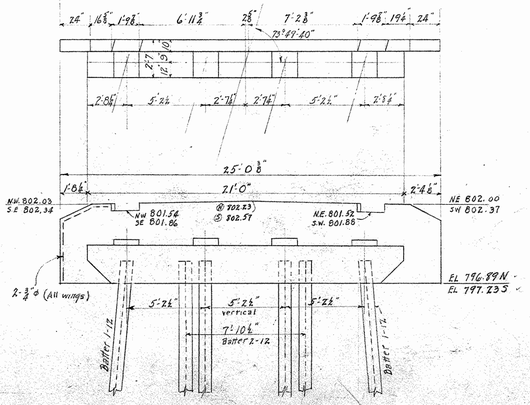


SECTION A-A
PIER DETAILS
Scale ½" = 1'-0"



WESTERLY ELEVATION
Scale ¼" = 1'-0"

NOTE
MAXIMUM PRESSURE ON PILES = 15 Tons per Pile



TYPICAL ABUTMENT ELEVATION
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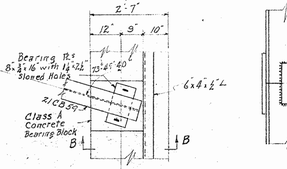
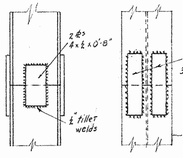
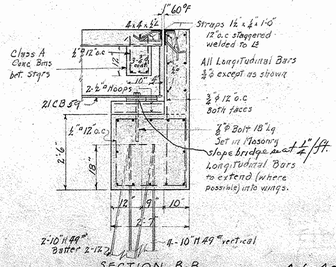


BEARING DETAILS
SLAB NOT SHOWN
Scale ½" = 1'-0"



PILE SPLICE DETAIL
Scale 1" = 1'-0"



SECTION B-B
ABUTMENT DETAILS
Scale ½" = 1'-0"

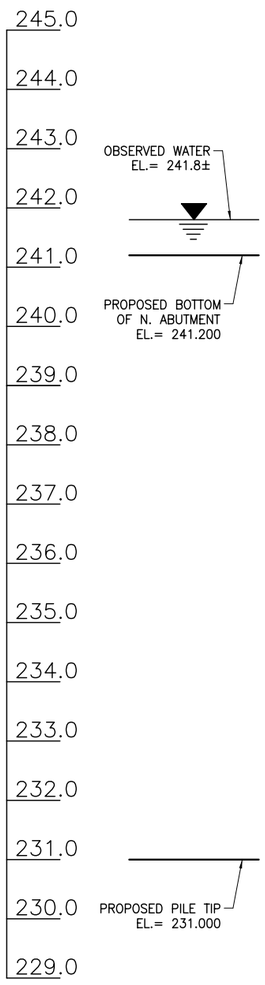
4-6-40 CONSTRUCTION
GRADE REVISED 3/28/40

SHEET No 7 OF 2 SHEETS BRIDGE No. C-20-A

STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
MASS.	BRZ-XXXXX	2007		
PROJECT FILE NO. 604005				

BORING B-1

N=918675.045
E=97802.767
GROUND ELEVATION: 244.4±



PHONE: (603) 437-1610 — NEW HAMPSHIRE BORING, INC. — FAX: (603) 437-0034
P. O. BOX 165 DERRY, NH 03038
E MAIL: nhb@nhboring

Boring #: B-1 | Project: C-20-4 | Contract #: 31240 | Station: N918675.05
Project Address: North Poland Road over Poland Brook | City: Conway | State: MA | Offset: E97807.77
Date Start: 2/03/03 | Start Time: 8:30AM | Date End: 2/04/03 | End Time: 2:00PM | Elev: 244.4m

Casing: Type: HW | Size: .1m I.D. | Hammer: 136 Kg | Fall: .6m
Sampler: S/S | Size: 34.9mm\ I.D. | Hammer: 63.5 Kg | Fall: 760 mm Length

GROUNDWATER OBSERVATION - METRIC, SCALE X:X
Date: 2/04/03 | Time: | Depth: 2.6m | Casing: 15.0m | Stablization Per:

DP	S./#	DEPTH (m)	PEN (m)	REC	BLOWS/.15m	S/C	SAMPLE DESCRIPTION
						.15	ASPHALT
	S-1	.3 - .48	.18	15	63-120/.03m		Wet, very dense, brown FINE SAND, some inorganic silt, some coarse sand, some coarse to fine gravel.
1m						1.4	
	S-2	1.5 - 2.1	.6	.15	8-7-6-7		Wet, medium dense, brown FINE SAND, some inorganic silt, trace coarse sand.
2m						3.0	
3m	S-3	3.0 - 3.6	.6	.04	8-6-11-29		Wet, medium dense, brown COARSE GRAVEL, some fine to medium gravel, some coarse sand, some fine sand, trace inorganic silt.
4m						4.4	
	S-4	4.5 - 5.1	.6	.02	4-5-6-4		Wet, medium dense grey, COARSE GRAVEL, some inorganic silt, some clay, trace fine sand.
5m						6.0	
6m	S-5	6.0 - 6.6	.6	.2	4-4-5-8		Wet, loose, grey FINE SAND, trace inorganic silt.
7m							
	S-6	7.5 - 8.1	.6	.18	5-4-5-6		Wet, loose, grey FINE SAND, trace inorganic silt.
8m							
9m	S-7	9.0 - 9.6	.6	.32	5-4-4-5		Wet, loose, grey FINE SAND, some inorganic silt, some clay.
10m							
	S-8	10.5 - 11.1	.6	.5	4-4-5-8		Wet, stiff, gray INORGANIC SILT, some fine sand, trace clay.
11m							
12m		12.0 - 12.6	.6	0	12-15-18-34		No Recovery
	S-9	12.6 - 13.2	.6	.07	37-45-38-42		Wet, hard, grey INORGANIC SILT, some fine sand, trace clay.
13m						13.4	
	S-10	13.4 - 14.0	.6	.25	24-27-31-36		Wet, very dense, grey FINE SAND, some inorganic silt, some coarse sand, some fine gravel.
14m							
15m	S-11	14.9 - 15.5	.6	.2	39-33-35-41		Wet, very dense, grey FINE SAND, some inorganic silt, some coarse sand, some fine to medium gravel.
16m							
	S-12	16.4 - 17.0	.6	.25	41-42-22-25		Wet, very dense, grey FINE SAND, some inorganic silt, some coarse sand, some fine to medium gravel, trace coarse gravel..
17m						17.9	
18m	S-13	17.9 - 18.2	.3	.06	88-76	18.2	Wet, very dense, grey COARSE GRAVEL, some fine to medium gravel, some fine sand, some inorganic silt, some coarse sand.
							Bottom of Exploration = 18.2m
19m							
20m							

Driller: Steve Clavette | Helper: Jeremy Caldwell | Inspection: Justin Downing

Remarks: PAGE 1 OF 1 | HOURS WORKED: 11 hrs | CASING TYPE: HW | CASING USED: 18.2 | CASING SIZE: .10 | TYPE OF COREBARREL:
No. Of Road Signs Used: 4 | Bags Of Grout Used: 4 | Well Size: | Screen Size: | Riser:
Note 1: .15m to 4.4 - Fine sand and gravel, with several cobbles throughout this zone. small cobbles and gravel advanced with casing down to change at 4.4m Note: Hole was terminatd at 18.2m as requested by the Inspector. Put bentonite from 18.2m to 15.0m, grouted from 15.0 to surface.

S./#: SAMPLE | PEN: PENETRATION | REC: RECOVERY | S/C: STRATA CHANGE

START: 2/3/03 9:00 AM
COMPLETE: 2/4/03 12:30 PM
COMPLETION TIME: 8.5 HOURS
DRILLER: STEVE CLAVETTE
HELPER: JEREMY CALDWELL
INSPECTOR: JUSTIN DOWNING
BOTTOM ELEVATION: 226.2±

BORING B-2

N=918654.434
E=97815.562
GROUND ELEVATION: 244.5±

PHONE: (603) 437-1610 — NEW HAMPSHIRE BORING, INC. — FAX: (603) 437-0034
P. O. BOX 165 DERRY, NH 03038
E MAIL: nhb@nhboring

Boring #: B-2 | Project: C-20-4 | Contract #: 31240 | Station: N918654.43
Project Address: North Poland Road over Poland Brook | City: Conway | State: MA | Offset: E97815.56
Date Start: 02/03/03 | Start Time: 8:30AM | Date End: 02/04/03 | End Time: 2:00PM | Elev: 244.5

Casing: Type: HW | Size: .1m I.D. | Hammer: 136 Kg | Fall: .6m
Sampler: S/S | Size: 34.9mm\ I.D. | Hammer: 63.5 Kg | Fall: 760 mm Length

GROUNDWATER OBSERVATION - METRIC, SCALE X:X
Date: 02/03/03 | Time: 11:00AM | Depth: 2.74 | Casing: 7.62 | Stablization Per:

DP	S./#	DEPTH (m)	PEN (m)	REC	BLOWS/.15m	S/C	SAMPLE DESCRIPTION
						.17	ASPHALT
	S-1	.30 - .90	.60	.25	44-45-50-15		Moist, very dense, dark brown COARSE TO FINE SAND, some coarse to fine gravel, fill, frost.
1m							
	S-2	1.50 - 2.10	.60	.30	15-18-11-15		Moist, medium dense, dark brown COARSE TO FINE SAND, trace fine gravel, fill.
2m							
3m	S-3	3.04 - 3.64	.60	.18	13-7-5-5	3.04	Wet, medium dense, brown FINE SAND, some inorganic silt.
4m						4.31	
	S-4	4.57 - 5.17	.60	.45	2-2-4-3		Wet, medium stiff, grey INORGANIC SILT, some fine sand.
5m							
6m	S-5	6.09 - 6.69	.60	.60	2-3-2-3		Wet, medium stiff, grey INORGANIC SILT and fine sand.
7m							
	S-6	7.62 - 8.22	.60	.35	4-5-5-4		Wet, medium dense, grey, FINE SAND, some inorganic silt.
8m							
9m	S-7	9.14 - 9.74	.60	.45	3-2-1-2		Wet, soft grey INORGANIC SILT, some fine sand.
10m							
	S-8	10.66 - 11.26	.60	.47	3-5-5-6		Wet, stiff grey, INORGANIC SILT, trace fine sand.
11m						11.58	
12m	S-9	12.19 - 12.79	.60	.32	5-6-6-9		Wet, medium dense, grey INORGANIC SILT, trace fine gravel, trace fine sand.
13m							
	S-10	13.71 - 14.31	.60	.27	29-21-34-37		Wet, very dense grey INORGANIC SILT, some fine sand, trace fine to medium gravel.
14m							
15m	S-11	15.24 - 15.84	.60	.40	22-34-38-50		Wet, very dense, grey INORGANIC SILT, some fine sand, some fine to medium gravel, cobbles.
16m							
	S-12	16.76 - 17.36	.60	.27	15-18-25-27		Wet, dense, grey FINE SAND and inorganic sitl, some fine to medium gravel.
17m							
18m	S-13	18.28 - 18.88	.60	.17	12-18-30-35		Wet, dense, grey FINE SAND some inorganic silt, some fine to medium gravel, trace coarse sand.
19m						19.81	
							Bottom of Exploration = 19.81m
20m							

Driller: Mark D'ambrosio | Helper: Joe Lafond | Inspection: Justin Downing

Remarks: PAGE 1 OF 1 | HOURS WORKED: 11 | CASING TYPE: HW | CASING USED: 13.71 | TYPE OF COREBARREL:
No. Of Road Signs Used: 2 | Bags Of Grout Used: | Well Size: | Screen Size: | Riser:
Note 1: Note: Drilled down to 19.81 No Sample, taken artesian conditions, bore hole terminated by Mass Highway. Borehole grouted upon completion from 19.81m to ground surface.

S./#: SAMPLE | PEN: PENETRATION | REC: RECOVERY | S/C: STRATA CHANGE

START: 2/3/03 9:00 AM
COMPLETE: 2/4/03 1:30 PM
COMPLETION TIME: 9.5 HOURS
DRILLER: MARK D'AMBROSIO
HELPER: JOE LaFOND
INSPECTOR: JUSTIN DOWNING
BOTTOM ELEVATION: 224.69±

BORING LOGS

BORING NOTES:

1. LOCATION OF BORINGS SHOWN ON THE PLAN THUS: B-1
2. BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
3. WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
4. FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 50.8 MILLIMETER SPLIT SPOON SAMPLER 150 MILLIMETERS WITH A 63.5 KILOGRAM MASS FALLING 760 MILLIMETERS.
5. BORING SAMPLES ARE STORED AT A STORAGE FACILITY LOCATED AT 219 WINTHROP AVE. (ROUTE 114) IN LAWRENCE, MA. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING THE MASSACHUSETTS HIGHWAY DEPARTMENT, GEOTECHNICAL SECTION AT 10 PARK PLAZA, ROOM 6500, BOSTON, MA 02116, AT (617) 973-8836.
6. THE BORINGS WERE MADE IN FEBRUARY 2003.
7. BORINGS WERE MADE BY:
   NEW HAMPSHIRE BORING, INC.
   P.O. BOX 165
   DERRY, NEW HAMPSHIRE 03038
8. THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.
9. THE DEPTHS AS SHOWN ON THE ORIGINAL BORING LOGS HAVE BEEN CONVERTED TO ELEVATIONS BY THE ENGINEER.

ESTIMATED QUANTITIES

(NOT GUARANTEED)

ITEM	QTY	UNIT
DEMOLITION OF BRIDGE NO. C-20-004	1	LS
BRIDGE EXCAVATION	205	CM
CLASS B ROCK EXCAVATION	5	CM
GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	52	CM
CRUSHED STONE FOR BRIDGE FOUNDATIONS	35	MG
CRUSHED STONE FOR FILTER BLANKET	26	CM
HOT POURED RUBBERIZED ASPHALT SEALER	16	M
GEOTEXTILE FABRIC FOR SEPARATION	85	SM
STEEL PIPE PILE 300mm O.D.	425	M
RIPRAP	105	MG
CONTROL OF WATER-STRUCTURE NO. C-20-004	1	LS
TEMP. PROTECTIVE SHIELDING BRIDGE NO. C-20-004	1	LS
BRIDGE STRUCTURE, BRIDGE NO. C-20-004	1	LS

HYDRAULIC DATA

DRAINAGE AREA: 17.612 SQUARE KILOMETERS
DESIGN DISCHARGE: 16.85 CUBIC METERS PER SECOND
DESIGN FREQUENCY: 10 YEARS
DESIGN VELOCITY: 1.09 METERS PER SECOND
DESIGN HIGH WATER: ELEVATION: 242.1 METERS

BASIC FLOOD DATA

Q (100 YEAR): 35.55 CUBIC METERS PER SECOND
WATER SURFACE ELEVATION: 242.57m, NAVD

FLOOD OF RECORD

Q = UNKNOWN CUBIC METERS PER SECOND
FREQUENCY: UNKNOWN
DATE: UNKNOWN

HISTORY OF ICE FLOES: NONE DOCUMENTED IN NBIS DATABASE
EVIDENCE OF SCOUR AND EROSION: THE PILINGS OF BOTH EXISTING PIERS ARE EXPOSED AND THEIR INTERSTITIAL CONCRETE WEBBING IS UNDERMINED.

DATE	DESCRIPTION
	ISSUED FOR CONSTRUCTION
USE ONLY PRINTS OF LATEST DATE	

Geotechnical Report
North Poland Road Bridge over North Poland Brook
Bridge No. C-20-4
Conway, Massachusetts
July 2022

Appendix B

GEI 2020 Exploration Logs

BORING INFORMATION

NORTHING (ft): 3,013,938 **EASTING (ft):** 320,898
GROUND SURFACE EL. (ft): ~801 (See Plan) **DATE START/END:** 10/20/2020 - 10/21/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 56.0 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Diedrich D-50

BORING

BB-101

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): ▼ 9.1 10/21/2020 8:18 am

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0 to 2	24/6	2-5-4-3	Advanced 4-inch-ID casing to 39 ft.	FILL	S1: Moist, loose, brown, FINE TO COARSE SAND, some inorganic silt. Roots present.
		S2	2 to 4	24/9	3-2-1-2			S2: Moist, very loose, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.
	5	S3	4 to 6	24/9	2-2-2-2			S3 (0-5 in): Moist, very loose, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt. S3 (5-9 in): Moist, very loose, brown to gray, FINE TO COARSE SAND, trace inorganic silt.
						Rig chattered at ~7 ft.	SAND AND SILT	
	10	S4	9 to 11	24/5	5-7-6-4			S4: Wet, medium dense, brown, FINE TO MEDIUM GRAVEL, some fine to coarse sand.
	15	S5	14 to 16	24/9	10-6-5-4			S5: Wet, medium dense, gray, FINE TO COARSE SAND, some inorganic silt. Sand mostly fine-grained. [GRAIN SIZE DISTRIBUTION TEST PERFORMED].
	20	S6	19 to 21	24/12	4-4-6-6			S6: Wet, medium dense, gray, FINE TO MEDIUM SAND, trace inorganic silt.
	25	S7	24 to 26	24/11	5-7-5-5			S7: Wet, medium dense, gray, FINE TO MEDIUM SAND, trace inorganic silt
		S8	29	24/8	2-2-1-2			S8: Wet, very loose, gray, FINE TO MEDIUM SAND, some

NOTES: Installed a piezometer at 37 feet and 52 feet. Installed a 5 foot standpipe over piezometer with a 3.5 foot stick up from ground surface.

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

NORTHING (ft): 3,013,938 **EASTING (ft):** 320,898
GROUND SURFACE EL. (ft): ~801 (See Plan) **DATE START/END:** 10/20/2020 - 10/21/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.

BORING BB-101

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
			to 31				SAND AND SILT	inorganic silt.
	35	S9	34 to 36	24/15	3-3-2-4			S9: Wet, loose, gray, INORGANIC SILT, trace fine sand. [GRAIN SIZE DISTRIBUTION TEST PERFORMED].
	40	S10	39 to 41	24/14	4-7-8-10	Open hole from 39 ft to 56 ft.		S10: Wet, medium dense, gray, FINE SAND, some inorganic silt.
	45	S11	44 to 46	24/10	19-15-18-18			S11 (0-7 in): Wet, dense, gray, FINE TO COARSE SAND.
							GLACIAL TILL	S11 (7-10 in): Moist, dense, gray, FINE SAND AND INORGANIC SILT, some coarse gravel.
	50	S12	49 to 51	24/8	14-15-17-23	Rig chattered at 48.5 ft.		S12: Moist, dense, gray, FINE SAND AND INORGANIC SILT, some fine to medium gravel.
	55	S13	54 to 56	24/4	20-16-33-26	Rig chattered at 53.5 ft.		S13: Moist, dense, gray, FINE TO COARSE GRAVEL, some fine to coarse sand, trace inorganic silt.
								Bottom of boring at 56 feet. Grouted to a depth of 9 feet. Backfilled with cuttings to ground surface.
	60							
	65							

NOTES: Installed a piezometer at 37 feet and 52 feet. Installed a 5 foot standpipe over piezometer with a 3.5 foot stick up from ground surface.

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

BORING INFORMATION

NORTHING (ft): 3,014,001 **EASTING (ft):** 320,862
GROUND SURFACE EL. (ft): ~799 (See Plan) **DATE START/END:** 10/21/2020 - 10/22/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 50.1 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Diedrich D-50

BORING

BB-102

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): ▼ 8.3 10/22/2020 10:52 am

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0 to 2	24/15	3-6-6-5	Advanced 4-inch-ID casing to 34 ft.	FILL	S1: Dry, medium dense, brown, FINE TO COARSE GRAVEL AND FINE TO COARSE SAND, trace inorganic silt. Roots present.
		S2	2 to 4	24/12	5-4-3-3			S2: Dry, loose, brown, FINE TO COARSE GRAVEL AND FINE TO COARSE SAND, trace inorganic silt. Roots present.
	5	S3	4 to 6	24/8	2-1-1/12"			S3 (0-5 in): Moist, very loose, brown, FINE TO COARSE SAND, trace inorganic silt, trace fine gravel. Wood present.
							SAND AND SILT	S3 (5-8 in): Wet, very loose, gray, FINE TO COARSE SAND, trace inorganic silt.
	10	S4	9 to 11	24/7	6-5-2-2			S4 (0-3 in): Wet, loose, light brown, FINE TO COARSE SAND. S4 (3-4 in): Wet, loose, gray, FINE SAND, some inorganic silt. S4 (4-7 in): Wet, loose, gray, FINE TO MEDIUM SAND, some inorganic silt.
						Wash color changed to grey.		
	15	S5	14 to 16	24/0	7-2-2-2			S5: No recovery.
	20	S6	19 to 21	24/5	1-1-1-2			S6: Wet, very loose, gray, FINE TO COARSE SAND, some inorganic silt, trace gravel. Sand and Gravel mostly fine-grained. [GRAIN SIZE DISTRIBUTION TEST PERFORMED].
	25	S7	24 to 26	24/10	3-3-6-4			S7: Wet, loose, gray, FINE TO MEDIUM SAND, trace inorganic silt.
		S8	29	24/21	2-3-2-4			S8: Wet, loose, gray, INORGANIC SILT, some fine sand.

NOTES: Installed a piezometer at 38 feet and 48 feet. Installed a 5 foot standpipe over piezometer with a 3.5 foot stick up from ground surface.

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

NORTHING (ft): 3,014,001 **EASTING (ft):** 320,862
GROUND SURFACE EL. (ft): ~799 (See Plan) **DATE START/END:** 10/21/2020 - 10/22/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.

BORING BB-102

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
			to 31					
						Rig chattered at 33 to 34 ft.	SAND AND SILT	
	35	S9	34 to 36	24/0	5-7-7-12	Open hole from 34 ft to 50.1 ft.		S9: No recovery.
	40	S10	39 to 41	24/12	6-7-6-21			S10 (0-6 in): Wet, medium dense, gray, FINE TO MEDIUM SAND, some coarse gravel, trace inorganic silt.
							GLACIAL TILL	S10 (6-12 in): Wet, medium dense, gray, FINE TO COARSE SAND, some inorganic silt, trace fine gravel.
	45	S11	44 to 46	24/15	11-11-19-18			S11: Dry, dense, gray, FINE TO COARSE SAND AND INORGANIC SILT, some fine to coarse gravel.
						Rig chattered at 47.5 to 48 ft.		
	50	S12	49 to 50.1	13/6	14-29-50/1"			S12: Moist, very dense, gray, FINE TO COARSE GRAVEL, some fine to coarse sand, trace inorganic silt.
								Bottom of boring at 50.1 feet. Grouted to a depth of 8 feet. Backfilled with cuttings to ground surface.
	55							
	60							
	65							

NOTES: Installed a piezometer at 38 feet and 48 feet. Installed a 5 foot standpipe over piezometer with a 3.5 foot stick up from ground surface.

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

BORING INFORMATION

NORTHING (ft): 3,013,833 **EASTING (ft):** 320,959
GROUND SURFACE EL. (ft): ~801.5 (See Plan) **DATE START/END:** 10/20/2020 - 10/20/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 3.8 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Mobile B-53

BORING

PC-1

PAGE 1 of 1

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
								(0-3.25 in): ASPHALT.
		S1	0.3 to 1.8	18/8	16-15-33	Unable to fully penerate S1 due to an emebedded tree root.	FILL	S1(0-3"): Wet, dense, black, FINE TO COARSE SAND, some fine gravel. S1(3-8"): Wet, dense, light brown, FINE TO COARSE SAND, some fine gravel, trace inorganic silt.
		S2	1.8 to 3.8	24/3	27-10-7-4			S2: Wet, medium dense, brown, FINE TO MEDIUM GRAVEL, some fine to coarse sand, trace inorganic silt.
	5							Bottom of boring at 3.8 feet. Backfilled with sand and topped with cold patch.

NOTES:

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

BORING INFORMATION

NORTHING (ft): 3,013,903 **EASTING (ft):** 320,926
GROUND SURFACE EL. (ft): ~801.5 (See Plan) **DATE START/END:** 10/20/2020 - 10/20/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 2.3 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Mobile B-53

BORING

PC-2

PAGE 1 of 1

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
								(0-3 in): ASPHALT.
		S1	0.3 to 2.3	24/13	11-8-8-7		FILL	S1: Wet, medium dense, light brown, FINE TO COARSE SAND, some fine to medium gravel, trace inorganic silt.
	5							Bottom of boring at 2.2 feet. Backfilled with sand and topped with cold patch.

NOTES:

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

BORING INFORMATION

NORTHING (ft): 3,014,053 **EASTING (ft):** 320,861
GROUND SURFACE EL. (ft): ~801 (See Plan) **DATE START/END:** 10/21/2020 - 10/21/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 2.4 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Mobile B-53

BORING

PC-3

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
								(0-3.88 in): ASPHALT. Horizontally fracture at about 1".
		S1	0.3 to 2.3	24/15	12-12-9-7		FILL	S1: Moist, medium dense, light brown, FINE TO COARSE GRAVEL AND FINE TO COARSE SAND, trace inorganic silt.
	5							Bottom of boring at 2.3 feet. Backfilled with sand and topped with cold patch.

NOTES:

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

BORING INFORMATION

NORTHING (ft): 3,014,106 **EASTING (ft):** 320,830
GROUND SURFACE EL. (ft): ~799 (See Plan) **DATE START/END:** 10/21/2020 - 10/21/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 2.1 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Mobile B-53

BORING

PC-4

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0.1 to 2.1	24/14	10-14-26-14		FILL	(0-2 in): ASPHALT. S1: Wet, dense, FINE TO COARSE GRAVEL, some fine to coarse sand, trace inorganic silt.
	5							Bottom of boring at 2.1 feet. Backfilled with sand and topped with cold patch.

NOTES:

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

Geotechnical Report
North Poland Road Bridge over North Poland Brook
Bridge No. C-20-4
Conway, Massachusetts
July 2022

Appendix C

Piezometer Installation Logs

BORING INFORMATION

NORTHING (ft): 3,013,938 **EASTING (ft):** 320,898
GROUND SURFACE EL. (ft): ~801 (See Plan) **DATE START/END:** 10/20/2020 - 10/21/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 56.0 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Diedrich D-50

BORING

BB-101

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): ▼ 9.1 10/21/2020 8:18 am

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0 to 2	24/6	2-5-4-3	Advanced 4-inch-ID casing to 39 ft.	FILL	S1: Moist, loose, brown, FINE TO COARSE SAND, some inorganic silt. Roots present.
		S2	2 to 4	24/9	3-2-1-2			S2: Moist, very loose, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.
	5	S3	4 to 6	24/9	2-2-2-2			S3 (0-5 in): Moist, very loose, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt. S3 (5-9 in): Moist, very loose, brown to gray, FINE TO COARSE SAND, trace inorganic silt.
						Rig chattered at ~7 ft.	SAND AND SILT	
	10	S4	9 to 11	24/5	5-7-6-4			S4: Wet, medium dense, brown, FINE TO MEDIUM GRAVEL, some fine to coarse sand.
	15	S5	14 to 16	24/9	10-6-5-4			S5: Wet, medium dense, gray, FINE TO COARSE SAND, some inorganic silt. Sand mostly fine-grained. [GRAIN SIZE DISTRIBUTION TEST PERFORMED].
	20	S6	19 to 21	24/12	4-4-6-6			S6: Wet, medium dense, gray, FINE TO MEDIUM SAND, trace inorganic silt.
	25	S7	24 to 26	24/11	5-7-5-5			S7: Wet, medium dense, gray, FINE TO MEDIUM SAND, trace inorganic silt
		S8	29	24/8	2-2-1-2			S8: Wet, very loose, gray, FINE TO MEDIUM SAND, some

NOTES: Installed a piezometer at 37 feet and 52 feet. Installed a 5 foot standpipe over piezometer with a 3.5 foot stick up from ground surface.

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

NORTHING (ft): 3,013,938 **EASTING (ft):** 320,898
GROUND SURFACE EL. (ft): ~801 (See Plan) **DATE START/END:** 10/20/2020 - 10/21/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.

BORING BB-101

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
			to 31				SAND AND SILT	inorganic silt.
	35	S9	34 to 36	24/15	3-3-2-4			S9: Wet, loose, gray, INORGANIC SILT, trace fine sand. [GRAIN SIZE DISTRIBUTION TEST PERFORMED].
	40	S10	39 to 41	24/14	4-7-8-10	Open hole from 39 ft to 56 ft.		S10: Wet, medium dense, gray, FINE SAND, some inorganic silt.
	45	S11	44 to 46	24/10	19-15-18-18			S11 (0-7 in): Wet, dense, gray, FINE TO COARSE SAND.
							GLACIAL TILL	S11 (7-10 in): Moist, dense, gray, FINE SAND AND INORGANIC SILT, some coarse gravel.
	50	S12	49 to 51	24/8	14-15-17-23	Rig chattered at 48.5 ft.		S12: Moist, dense, gray, FINE SAND AND INORGANIC SILT, some fine to medium gravel.
	55	S13	54 to 56	24/4	20-16-33-26	Rig chattered at 53.5 ft.		S13: Moist, dense, gray, FINE TO COARSE GRAVEL, some fine to coarse sand, trace inorganic silt.
								Bottom of boring at 56 feet. Grouted to a depth of 9 feet. Backfilled with cuttings to ground surface.
	60							
	65							

NOTES: Installed a piezometer at 37 feet and 52 feet. Installed a 5 foot standpipe over piezometer with a 3.5 foot stick up from ground surface.

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

BORING INFORMATION

NORTHING (ft): 3,014,001 **EASTING (ft):** 320,862
GROUND SURFACE EL. (ft): ~799 (See Plan) **DATE START/END:** 10/21/2020 - 10/22/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 50.1 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Diedrich D-50

BORING

BB-102

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): ▼ 8.3 10/22/2020 10:52 am

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0 to 2	24/15	3-6-6-5	Advanced 4-inch-ID casing to 34 ft.	FILL	S1: Dry, medium dense, brown, FINE TO COARSE GRAVEL AND FINE TO COARSE SAND, trace inorganic silt. Roots present.
		S2	2 to 4	24/12	5-4-3-3			S2: Dry, loose, brown, FINE TO COARSE GRAVEL AND FINE TO COARSE SAND, trace inorganic silt. Roots present.
	5	S3	4 to 6	24/8	2-1-1/12"			S3 (0-5 in): Moist, very loose, brown, FINE TO COARSE SAND, trace inorganic silt, trace fine gravel. Wood present.
							SAND AND SILT	S3 (5-8 in): Wet, very loose, gray, FINE TO COARSE SAND, trace inorganic silt.
	10	S4	9 to 11	24/7	6-5-2-2			S4 (0-3 in): Wet, loose, light brown, FINE TO COARSE SAND. S4 (3-4 in): Wet, loose, gray, FINE SAND, some inorganic silt. S4 (4-7 in): Wet, loose, gray, FINE TO MEDIUM SAND, some inorganic silt.
						Wash color changed to grey.		
	15	S5	14 to 16	24/0	7-2-2-2			S5: No recovery.
	20	S6	19 to 21	24/5	1-1-1-2			S6: Wet, very loose, gray, FINE TO COARSE SAND, some inorganic silt, trace gravel. Sand and Gravel mostly fine-grained. [GRAIN SIZE DISTRIBUTION TEST PERFORMED].
	25	S7	24 to 26	24/10	3-3-6-4			S7: Wet, loose, gray, FINE TO MEDIUM SAND, trace inorganic silt.
		S8	29	24/21	2-3-2-4			S8: Wet, loose, gray, INORGANIC SILT, some fine sand.

NOTES: Installed a piezometer at 38 feet and 48 feet. Installed a 5 foot standpipe over piezometer with a 3.5 foot stick up from ground surface.

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

NORTHING (ft): 3,014,001 **EASTING (ft):** 320,862
GROUND SURFACE EL. (ft): ~799 (See Plan) **DATE START/END:** 10/21/2020 - 10/22/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.

BORING BB-102

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
			to 31					
						Rig chattered at 33 to 34 ft.	SAND AND SILT	
	35	S9	34 to 36	24/0	5-7-7-12	Open hole from 34 ft to 50.1 ft.		S9: No recovery.
	40	S10	39 to 41	24/12	6-7-6-21			S10 (0-6 in): Wet, medium dense, gray, FINE TO MEDIUM SAND, some coarse gravel, trace inorganic silt.
							GLACIAL TILL	S10 (6-12 in): Wet, medium dense, gray, FINE TO COARSE SAND, some inorganic silt, trace fine gravel.
	45	S11	44 to 46	24/15	11-11-19-18			S11: Dry, dense, gray, FINE TO COARSE SAND AND INORGANIC SILT, some fine to coarse gravel.
						Rig chattered at 47.5 to 48 ft.		
	50	S12	49 to 50.1	13/6	14-29-50/1"			S12: Moist, very dense, gray, FINE TO COARSE GRAVEL, some fine to coarse sand, trace inorganic silt.
								Bottom of boring at 50.1 feet. Grouted to a depth of 8 feet. Backfilled with cuttings to ground surface.
	55							
	60							
	65							

NOTES: Installed a piezometer at 38 feet and 48 feet. Installed a 5 foot standpipe over piezometer with a 3.5 foot stick up from ground surface.

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

BORING INFORMATION

NORTHING (ft): 3,013,833 **EASTING (ft):** 320,959
GROUND SURFACE EL. (ft): ~801.5 (See Plan) **DATE START/END:** 10/20/2020 - 10/20/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 3.8 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Mobile B-53

BORING

PC-1

PAGE 1 of 1

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
								(0-3.25 in): ASPHALT.
		S1	0.3 to 1.8	18/8	16-15-33	Unable to fully penerate S1 due to an emebedded tree root.	FILL	S1(0-3"): Wet, dense, black, FINE TO COARSE SAND, some fine gravel. S1(3-8"): Wet, dense, light brown, FINE TO COARSE SAND, some fine gravel, trace inorganic silt.
		S2	1.8 to 3.8	24/3	27-10-7-4			S2: Wet, medium dense, brown, FINE TO MEDIUM GRAVEL, some fine to coarse sand, trace inorganic silt.
	5							Bottom of boring at 3.8 feet. Backfilled with sand and topped with cold patch.

NOTES:

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

BORING INFORMATION

NORTHING (ft): 3,013,903 **EASTING (ft):** 320,926
GROUND SURFACE EL. (ft): ~801.5 (See Plan) **DATE START/END:** 10/20/2020 - 10/20/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 2.3 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Mobile B-53

BORING

PC-2

PAGE 1 of 1

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
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RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
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Qp = Pocket Penetrometer Strength
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LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
								(0-3 in): ASPHALT.
		S1	0.3 to 2.3	24/13	11-8-8-7		FILL	S1: Wet, medium dense, light brown, FINE TO COARSE SAND, some fine to medium gravel, trace inorganic silt.
	5							Bottom of boring at 2.2 feet. Backfilled with sand and topped with cold patch.

NOTES:

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

BORING INFORMATION

NORTHING (ft): 3,014,053 **EASTING (ft):** 320,861
GROUND SURFACE EL. (ft): ~801 (See Plan) **DATE START/END:** 10/21/2020 - 10/21/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 2.4 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Mobile B-53

BORING

PC-3

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
								(0-3.88 in): ASPHALT. Horizontally fracture at about 1".
		S1	0.3 to 2.3	24/15	12-12-9-7		FILL	S1: Moist, medium dense, light brown, FINE TO COARSE GRAVEL AND FINE TO COARSE SAND, trace inorganic silt.
	5							Bottom of boring at 2.3 feet. Backfilled with sand and topped with cold patch.

NOTES:

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

BORING INFORMATION

NORTHING (ft): 3,014,106 **EASTING (ft):** 320,830
GROUND SURFACE EL. (ft): ~799 (See Plan) **DATE START/END:** 10/21/2020 - 10/21/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD 1983 **DRILLING COMPANY:** Seaboard Drilling, Inc.
TOTAL DEPTH (ft): 2.1 **DRILLER NAME:** Mike
LOGGED BY: R. Oulal **RIG TYPE:** Mobile B-53

BORING

PC-4

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** N/A
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Drive and Wash
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0.1 to 2.1	24/14	10-14-26-14		FILL	(0-2 in): ASPHALT. S1: Wet, dense, FINE TO COARSE GRAVEL, some fine to coarse sand, trace inorganic silt.
	5							Bottom of boring at 2.1 feet. Backfilled with sand and topped with cold patch.

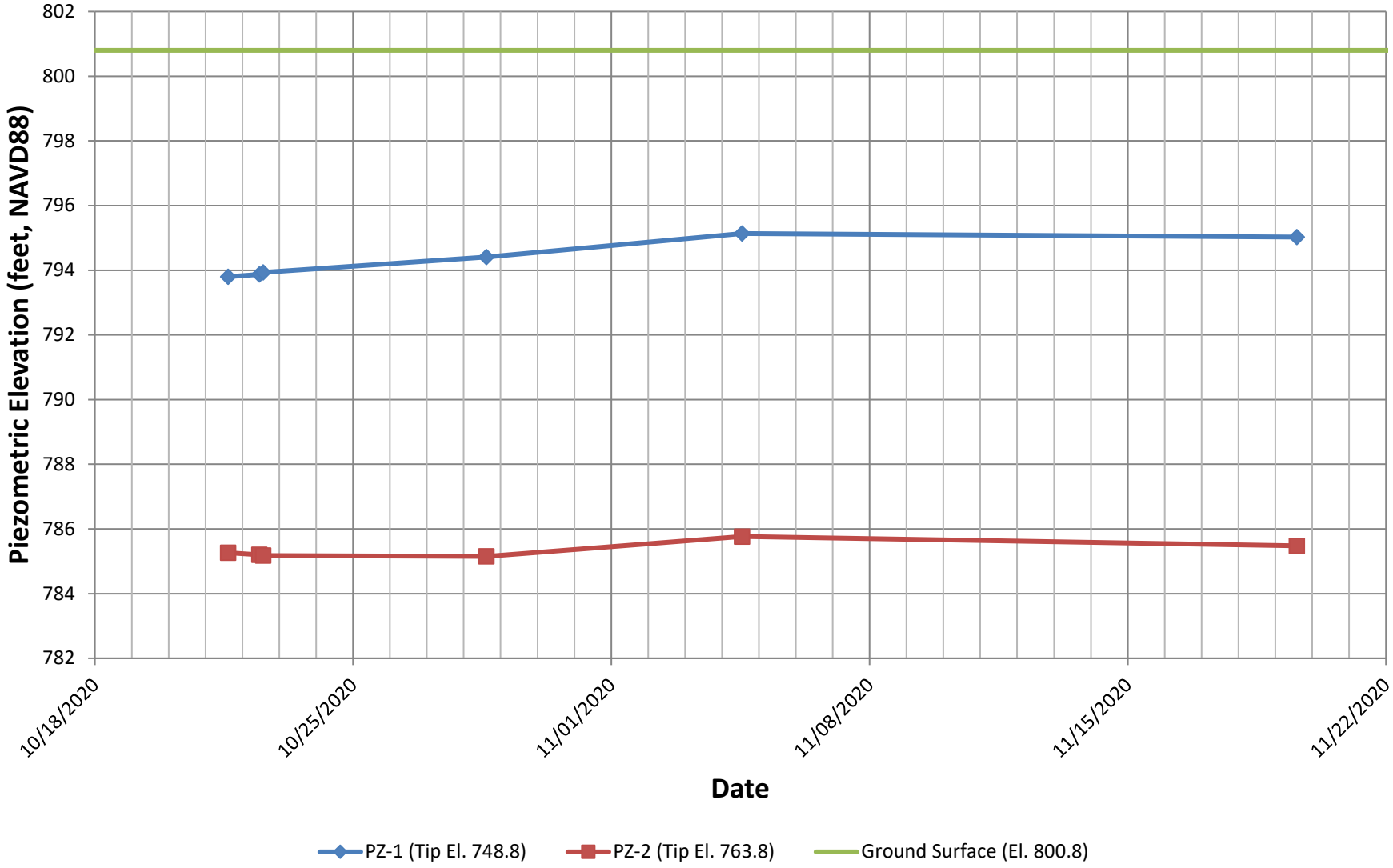
NOTES:

PROJECT NAME: North Poland Road Over Poland Road
CITY/STATE: Conway, Massachusetts
GEI PROJECT NUMBER: 2004115

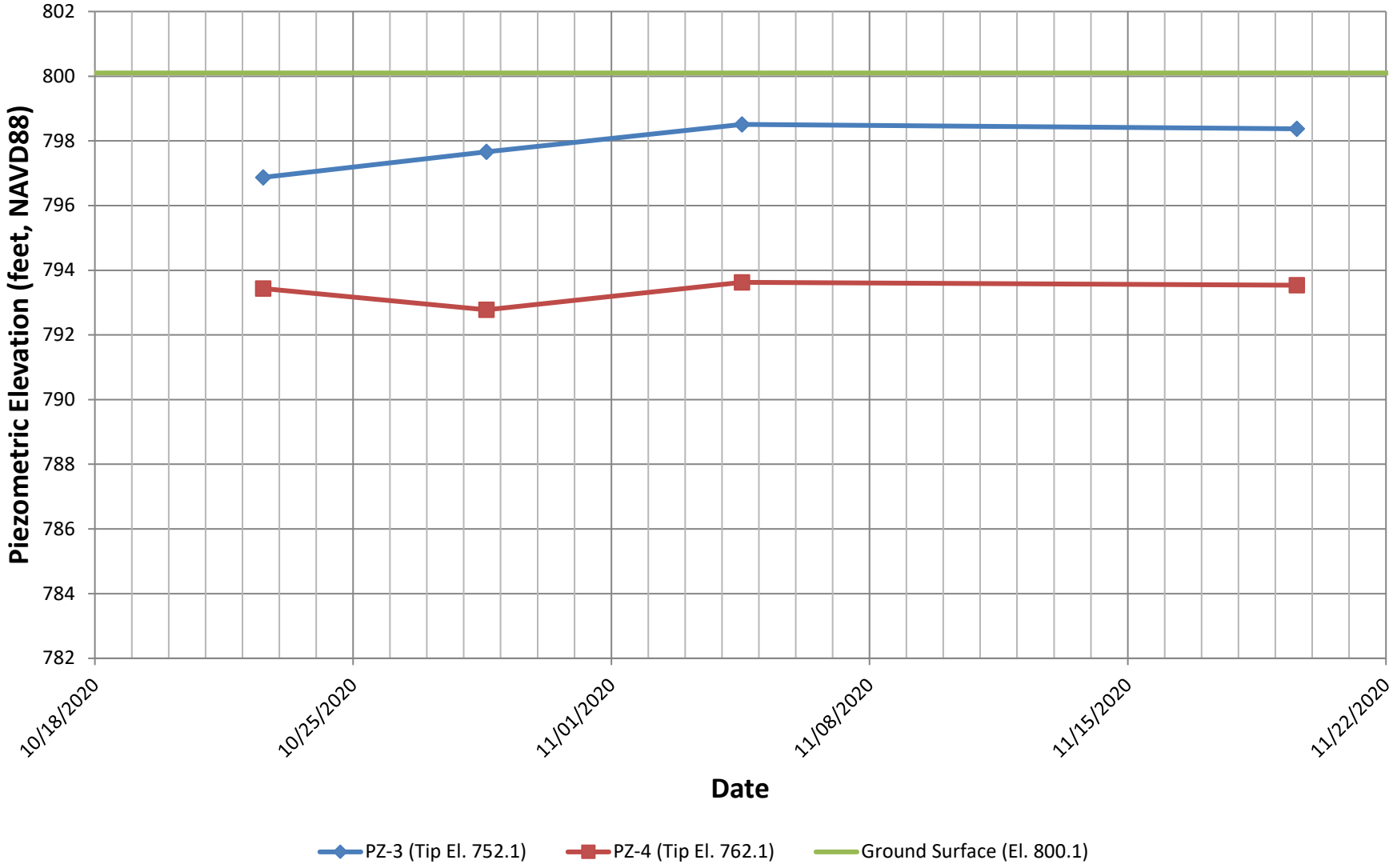
GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME BORING LOGS.GPJ 6/27/22

B-101 Piezometric Elevations
North Poland Road Over Poland Brook Bridge Replacement
Conway, Massachusetts



B-102 Piezometric Elevations
North Poland Road Over Poland Brook Bridge Replacement
Conway, Massachusetts



VIBRATING WIRE PIEZOMETER MONITORING REPORT

PZ-1

Project: North Poland Road Over Poland Brook Bridge Replacement
Conway, Massachusetts

Project No. 2004115

GENERAL INFORMATION

Model Number: Geokon 4500S-700KPA-30M
Serial Number: 2021907
Installation Date: 10/21/2020
Strata: TILL
Location Coordinates[1]:
N: 3013938
E: 320898
Ground Surface Elevation: 800.8 (ft, NAVD88)
Tip Elevation: 748.8 (ft, NAVD88)

CALIBRATION DATA

Field Zero Readings:
Gage (R_0): 9034.0 digits
Temperature (T_0): 17.7 °C
Barometric Pressure (S_0): 999.0 mbar

Factory Calibration Factors:
Linear Gage Factor (G): -0.02531 psi/digit
Thermal Factor (K): -0.005667 psi/°C

Field Data							Calculations			
Date	Time	Piezometer Transducer Reading (digits)	Piezometer Temperature Reading (°C)	Barometric Pressure (in. Hg)	Read By	Remarks	Date & Time	Piezometric Head[2] (psi)	Piezometric Head (ft H_2O)	Piezometric Elevation[3] (ft, NAVD88)
10/21/2020	14:45	8264.5	13.4	30.2	RO		10/21/2020 14:45	19.50	45.00	793.80
10/22/2020	11:00	8264.0	10.1	30.3	RO		10/22/2020 11:00	19.53	45.07	793.87
10/22/2020	13:30	8263.0	10.0	30.3	RO		10/22/2020 13:30	19.56	45.13	793.93
10/28/2020	14:45	8255.0	9.2	29.8	RO		10/28/2020 14:45	19.76	45.61	794.41
11/04/2020	13:00	8242.6	9.2	30.4	RO		11/04/2020 13:00	20.08	46.34	795.14
11/19/2020	14:00	8244.5	9.1		SJS		11/19/2020 14:00	20.03	46.23	795.03

Notes:

1. Location coordinates referenced to Massachusetts Plane Coordinate System Mainland Zone (NAD 1983).
2. Piezometric head is calculated using the following equation:
   $G(R_1 - R_0) + K(T_1 - T_0)$
   Where G is the linear gage factor in psi/digit, R_1 is the current gage reading, R_0 is the field zero gage reading, K is the thermal gage factor in psi/°C, T_0 is the field zero temperature reading, and T_1 is the current temperature reading.
3. Piezometric Elevation is calculated using the following equation:
   Tip El. + Piezometric Head (ft H_2O)
4. Barometric pressure correction not applicable for fully grouted vibrating wire piezometer.

VIBRATING WIRE PIEZOMETER MONITORING REPORT

PZ-2

Project: North Poland Road Over Poland Brook Bridge Replacement
Conway, Massachusetts

Project No. 2004115

GENERAL INFORMATION		CALIBRATION DATA		
Model Number:	Geokon 4500S-700KPA-30M	Field Zero Readings:		
Serial Number:	2021908	Gage (R_0):	8826.0	digits
Installation Date:	10/21/2020	Temperature (T_0):	18.2	°C
Strata:	SILTY SAND	Barometric Pressure (S_0):	999.0	mbar
Location Coordinates[1]:				
N:	3013938	Factory Calibration Factors:		
E:	320898	Linear Gage Factor (G):	-0.02581	psi/digit
Ground Surface Elevation:	800.8 (ft, NAVD88)	Thermal Factor (K):	-0.005386	psi/°C
Tip Elevation:	763.8 (ft, NAVD88)			

Field Data							Calculations			
Date	Time	Piezometer Transducer Reading (digits)	Piezometer Temperature Reading (°C)	Barometric Pressure (in. Hg)	Read By	Remarks	Date & Time	Piezometric Head[2] (psi)	Piezometric Head (ft H_2O)	Piezometric Elevation[3] (ft, NAVD88)
10/21/2020	14:45	8466.1	16.0	30.2	RO		10/21/2020 14:45	9.30	21.46	785.26
10/22/2020	11:00	8468.0	11.8	30.3	RO		10/22/2020 11:00	9.27	21.40	785.20
10/22/2020	13:30	8468.4	11.7	30.3	RO		10/22/2020 13:30	9.26	21.38	785.18
10/28/2020	14:45	8469.3	9.7	29.8	RO		10/28/2020 14:45	9.25	21.35	785.15
11/04/2020	13:00	8459.0	9.5	30.4	RO		11/04/2020 13:00	9.52	21.97	785.77
11/19/2020	14:00	8463.9	9.5		SJS		11/19/2020 14:00	9.39	21.68	785.48

Notes:

1. Location coordinates referenced to Massachusetts Plane Coordinate System Mainland Zone (NAD 1983).
2. Piezometric head is calculated using the following equation:

   $G(R_1 - R_0) + K(T_1 - T_0)$

   Where G is the linear gage factor in psi/digit, R_1 is the current gage reading, R_0 is the field zero gage reading, K is the thermal gage factor in psi/°C, T_0 is the field zero temperature reading, and T_1 is the current temperature reading.
3. Piezometric Elevation is calculated using the following equation:

   Tip El. + Piezometric Head (ft H_2O)
4. Barometric pressure correction not applicable for fully grouted vibrating wire piezometer.

VIBRATING WIRE PIEZOMETER MONITORING REPORT

PZ-3

Project: North Poland Road Over Poland Brook Bridge Replacement
Conway, Massachusetts

Project No. 2004115

GENERAL INFORMATION

Model Number: Geokon 4500S-700KPA-30M
Serial Number: 2021909
Installation Date: 10/22/2020
Strata: TILL
Location Coordinates[1]:
N: 3014001
E: 320862
Ground Surface Elevation: 800.1 (ft, NAVD88)
Tip Elevation: 752.1 (ft, NAVD88)

CALIBRATION DATA

Field Zero Readings:
Gage (R_0): 9030.0 digits
Temperature (T_0): 18.8 °C
Barometric Pressure (S_0): 999.0 mbar

Factory Calibration Factors:
Linear Gage Factor (G): -0.02743 psi/digit
Thermal Factor (K): -0.0007890 psi/°C

Field Data							Calculations			
Date	Time	Piezometer Transducer Reading (digits)	Piezometer Temperature Reading (°C)	Barometric Pressure (in. Hg)	Read By	Remarks	Date & Time	Piezometric Head[2] (psi)	Piezometric Head (ft H_2O)	Piezometric Elevation[3] (ft, NAVD88)
10/22/2020	13:30	8322.8	15.3	30.3	RO		10/22/2020 13:30	19.40	44.77	796.87
10/28/2020	14:45	8310.5	9.7	29.8	RO		10/28/2020 14:45	19.74	45.56	797.66
11/04/2020	13:00	8297.1	9.6	30.4	RO		11/04/2020 13:00	20.11	46.41	798.51
11/19/2020	14:00	8299.3	9.6		SJS		11/19/2020 14:00	20.05	46.27	798.37

Notes:

1. Location coordinates referenced to Massachusetts Plane Coordinate System Mainland Zone (NAD 1983).
2. Piezometric head is calculated using the following equation:
   $G(R_1 - R_0) + K(T_1 - T_0)$
   Where G is the linear gage factor in psi/digit, R_1 is the current gage reading, R_0 is the field zero gage reading, K is the thermal gage factor in psi/°C, T_0 is the field zero temperature reading, and T_1 is the current temperature reading.
3. Piezometric Elevation is calculated using the following equation:
   Tip El. + Piezometric Head (ft H_2O)
4. Barometric pressure correction not applicable for fully grouted vibrating wire piezometer.

VIBRATING WIRE PIEZOMETER MONITORING REPORT

PZ-4

Project: North Poland Road Over Poland Brook Bridge Replacement
Conway, Massachusetts

Project No. 2004115

GENERAL INFORMATION

Model Number: Geokon 4500S-700KPA-30M
Serial Number: 2021910
Installation Date: 10/21/2020
Strata: SAND
Location Coordinates[1]:
N: 3014001
E: 320862
Ground Surface Elevation: 800.1 (ft, NAVD88)
Tip Elevation: 762.1 (ft, NAVD88)

CALIBRATION DATA

Field Zero Readings:
Gage (R_0): 8877.0 digits
Temperature (T_0): 18.7 °C
Barometric Pressure (S_0): 999.0 mbar

Factory Calibration Factors:
Linear Gage Factor (G): -0.02663 psi/digit
Thermal Factor (K): -0.008903 psi/°C

Field Data							Calculations			
Date	Time	Piezometer Transducer Reading (digits)	Piezometer Temperature Reading (°C)	Barometric Pressure (in. Hg)	Read By	Remarks	Date & Time	Piezometric Head[2] (psi)	Piezometric Head (ft H_2O)	Piezometric Elevation[3] (ft, NAVD88)
10/22/2020	13:30	8367.3	18.3	30.3	RO		10/22/2020 13:30	13.58	31.33	793.43
10/28/2020	14:45	8380.7	10.1	29.8	RO		10/28/2020 14:45	13.29	30.68	792.78
11/04/2020	13:00	8367.0	9.7	30.4	RO		11/04/2020 13:00	13.66	31.53	793.63
11/19/2020	14:00	8368.5	9.6		SJS		11/19/2020 14:00	13.62	31.44	793.54

Notes:

1. Location coordinates referenced to Massachusetts Plane Coordinate System Mainland Zone (NAD 1983).
2. Piezometric head is calculated using the following equation:

   $G(R_1 - R_0) + K(T_1 - T_0)$

   Where G is the linear gage factor in psi/digit, R_1 is the current gage reading, R_0 is the field zero gage reading, K is the thermal gage factor in psi/°C, T_0 is the field zero temperature reading, and T_1 is the current temperature reading.
3. Piezometric Elevation is calculated using the following equation:

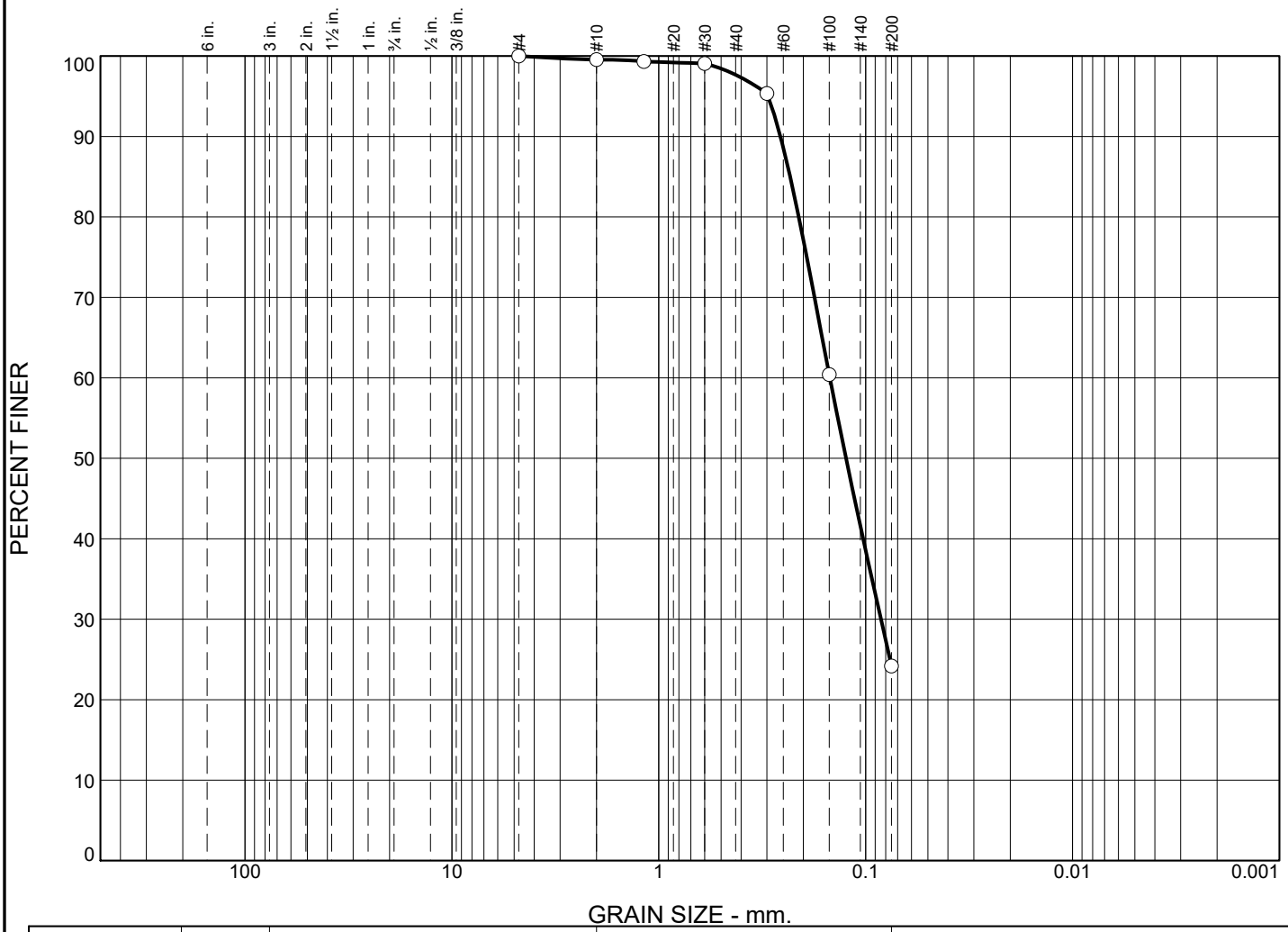
   Tip El. + Piezometric Head (ft H_2O)
4. Barometric pressure correction not applicable for fully grouted vibrating wire piezometer.

Geotechnical Report
North Poland Road Bridge over North Poland Brook
Bridge No. C-20-4
Conway, Massachusetts
July 2022

Appendix D

Laboratory Test Results

Particle Size Distribution Report



	% Boulders	% +3"	% Gravel			% Sand		% Fines
			Coarse	Medium	Fine	Coarse	Fine	
○	0.0	0.0	0.0	0.0	0.4	1.9	73.5	24.2

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.2316	0.1489	0.1244	0.0843				

Material Description	USCS	AASHTO
○ Wet, medium dense, gray, FINE SAND, some inorganic silt.	SM	

Project No. 2004115 **Client:** BETA Group, Inc.

Project: North Poland Rd. over Poland Brook Bridge Replacement

○ **Source of Sample:** B101 **Depth:** 14-16 ft **Sample Number:** S5

Remarks:

○ As Received WC = 22.6%

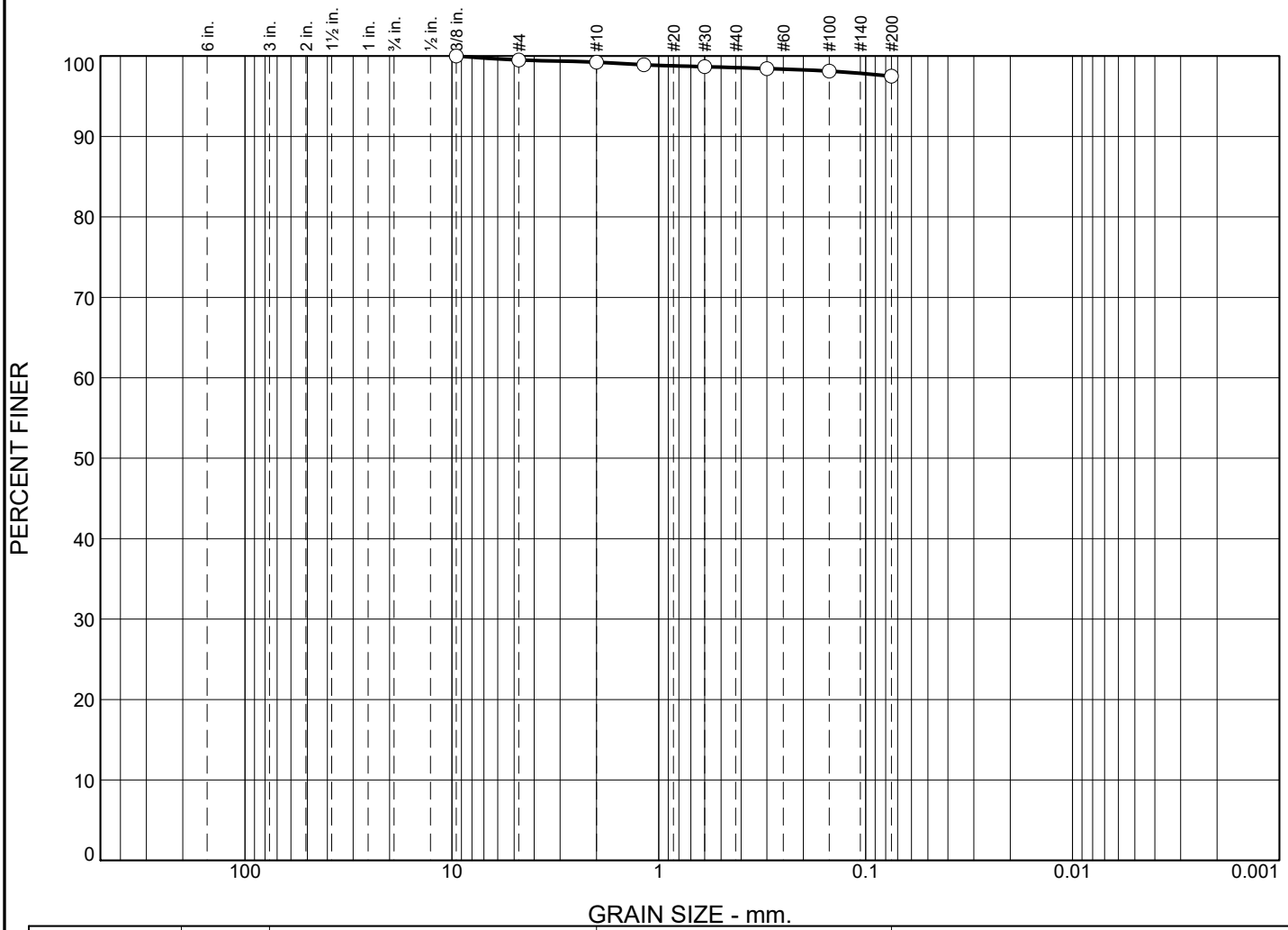
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: EF **Checked By:** MA

Particle Size Distribution Report



	% Boulders	% +3"	% Gravel			% Sand		% Fines
			Coarse	Medium	Fine	Coarse	Fine	
○	0.0	0.0	0.0	0.0	0.8	0.6	1.1	97.5

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	-	-								

Material Description	USCS	AASHTO
○ Wet, loose, gray, INORGANIC CLAY.	CL	

Project No. 2004115 **Client:** BETA Group, Inc.

Project: North Poland Rd. over Poland Brook Bridge Replacement

○ **Source of Sample:** B101 **Depth:** 34-36 ft **Sample Number:** S9

Remarks:

○ As Received WC = 42.7%
Fines plasticity determined visually.

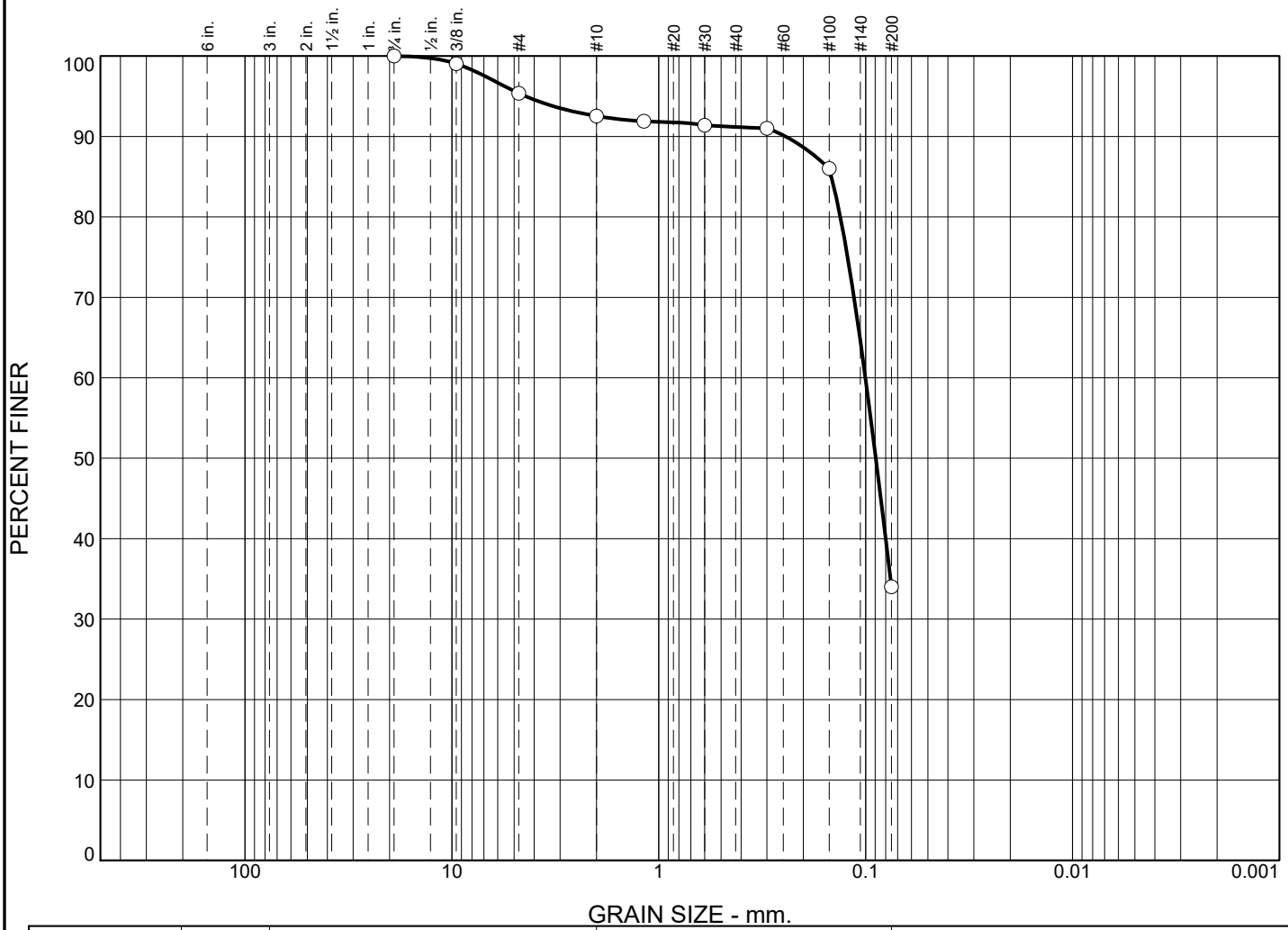
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: EF **Checked By:** MA

Particle Size Distribution Report



	% Boulders	% +3"	% Gravel			% Sand		% Fines
			Coarse	Medium	Fine	Coarse	Fine	
○	0.0	0.0	0.0	1.0	6.5	1.3	57.2	34.0

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.1464	0.1002	0.0893					

Material Description	USCS	AASHTO
○ Wet, very loose, gray, FINE SAND, some inorganic silt, trace fine gravel.	SM	

Project No. 2004115 **Client:** BETA Group, Inc.

Project: North Poland Rd. over Poland Brook Bridge Replacement

○ **Source of Sample:** B102 **Depth:** 19-21 ft **Sample Number:** S6

Remarks:

○ As Received WC = 23.1%

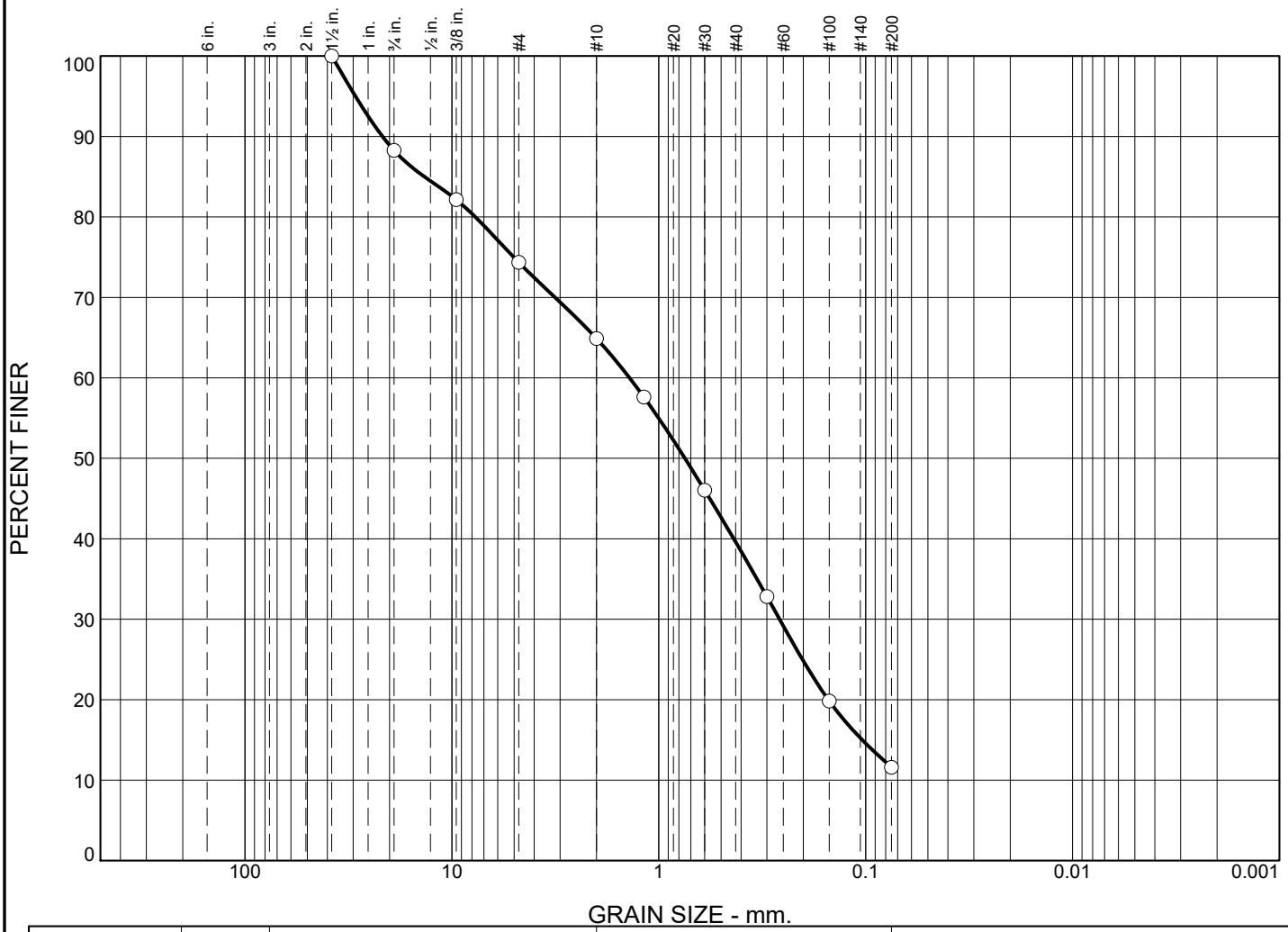
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: EF **Checked By:** MA

Particle Size Distribution Report



	% Boulders	% +3"	% Gravel			% Sand		% Fines
			Coarse	Medium	Fine	Coarse	Fine	
○	0.0	0.0	7.5	10.4	17.2	25.3	28.0	11.6

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			13.5710	1.3841	0.7475	0.2607	0.1038			

Material Description	USCS	AASHTO
○ Moist, brown, FINE TO COARSE SAND, some fine to coarse gravel, some inorganic silt	SP-SM	

Project No. 2004115 **Client:** BETA Group, Inc.

Project: North Poland Rd. over Poland Brook Bridge Replacement

○ **Source of Sample:** NA **Depth:** Surface **Sample Number:** Scour-1

Remarks:

○ As Received WC = 11.3%

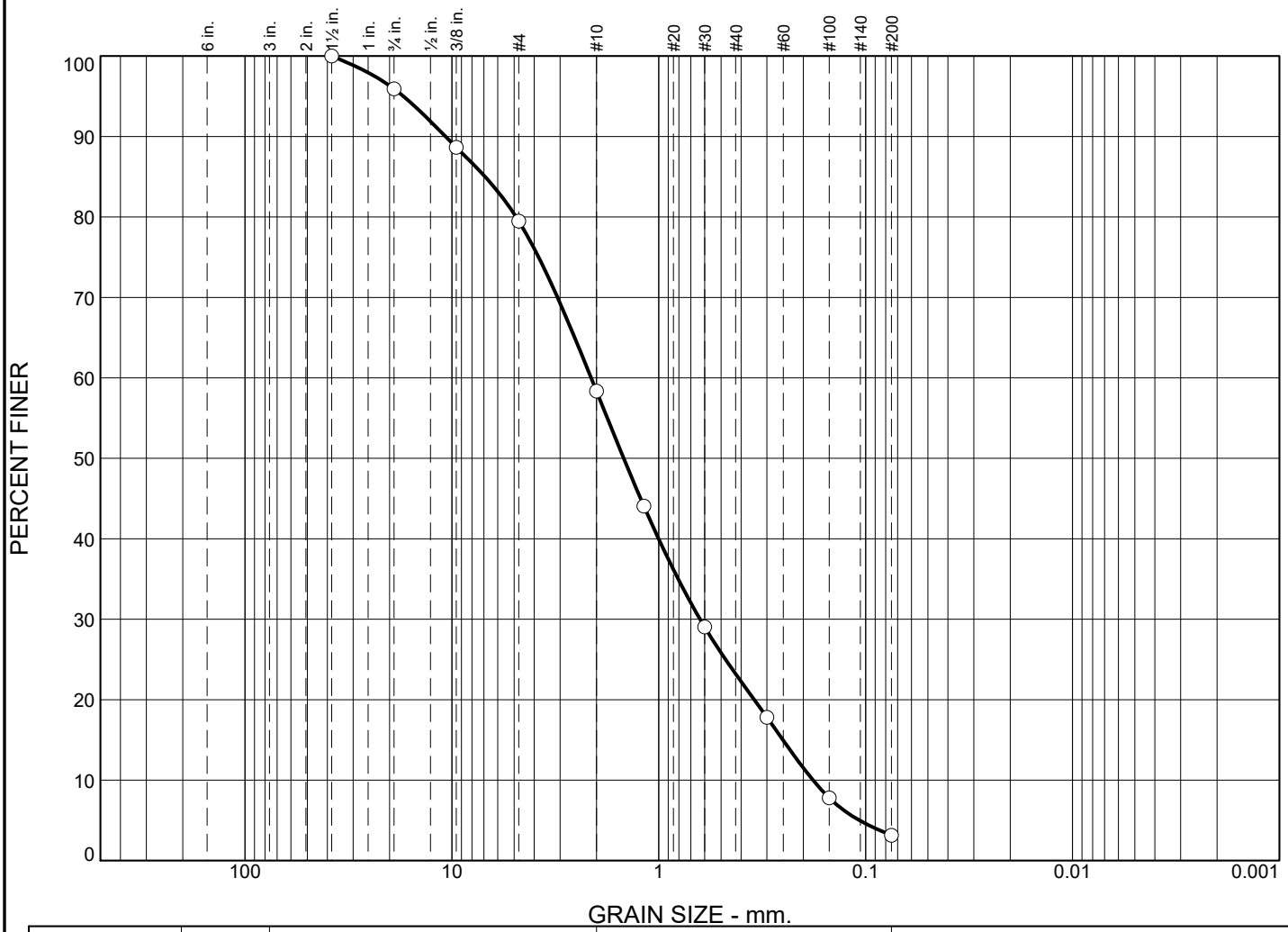
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: EF **Checked By:** WGL

Particle Size Distribution Report



	% Boulders	% +3"	% Gravel			% Sand		% Fines
			Coarse	Medium	Fine	Coarse	Fine	
○	0.0	0.0	2.1	9.2	30.4	35.1	20.1	3.1

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			6.9133	2.1229	1.4773	0.6316	0.2511	0.1797	1.05	11.81

Material Description	USCS	AASHTO
○ Wet, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.	SW	-

Project No. 2004115 **Client:** BETA Group, Inc.

Project: North Poland Rd. over Poland Brook Bridge Replacement

○ **Source of Sample:** NA **Depth:** Surface **Sample Number:** Scour-2

Remarks:

○ As Received WC = 23.0%

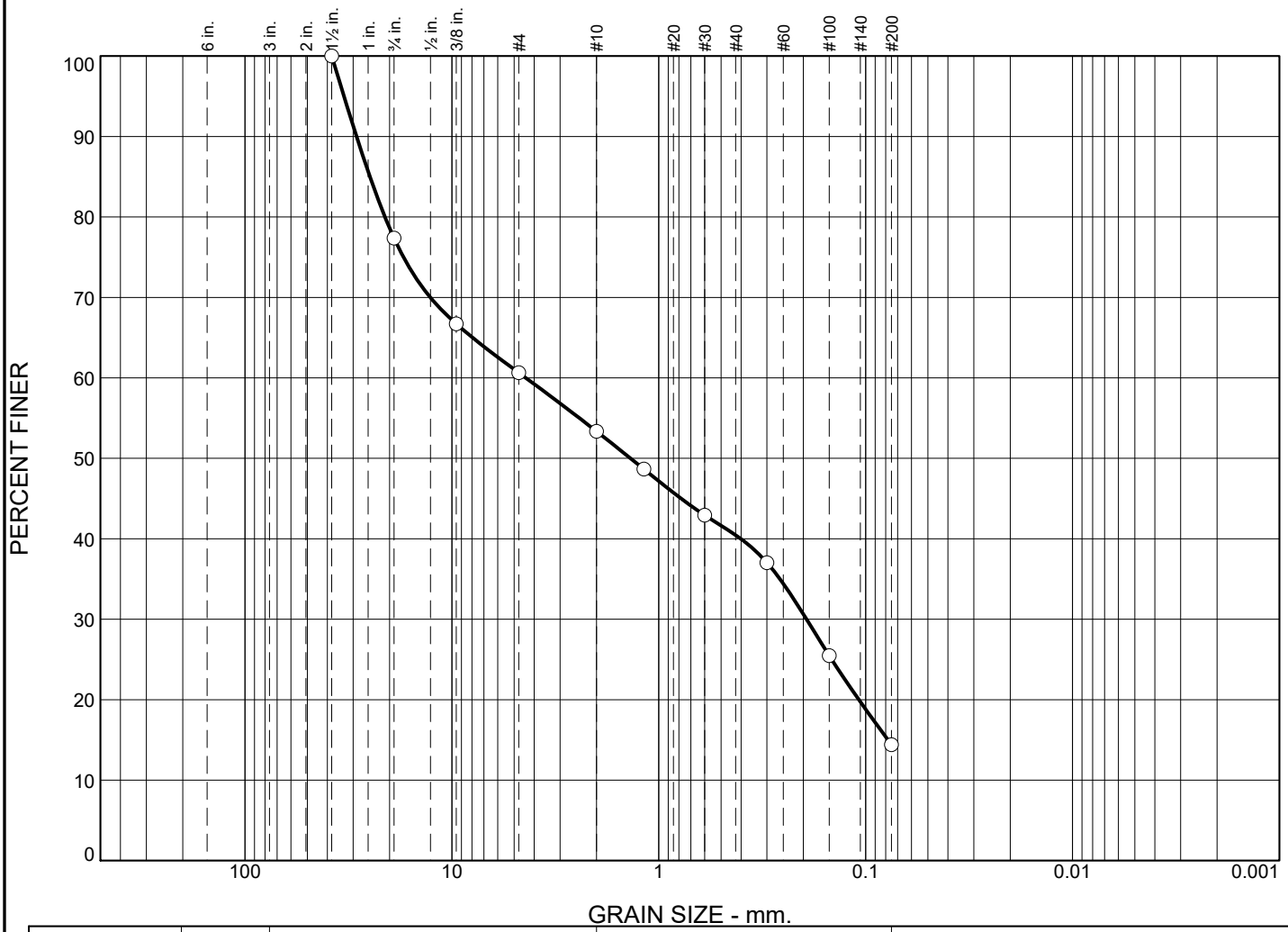
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: EF **Checked By:** WGL

Particle Size Distribution Report



	% Boulders	% +3"	% Gravel			% Sand		% Fines
			Coarse	Medium	Fine	Coarse	Fine	
○	0.0	0.0	14.4	18.9	13.3	12.9	26.1	14.4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			24.8991	4.3933	1.3701	0.1931	0.0780			

Material Description	USCS	AASHTO
○ Moist, brown, FINE TO COARSE GRAVEL, some fine to coarse sand, some inorganic silt	SM	

Project No. 2004115 **Client:** BETA Group, Inc.

Project: North Poland Rd. over Poland Brook Bridge Replacement

○ **Source of Sample:** NA **Depth:** Surface **Sample Number:** Scour-3

Remarks:

○ As Received WC = 21.4%

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: EF **Checked By:** WGL

Geotechnical Report
North Poland Road Bridge over North Poland Brook
Bridge No. C-20-4
Conway, Massachusetts
July 2022

Appendix E

Geotechnical Calculations

- Recommended Soil Properties
- Blowcount Corrections
- Earth Pressure Coefficients
- Seismic Site Class Evaluation
- Pile Geotechnical Capacities
- Pile Lateral Load Capacities

Recommended Soil Properties

Purpose:
The purpose of this evaluation is to select representative soil properties for the North Poland Road over North Poland Brook bridge replacement in Conway, MA. The soil properties will be used in our engineering analyses.

Approach:
We selected values for unit weight, angle of internal friction of soils and soil modulus parameters. Values were selected for the general soil layers observed in the borings and for proposed fills to be used during construction of the bridge.

Unit Weight
We selected a saturated (total) unit weight in pounds per cubic foot (pcf). The buoyant unit weight can then be determined by subtracting the unit weight of water (62.4 pcf).

Angle of Internal Friction
We selected an angle of internal friction (ϕ) in degrees. We used Mohr-Coulomb drained properties for each soil.

Soil Modulus Parameter
We selected a soil modulus parameter (k) in pounds per cubic inch (pci). We estimated k based on the references presented in the LPILE manual.

Proposed Fills
We selected properties for gravel borrow and gravel borrow for bridge foundations based on the required material gradations and compaction requirements per MassDOT.

Subsurface Investigation and SPT Correlations for Observed Soil Layers:
We reviewed Standard Penetration Test (SPT) N-Values collected during our 2020 subsurface investigation. We estimated angles of internal friction for the soils above based on N-Values corrected for overburden and hammer efficiency ($N1_{60}$). All SPTs were performed using an automatic hammer. We assumed an efficiency of 80 percent based on published data on automatic hammers.

A summary of corrected N-Values based on general soil type is shown below. Our N-Value correction calculations are attached. We did not include refusals due to cobbles or boulders, and we limited the uncorrected (field) N-value to a maximum of 120 blows per foot, which MassDOT considers “practical refusal.”

Soil Layer	Average N_{60}	Average $N1_{60}$
Existing Fill	8	14
Sand and Silt	12	12
Glacial Till	49	40

Results:

We selected the following soil properties for each layer/soil type based on the references provided in the following pages and our engineering judgment:

Layer/Soil Type	Total Unit Weight, γ (pcf)	Friction Angle, ϕ (deg)	Soil Modulus Parameter, k (pci)
Existing Fill	115/120[(1)]	30	57.5/40[(1)]
Sand and Silt	115/120[(1)]	30	57.5/40[(1)]
Glacial Till	130	38	125
Gravel Borrow	125/130[(1)]	35	--
Gravel Borrow for Bridge Foundations	130/135[(1)]	37	--
Retained Backfill (Ordinary Borrow)	120/130[(1)]	32	--

[(1)] Above/below the groundwater level.

References:

[1] AASHTO LRFD Bridge Design Specifications, Ninth Edition, 2020.

[2] Terzaghi, K., Peck, R.B., 1968. Soil Mechanics in Engineering Practice, 2nd Edition, John Wiley & Sons, New York.

[3] Caltrans Geotechnical Manual, March 2014.

[4] NAVFAC Design Manual 7.01 Soil Mechanics, Naval Facilities Engineering Command, September 1986.

[5] Isenhower, W.M, Wang, S.-T., and Vasquez, L.G., 2017, Technical Manual for LPile 2018, Ensoft, Inc.

AASHTO LRFD Bridge Design Specifications, Ninth Edition, 2020
Section 10.4.6.2.4 recommends using the following correlation to select friction angles of granular soils:

Table 10.4.6.2.4-1—Correlation of *SPT* $N1_{60}$ Values to Drained Friction Angle of Granular Soils (modified after Bowles, 1977)

$N1_{60}$	ϕ_f
<4	25–30
4	27–32
10	30–35
30	35–40
50	38–43

Soil Mechanics in Engineering Practice
Karl Terzaghi and Ralph Peck compiled various parameters of soils into the tables below:

Table 6.3
Porosity, Void Ratio, and Unit Weight of Typical Soils in Natural State

Description	Porosity, n (%)	Void ratio, e	Water content, w (%)	Unit weight grams/cm³ γ_d	grams/cm³ γ	lb/ft³ γ_d	lb/ft³ γ
1. Uniform sand, loose	46	0.85	32	1.43	1.89	90	118
2. Uniform sand, dense	34	0.51	19	1.75	2.09	109	130
3. Mixed-grained sand, loose	40	0.67	25	1.59	1.99	99	124
4. Mixed-grained sand, dense	30	0.43	16	1.86	2.16	116	135
5. Glacial till, very mixed-grained	20	0.25	9	2.12	2.32	132	145
6. Soft glacial clay	55	1.2	45	–	1.77	–	110
7. Stiff glacial clay	37	0.6	22	–	2.07	–	129
8. Soft slightly organic clay	66	1.9	70	–	1.58	–	98
9. Soft very organic clay	75	3.0	110	–	1.43	–	89
10. Soft bentonite	84	5.2	194	–	1.27	–	80

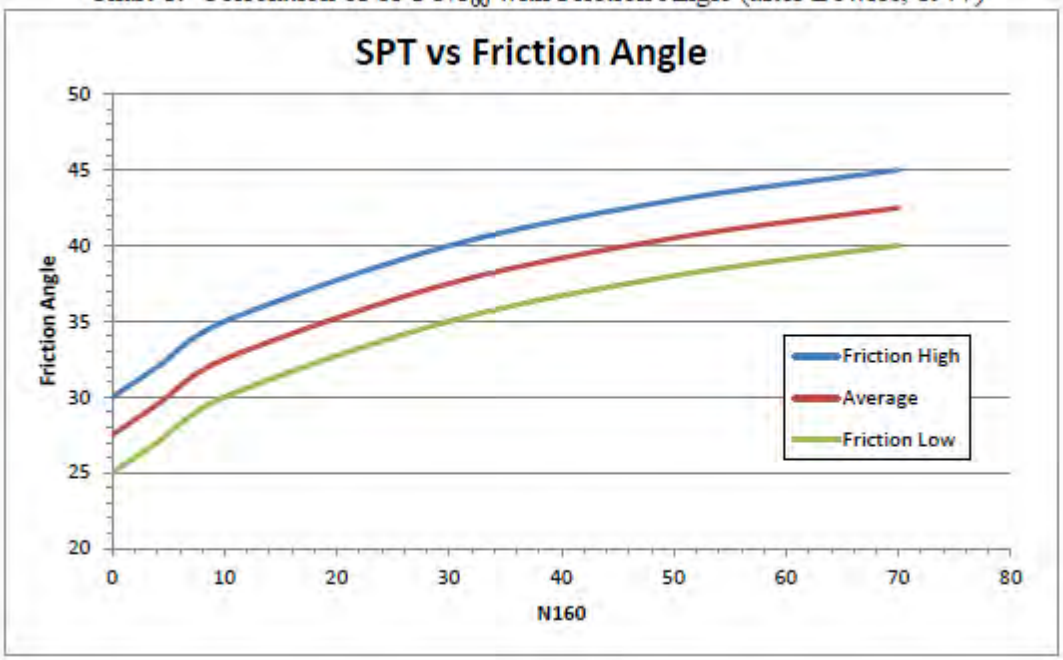
w = water content when saturated, in per cent of dry weight.
γ^d = unit weight in dry state.
γ = unit weight in saturated state.

Table 17.1
Representative Values of ϕ for Sands and Silts

Material	*Degrees* *Loose*	*Dense*
Sand, round grains, uniform	27.5	34
Sand, angular grains, well graded	33	45
Sandy gravels	35	50
Silty sand	27–33	30–34
Inorganic silt	27–30	30–35

Caltrans Geotechnical Manual (March 2014)

Chart 1: Correlation of SPT $N1_{60}$ with Friction Angle (after Bowles, 1977)



Choose the friction angle (expressed to the nearest degree) based upon the soil type, particle size(s), and rounding or angularity. Experience should be used to select specific values within the ranges. In general, finer materials or materials with significant (about 30+ %) silt-sized material will fall in the lower portion of the range. Coarser materials with less than 5% fines will fall in the upper portion of the range. The extreme range of phi angles for any $N1_{60}$ is five degrees, so the adjustment factors for particle size and roundness should be only a degree or two. The following bullets provide help in determining which value to select for a given $N1_{60}$ and soil type:

- Use the maximum value for GW
- Use the average for GM and SP
- Use the minimum for SC
- Use the minimum + 0.5 for ML
- Use the average +1 for SW
- Use the average -1 for GC
- Use the Maximum -1 for GP

Values may also be increased with increasing grain size and/or particle angularity, and decreased with decreasing grain size and/or increasing roundness. For example, an SP with $N1_{60}$ = 30 could be assigned phi angles of 37, 38 or 39 degrees for fine, medium and coarse grain sizes respectively.

NAVFAC Design Manual 7.01 Soil Mechanics

TABLE 6
Typical Values of Soil Index Properties

	Particle Size and Gradation				Voids[1]					Unit Weight[2] (lb./cu.ft.)						
	Approximate Size Range (mm)		Approx. D_{10} (mm)	Approx. Range Uniform Coefficient C_u	Void Ratio			Porosity (%)		Dry Weight			Wet Weight		Submerged Weight	
	D_{max}	D_{min}			e_{max} loose	e_{cr}	e_{min} dense	n_{max} loose	n_{min} dense	Min loose	100% Mod. AASHO	Max dense	Min loose	Max dense	Min loose	Max dense
GRANULAR MATERIALS																
Uniform Materials																
a. Equal spheres (theoretical values)	-	-	-	1.0	0.92	-	0.35	47.6	26	-	-	-	-	-	-	-
b. Standard Ottawa SAND	0.84	0.59	0.67	1.1	0.80	0.75	0.50	44	33	92	-	110	93	131	57	69
c. Clean, uniform SAND (fine or medium)	-	-	-	1.2 to 2.0	1.0	0.80	0.40	50	29	83	115	118	84	136	52	73
d. Uniform, inorganic SILT	0.05	0.005	0.012	1.2 to 2.0	1.1	-	0.40	52	29	80	-	118	81	136	51	73
Well-graded Materials																
a. Silty SAND	2.0	0.005	0.02	5 to 10	0.90	-	0.30	47	23	87	122	127	88	142	54	79
b. Clean, fine to coarse SAND	2.0	0.05	0.09	4 to 6	0.95	0.70	0.20	49	17	85	132	138	86	148	53	86
c. Micaceous SAND	-	-	-	-	1.2	-	0.40	55	29	76	-	120	77	138	48	76
d. Silty SAND & GRAVEL	100	0.005	0.02	15 to 300	0.85	-	0.14	46	12	89	-	146[3]	90	155[3]	56	92
MIXED SOILS																
Sandy or Silty CLAY	2.0	0.001	0.003	10 to 30	1.8	-	0.25	64	20	60	130	135	100	147	38	85
Skip-graded Silty CLAY with stones or rk fgmts	250	0.001	-	-	1.0	-	0.20	50	17	84	-	140	115	151	53	89
Well-graded GRAVEL, SAND, SILT & CLAY mixture	250	0.001	0.002	25 to 1000	0.70	-	0.13	41	11	100	140	148[4]	125	156[4]	62	94
CLAY SOILS																
CLAY (30%-50% clay sizes)	0.05	0.5μ	0.001	-	2.4	-	0.50	71	33	50	105	112	94	133	31	71
Colloidal CLAY (-0.002 mm: 50%)	0.01	10 Å	-	-	12	-	0.60	92	37	13	90	106	71	128	8	66
ORGANIC SOILS																
Organic SILT	-	-	-	-	3.0	-	0.55	75	35	40	-	110	87	131	25	69
Organic CLAY (30% - 50% clay sizes)	-	-	-	-	4.4	-	0.70	81	41	30		100	81	125	18	62

From the LPILE Technical Manual (November 2017):

Use 40 pci for Sand and Silt (Below GW)

Table 3-6 Representative Values of k for Fine Sand Below the Water Table for Static and Cyclic Loading

Recommended k	Relative Density		
	Loose	Medium	Dense
MN/m^3 (pci)	5.4 (20.0)	16.3 (60.0)	34 (125.0)

Table 3-7 Representative Values of k for Fine Sand Above Water Table for Static and Cyclic Loading

Recommended k	Relative Density		
	Loose	Medium	Dense
MN/m^3 (pci)	6.8 (25.0)	24.4 (90.0)	61.0 (225.0)

Glacial Till

If the sand profile is coarse or well-graded sand, the user may consider using a higher value of k that those suggested in the tables above. While experimental data for k in well-graded sands is poorly documented, use of values 10 to 50 percent higher may be appropriate in dense and very dense well-graded sands that do not contain any compressible minerals such as mica.

Use 57.5 pci for Sand and Silt (Above GW)

GEI Consultants

Client:	BETA Group, Inc.	**Prepared By:**	R. Oulal
Project:	North Poland Road over Poland Brook Bridge	**Date:**	October 2020
Project No.:	2004115	**Checked By:**	H. Ghiye
Subject:	Corrected Blow Counts	**Date:**	March 2021

Summary of Corrected Blow Counts by Layer

Topsoil/Fill

Boring	No. Values	N_{60} Avg.	N_{60} Max.	N_{60} Min.	$N1_{60}$ Avg.	$N1_{60}$ Max.	$N1_{60}$ Min.
BB-101	3	7	12	4	12	23	6
BB-102	3	9	16	1	16	31	2

Average N_{60}: 8 **Average $N1_{60}$: 14**

Sand and Silt

Boring	No. Values	N_{60} Avg.	N_{60} Max.	N_{60} Min.	$N1_{60}$ Avg.	$N1_{60}$ Max.	$N1_{60}$ Min.
BB-101	7	13	20	4	13	20	4
BB-102	7	10	19	3	10	17	3

Average N_{60}: 12 **Average $N1_{60}$: 12**

Glacial Till

Boring	No. Values	N_{60} Avg.	N_{60} Max.	N_{60} Min.	$N1_{60}$ Avg.	$N1_{60}$ Max.	$N1_{60}$ Min.
BB-101	2	54	65	43	44	52	35
BB-102	1	40	40	40	34	34	34

Average N_{60}: 49 **Average $N1_{60}$: 40**

GEI Consultants

Client:	BETA Group, Inc.	**Prepared By:**	R. Oulal
Project:	North Poland Road over Poland Brook Bridge	**Date:**	October 2020
Project No.:	2004115	**Checked By:**	H. Ghiye
Subject:	Corrected Blow Counts	**Date:**	March 2021

References: 1) American Association of State Highway and Transportation Officials (AASHTO) "AASHTO LRFD Bridge Design Specifications, Eighth Edition, 2017"

Equations:

Ref. 1 Eqn. No.	Equation		
10.4.6.2.4-2	$N_{60} = (ER / 60\%) * N$	where:	N_{60} = SPT blow count corrected for hammer efficiency (blows/ft)
			ER = hammer efficiency expressed as percent of theoretical free fall energy
			N = Uncorrected SPT blow count (blows/ft)
10.4.6.2.4-3	$N1_{60} = C_N * N_{60}$	where:	$N1_{60}$ = SPT blow count corrected for overburden and hammer efficiency (blows/ft)
			$C_N = 0.77 * \log_{10}(40/\sigma'_v)$ $[C_N < 2.0]$
			σ'_v = vertical effective stress (ksf)

Assumptions:

Ground Surface El.:	801	ft
Depth to Groundwater:	9.5	ft
Average Total Unit Weight of Soil:	120	pcf

Hammer Type	ER (%)	C_E = ER / 60%
Donut	45	0.75
Safety	60	1.00
Automatic	80	1.33

Boring: ***BB-101***

Depth (ft)	El. (ft)	Layer Name	N	Corrected Blow Counts N_{60}	Corrected Blow Counts $N1_{60}$	Avg. N_{60}	Avg. $N1_{60}$	Overburden Correction σ_v (psf)	u (psf)	σ'_v (psf)	σ'_v (ksf)	C_N	Hammer Efficiency Correction Hammer Type	ER (%)	C_E
1	800.0	Topsoil/Fill	9	12	23	7	12	120	0	120	0.120	1.94	Automatic	80	1.33
3	798.0	Topsoil/Fill	3	4	6			360	0	360	0.360	1.58	Automatic	80	1.33
5	796.0	Topsoil/Fill	4	5	7			600	0	600	0.600	1.40	Automatic	80	1.33
10	791.0	Sand and Silt	13	17	20	13	13	1,200	31	1,169	1.169	1.18	Automatic	80	1.33
15	786.0	Sand and Silt	11	15	16			1,800	343	1,457	1.457	1.11	Automatic	80	1.33
20	781.0	Sand and Silt	10	13	14			2,400	655	1,745	1.745	1.05	Automatic	80	1.33
25	776.0	Sand and Silt	12	16	16			3,000	967	2,033	2.033	1.00	Automatic	80	1.33
30	771.0	Sand and Silt	3	4	4			3,600	1,279	2,321	2.321	0.95	Automatic	80	1.33
35	766.0	Sand and Silt	5	7	6			4,200	1,591	2,609	2.609	0.91	Automatic	80	1.33
40	761.0	Sand and Silt	15	20	18			4,800	1,903	2,897	2.897	0.88	Automatic	80	1.33
45	756.0	Layer Change	33	NA	NA	NA	NA	5,400	2,215	3,185	3.185	0.85	Automatic	80	1.33
50	751.0	Glacial Till	32	43	35	54	44	6,000	2,527	3,473	3.473	0.82	Automatic	80	1.33
55	746.0	Glacial Till	49	65	52			6,600	2,839	3,761	3.761	0.79	Automatic	80	1.33

Notes:
1. MassDOT considers an uncorrected SPT blow count (N) of 120 blows/ft "practical refusal." Therefore, if N was greater than 120 blows/ft, we input the value as 120 blows/ft.
2. N-Values from SPT's that encountered drilling refusal prior to obtaining 120 blows/ft were not included in the averages and are noted as "--."
3. N-Values from SPT's that encountered layer change were not included in the averages and are noted as "N/A."
4. For N_{60} and $N1_{60}$ values greater than 100 blows/ft, we input the value 100 blows/ft.

GEI Consultants

Client:	BETA Group, Inc.	**Prepared By:**	R. Oulal
Project:	North Poland Road over Poland Brook Bridge	**Date:**	October 2020
Project No.:	2004115	**Checked By:**	H. Ghiye
Subject:	Corrected Blow Counts	**Date:**	March 2021

References: 1) American Association of State Highway and Transportation Officials (AASHTO) "AASHTO LRFD Bridge Design Specifications, Eighth Edition, 2017"

Equations:

Ref. 1 Eqn. No.	Equation		
10.4.6.2.4-2	$N_{60} = (ER / 60\%) * N$	where:	N_{60} = SPT blow count corrected for hammer efficiency (blows/ft)
			ER = hammer efficiency expressed as percent of theoretical free fall energy
			N = Uncorrected SPT blow count (blows/ft)
10.4.6.2.4-3	$N1_{60} = C_N * N_{60}$	where:	$N1_{60}$ = SPT blow count corrected for overburden and hammer efficiency (blows/ft)
			$C_N = 0.77 * \log_{10}(40/\sigma'_v)$ $[C_N < 2.0]$
			σ'_v = vertical effective stress (ksf)

Assumptions:

Ground Surface El.:	800	ft
Depth to Groundwater:	8.3	ft
Average Total Unit Weight of Soil:	120	pcf

Hammer Type	ER (%)	C_E = ER / 60%
Donut	45	0.75
Safety	60	1.00
Automatic	80	1.33

Boring: ***BB-102***

				Corrected Blow Counts				Overburden Correction					Hammer Efficiency Correction		
Depth (ft)	El. (ft)	Layer Name	N	N_{60}	$N1_{60}$	Avg. N_{60}	Avg. $N1_{60}$	σ_v (psf)	u (psf)	σ'_v (psf)	σ'_v (ksf)	C_N	Hammer Type	ER (%)	C_E
1	799.0	Topsoil/Fill	12	16	31	9	16	120	0	120	0.120	1.94	Automatic	80	1.33
3	797.0	Topsoil/Fill	7	9	15			360	0	360	0.360	1.58	Automatic	80	1.33
5	795.0	Topsoil/Fill	1	1	2			600	0	600	0.600	1.40	Automatic	80	1.33
10	790.0	Sand and Silt	7	9	11	10	10	1,200	106	1,094	1.094	1.20	Automatic	80	1.33
15	785.0	Sand and Silt	4	5	6			1,800	418	1,382	1.382	1.13	Automatic	80	1.33
20	780.0	Sand and Silt	2	3	3			2,400	730	1,670	1.670	1.06	Automatic	80	1.33
25	775.0	Sand and Silt	9	12	12			3,000	1,042	1,958	1.958	1.01	Automatic	80	1.33
30	770.0	Sand and Silt	5	7	6			3,600	1,354	2,246	2.246	0.96	Automatic	80	1.33
35	765.0	Sand and Silt	14	19	17			4,200	1,666	2,534	2.534	0.92	Automatic	80	1.33
40	760.0	Sand and Silt	13	17	15			4,800	1,978	2,822	2.822	0.89	Automatic	80	1.33
45	755.0	Glacial Till	30	40	34	40	34	5,400	2,290	3,110	3.110	0.85	Automatic	80	1.33
49.5	750.5	Glacial Till	--	--	--			5,940	2,571	3,369	3.369	0.83	Automatic	80	1.33

Notes:
1. MassDOT considers an uncorrected SPT blow count (N) of 120 blows/ft "practical refusal." Therefore, if N was greater than 120 blows/ft, we input the value as 120 blows/ft.
2. N-Values from SPT's that encountered drilling refusal prior to obtaining 120 blows/ft were not included in the averages and are noted as "--."
3. N-Values from SPT's that encountered layer change were not included in the averages and are noted as "N/A."
4. For N_{60} and $N1_{60}$ values greater than 100 blows/ft, we input the value 100 blows/ft.

GEI Consultants

Client:	BETA Group, Inc.	**Prepared By:**	R. Oulal
Project:	North Poland Road Bridge	**Date:**	Nov-20
Project No.:	2004115	**Checked By:**	H. Ghiye
Subject:	Lateral Earth Pressures	**Date:**	Mar-21

Purpose: Calculate lateral earth pressure coefficients

Reference: American Association of State Highway and Transportation Officials (AASHTO) "AASHTO LRFD Bridge Design Specifications, Eighth Edition, 2020"

Equations: See attached

Calculations:

	Existing Fill	**Sand and Silt**	**Glacial Till**	**Gravel Borrow**	**Gravel Borrow for Brdige Foundations**	**Retained Backfill (Ordinary Borrow)**
Effective Friction Angle of Soil, ϕ'_f (deg)	30	30	38	35	37	32
Friction Angle Between Fill and Wall, δ (deg)	15.0	15.0	19.0	17.5	18.5	16.0
Angle of Fill to the Horizontal, β (deg)	0	0	0	0	0	0
Angle of Back Face of Wall to the Horizontal, θ (deg)	90	90	90	90	90	90
At-Rest Lateral Earth Pressure Coefficient, k_o (Eq. 3.11.5.2-1)	**0.50**	**0.50**	**0.38**	**0.43**	**0.40**	**0.47**
Γ (Eq. 3.11.5.3-2)	2.58	2.58	3.02	2.86	2.97	2.69
Active Lateral Earth Pressure Coefficient, k_a (Eq. 3.11.5.3-1)	**0.30**	**0.30**	**0.22**	**0.25**	**0.23**	**0.28**
$-\delta/\phi_f$	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
β/ϕ_f	0.0	0.0	0.0	0.0	0.0	0.0
Coefficient of Passive Pressure for δ/ϕ_f = -1, k_p (Figure 3.11.5.4-2)	6.5	6.5	14.0	10.5	13.0	7.7
Reduction Factor of k_p, R (Figure 3.11.5.4-2)	0.746	0.746	0.625	0.674	0.641	0.717
Coefficient of Passive Pressure, k_p	**4.85**	**4.85**	**8.75**	**7.08**	**8.34**	**5.52**

GEI Consultants

Client:	BETA Group, Inc.	**Prepared By:**	R. Oulal
Project:	North Poland Road Bridge	**Date:**	Nov-20
Project No.:	2E+06	**Checked By:**	H. Ghiye
Subject:	Lateral Earth Pressures	**Date:**	Mar-20

Reference: AASHTO (2020). "AASHTO LRFD Bridge Design Specifications," 9th Edition

Equations:

At-Rest Lateral Earth Pressure Coefficient, k_o

3.11.5.2—At-Rest Lateral Earth Pressure Coefficient, k_o

For normally consolidated soils, vertical wall, and level ground, the coefficient of at-rest lateral earth pressure may be taken as:

$$k_o = 1 - \sin \phi'_f \qquad (3.11.5.2\text{-}1)$$

where:

ϕ'_f = effective friction angle of soil
k_o = coefficient of at-rest lateral earth pressure

Active Lateral Earth Pressure Coefficient, k_a

3.11.5.3—Active Lateral Earth Pressure Coefficient, k_a

Values for the coefficient of active lateral earth pressure may be taken as:

$$k_a = \frac{\sin^2(\theta + \phi'_f)}{\Gamma[\sin^2\theta \sin(\theta - \delta)]} \qquad (3.11.5.3\text{-}1)$$

in which:

$$\Gamma = \left[1 + \sqrt{\frac{\sin(\phi'_f + \delta)\sin(\phi'_f - \beta)}{\sin(\theta - \delta)\sin(\theta + \beta)}}\right]^2 \qquad (3.11.5.3\text{-}2)$$

where:

δ = friction angle between fill and wall (degrees)
β = angle of fill to the horizontal as shown in Figure 3.11.5.3-1 (degrees)
θ = angle of back face of wall to the horizontal as shown in Figure 3.11.5.3-1 (degrees)
ϕ'_f = effective angle of internal friction (degrees)

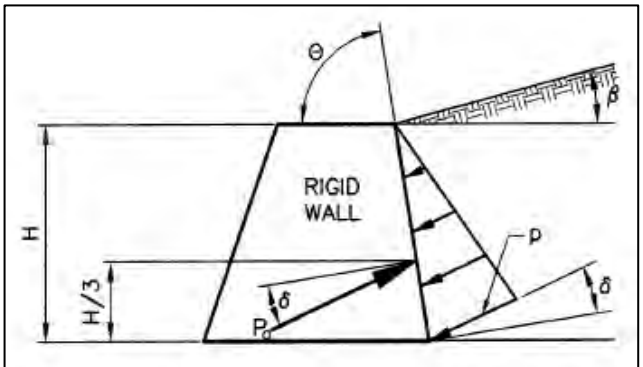


Figure 3.11.5.3-1—Notation for Coulomb Active Earth Pressure

GEI Consultants

Client: BETA Group, Inc.
Project: North Poland Road Bridge
Project No.: 2E+06
Subject: Lateral Earth Pressures

Prepared By: R. Oulal
Date: Nov-20
Checked By: H. Ghiye
Date: Mar-20

Table C3.11.5.3-1—Friction Angle for Dissimilar Materials (U.S. Department of the Navy, 1982a)

Interface Materials	Friction Angle, δ (degrees)	Coefficient of Friction, tan δ (dim.)
Mass concrete on the following foundation materials:		
• Clean sound rock	35	0.70
• Clean gravel, gravel-sand mixtures, coarse sand	29 to 31	0.55 to 0.60
• Clean fine to medium sand, silty medium to coarse sand, silty or clayey gravel	24 to 29	0.45 to 0.55
• Clean fine sand, silty or clayey fine to medium sand	19 to 24	0.34 to 0.45
• Fine sandy silt, nonplastic silt	17 to 19	0.31 to 0.34
• Very stiff and hard residual or preconsolidated clay	22 to 26	0.40 to 0.49
• Medium stiff and stiff clay and silty clay	17 to 19	0.31 to 0.34
Masonry on foundation materials has same friction factors.		
Steel sheet piles against the following soils:		
• Clean gravel, gravel-sand mixtures, well-graded rock fill with spalls	22	0.40
• Clean sand, silty sand-gravel mixture, single-size hard rock fill	17	0.31
• Silty sand, gravel or sand mixed with silt or clay	14	0.25
• Fine sandy silt, nonplastic silt	11	0.19
Formed or precast concrete or concrete sheet piling against the following soils:		
• Clean gravel, gravel-sand mixture, well-graded rock fill with spalls	22 to 26	0.40 to 0.49
• Clean sand, silty sand-gravel mixture, single-size hard rock fill	17 to 22	0.31 to 0.40
• Silty sand, gravel or sand mixed with silt or clay	17	0.31
• Fine sandy silt, nonplastic silt	14	0.25
Various structural materials:		
• Masonry on masonry, igneous and metamorphic rocks:		
○ dressed soft rock on dressed soft rock	35	0.70
○ dressed hard rock on dressed soft rock	33	0.65
○ dressed hard rock on dressed hard rock	29	0.55
• Masonry on wood in direction of cross grain	26	0.49
• Steel on steel at sheet pile interlocks	17	0.31

Passive Lateral Earth Pressure Coefficient, k_p

3.11.5.4—Passive Lateral Earth Pressure Coefficient, k_p

For noncohesive soils, values of the coefficient of passive lateral earth pressure may be taken from Figure 3.11.5.4-1 for the case of a sloping or vertical wall with a horizontal backfill or from Figure 3.11.5.4-2 for the case of a vertical wall and sloping backfill. For conditions that deviate from those described in Figures 3.11.5.4-1 and 3.11.5.4-2, the passive pressure may be calculated by using a trial procedure based on wedge theory, e.g., see Terzaghi et al. (1996). When wedge theory is used, the limiting value of the wall friction angle should not be taken larger than one-half the angle of internal friction, ϕ_f.

GEI Consultants

Client:	BETA Group, Inc.	**Prepared By:**	R. Oulal
Project:	North Poland Road Bridge	**Date:**	Nov-20
Project No.:	2E+06	**Checked By:**	H. Ghiye
Subject:	Lateral Earth Pressures	**Date:**	Mar-20

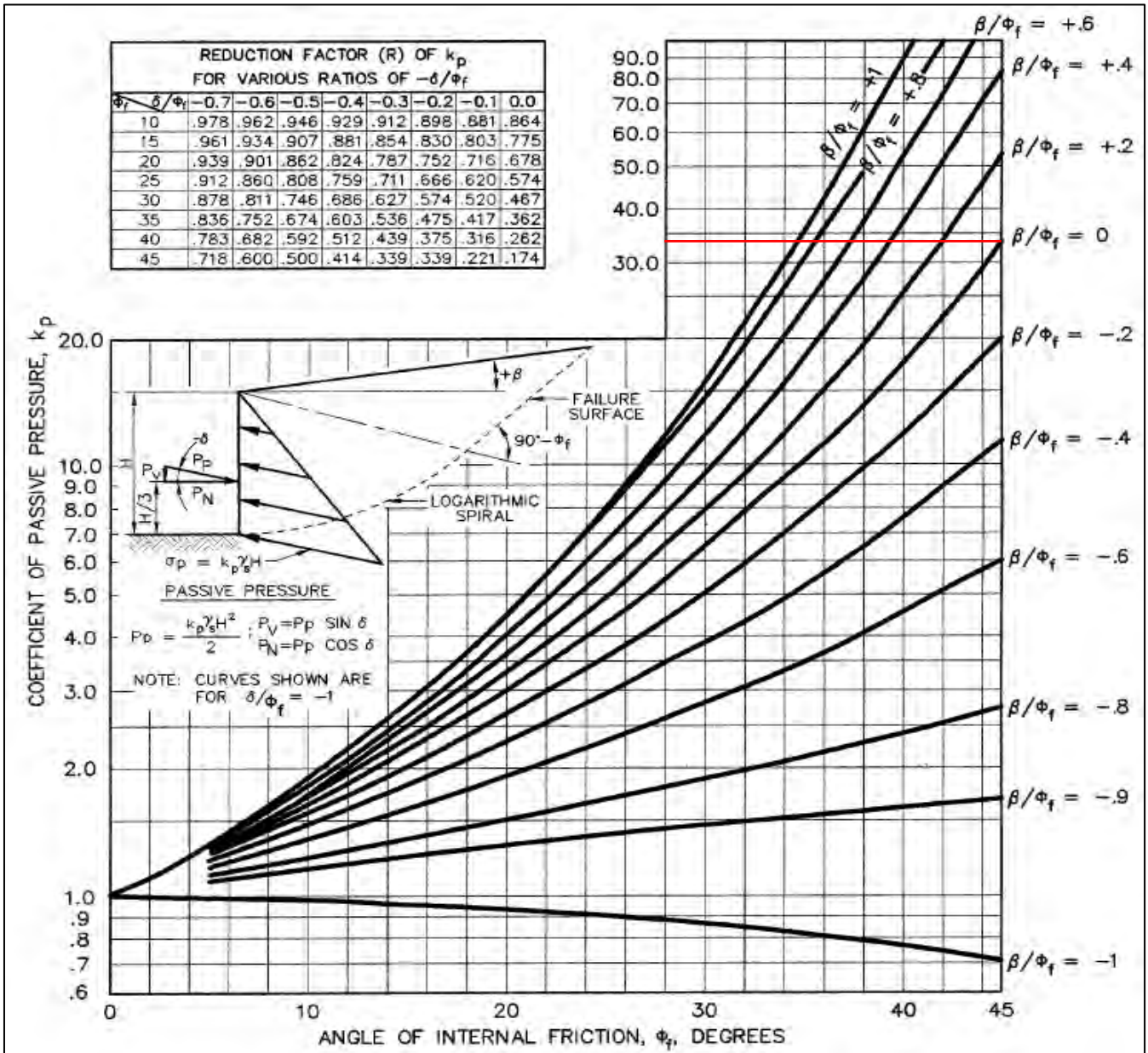


Figure 3.11.5.4-2—Computational Procedures for Passive Earth Pressures for Vertical Wall with Sloping Backfill (U.S. Department of the Navy, 1982a)

GEI Consultants

Client:	BETA Group, Inc.	**Prepared By:**	R. Oulal
Project:	North Poland Road Bridge	**Date:**	Nov-20
Project No.:	2E+06	**Checked By:**	H. Ghiye
Subject:	Lateral Earth Pressures	**Date:**	Mar-20

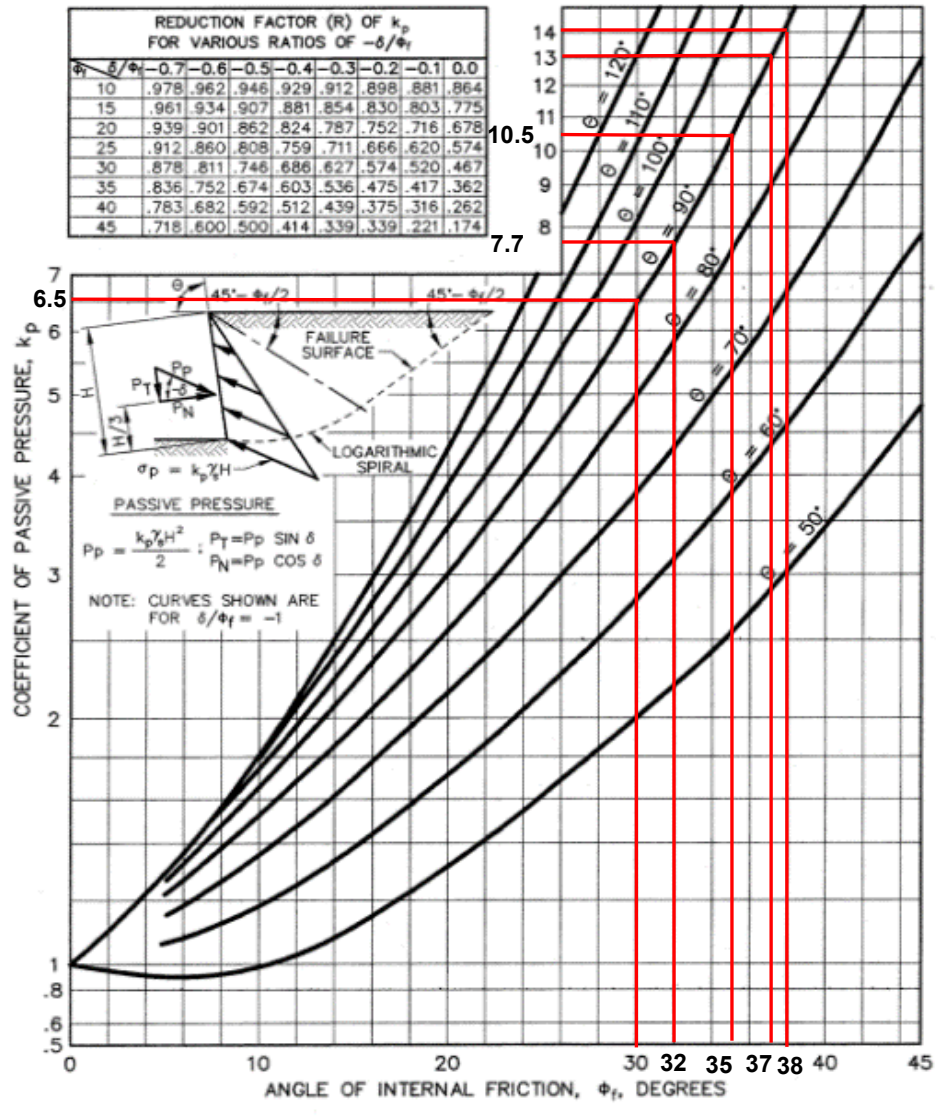


Figure 3.11.5.4-1—Computational Procedures for Passive Earth Pressures for Vertical and Sloping Walls with Horizontal Backfill (U.S. Department of the Navy, 1982a)

GEI Consultants

Client:	BETA Group, Inc.	**Prepared By:**	R. Oulal
Project:	North Poland Road Bridge	**Date:**	Nov-20
Project No.:	2E+06	**Checked By:**	H. Ghiye
Subject:	Lateral Earth Pressures	**Date:**	Mar-20

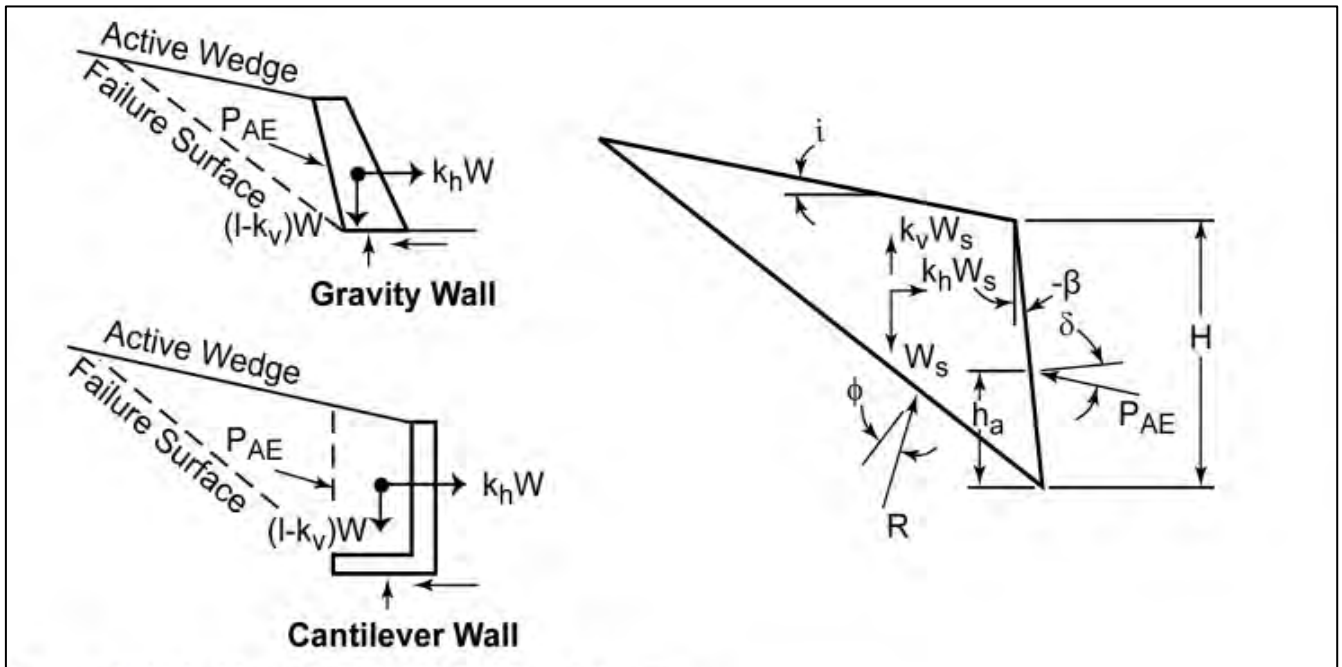


Figure A11.3.1-1—Mononobe-Okabe Method Force Diagrams

$$K_{AE} = \frac{\cos^2(\phi - \theta_{MO} - \beta)}{\cos\theta_{MO}\cos^2\beta\cos(\delta + \beta + \theta_{MO})} \times \left[1 + \sqrt{\frac{\sin(\phi + \delta)\sin(\phi - \theta_{MO} - i)}{\cos(\delta + \beta + \theta_{MO})\cos(i - \beta)}}\right]^{-2} \quad \text{(A11.3.1-1)}$$

where:

K_{AE} = seismic active earth pressure coefficient (dim)
γ = unit weight of soil (kcf)
H = height of wall (ft)
h = height of wall at back of wall heel considering height of sloping surcharge, if present (ft)
ϕ_f = friction angle of soil (degrees)
θ_{MO} = arc tan $[k_h/(1 - k_v)]$ (degrees)
δ = wall backfill interface friction angle (degrees)
k_h = horizontal seismic acceleration coefficient (dim.)
k_v = vertical seismic acceleration coefficient (dim.)
i = backfill slope angle (degrees)
β = slope of wall to the vertical, negative as shown (degrees)

North Poland Road over Poland Brook Bridge Replacement
Conway, Massachusetts
GEI Project No.: 2004115

Prepard By: R. Oulal
Date: October 2021
Checked By: H. Ghiye
Date: March 2021

Seismic Site Class Evaluation - North Poland Road over Poland Brook Bridge Replacement; Conway, MA

Purpose: Evaluate seismic design criteria in accordance with 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design with 2012 through 2015 Interim Revisions and MassDOT 2020 LRFD Bridge Manual. Evaluate borings BB-101 and BB-102 based on N60 values (Assuming CE=1.33 for automatic hammer).

Layer	BB-101		
	N_i	Layer (D_i)	D_i/N_i
1	7	7	1.00
2	13	38	2.92
3	54	55	1.02
	Σ =	100	4.9
		$\bar{N}$	**20.2**

Layer	BB-102		
	N_i	Layer (D_i)	D_i/N_i
1	9	6	0.67
2	10	34	3.40
3	40	60	1.50
	Σ =	100	5.6
		$\bar{N}$	**18.0**

$$\bar{N} = \frac{\sum d_i}{\sum {}^{d_i}/_{N_i}}$$

From AASHTO Eq. 3.4.2.2-2

From AASHTO Table 3.4.2.1-1
where 15 < N < 50
Site Class D

North Poland Road over Poland Brook Bridge Replacement
Conway, Massachusetts
GEI Project No.: 2004115

Prepard By: R. Oulal
Date: October 2021
Checked By: H. Ghiye
Date: March 2021

Site Seismic Coefficients

Horizontal Peak Ground Acceleration,	PGA =	0.060	
Horizontal Response Spectral Acceleration (0.2 sec),	S_s =	0.135	AASHTO Figs. 3.4.1-2b, -3b, and -4b
Horizontal Response Spectral Acceleration (1 sec),	S_1 =	0.040	
	F_{PGA} =	1.6	AASHTO Table 3.4.2.3-1
	F_A =	1.6	AASHTO Table 3.4.2.3-1
	F_V =	2.4	AASHTO Table 3.4.2.3-2

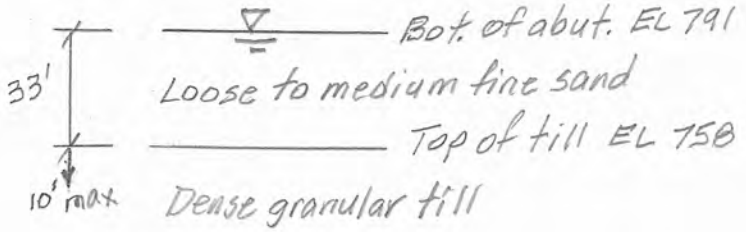
Design Response Spectra

Acceleration Coefficient, $A_S = PGA \times F_{PGA}$	A_S =	0.096	AASHTO Eq. 3.4.1-1
Design Spectral Acceleration (0.2 sec), $S_{DS} = S_S \times F_A$	S_{DS} =	0.216	AASHTO Eq. 3.4.1-2
Design Spectral Acceleration (1 sec), $S_{D1} = S_1 \times F_V$	S_{D1} =	0.096	AASHTO Eq. 3.4.1-3

From AASHTO Table 3.5-1
SDC A

GEI Consultants	Client	Beta			Page	1
	Project	North Poland Road			Pg. Rev.	
	By	D. Shields	Chk.		App.	
	Date	1/8/21	Date		Date	
Project No.	2004115	Document No.				
Subject						

Estimate bearing capacity of H-piles for an integral abutment using Driven computer program.



Artesian pressure encountered at ≈ EL 738

N-values in B1 & B2

Sand	Till
17 12	33 55
11 6	83 72
9 5	58 43
9 10	68 48
8 3	64
9 10	58.2
12	
9.3	

N-values in B101 & B102

Sand	Till
13 7	33 30
11 4	32 58
13 2	49
12 9	40.4
3 5	↑ 60.6 corr. for auto hammer
5 14	
15 13	
9.0	

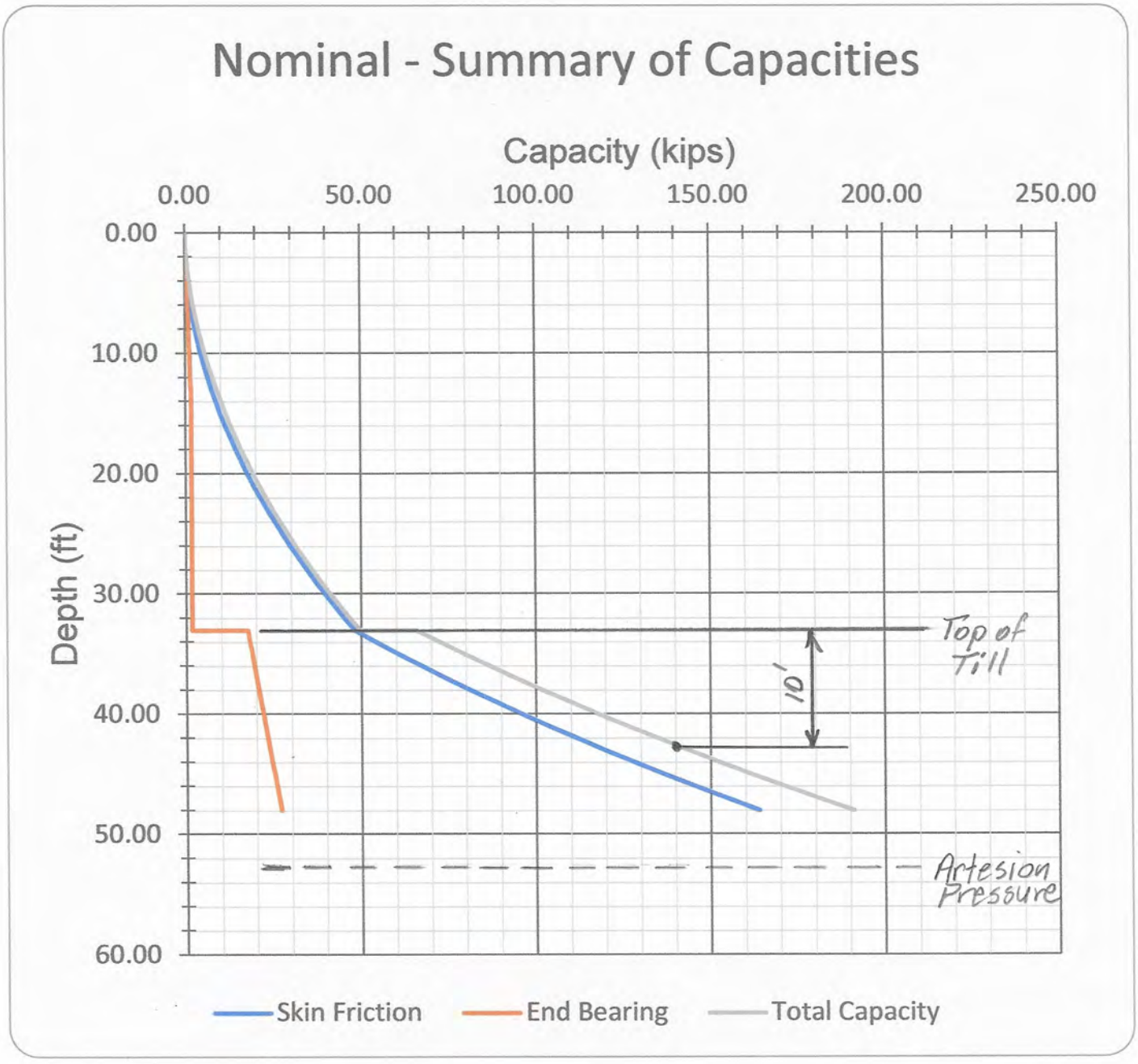
↑ 13.5 corr. for auto hammer

For sand use $\gamma = 120$ & $N = 10$ ($\phi = 30°$)

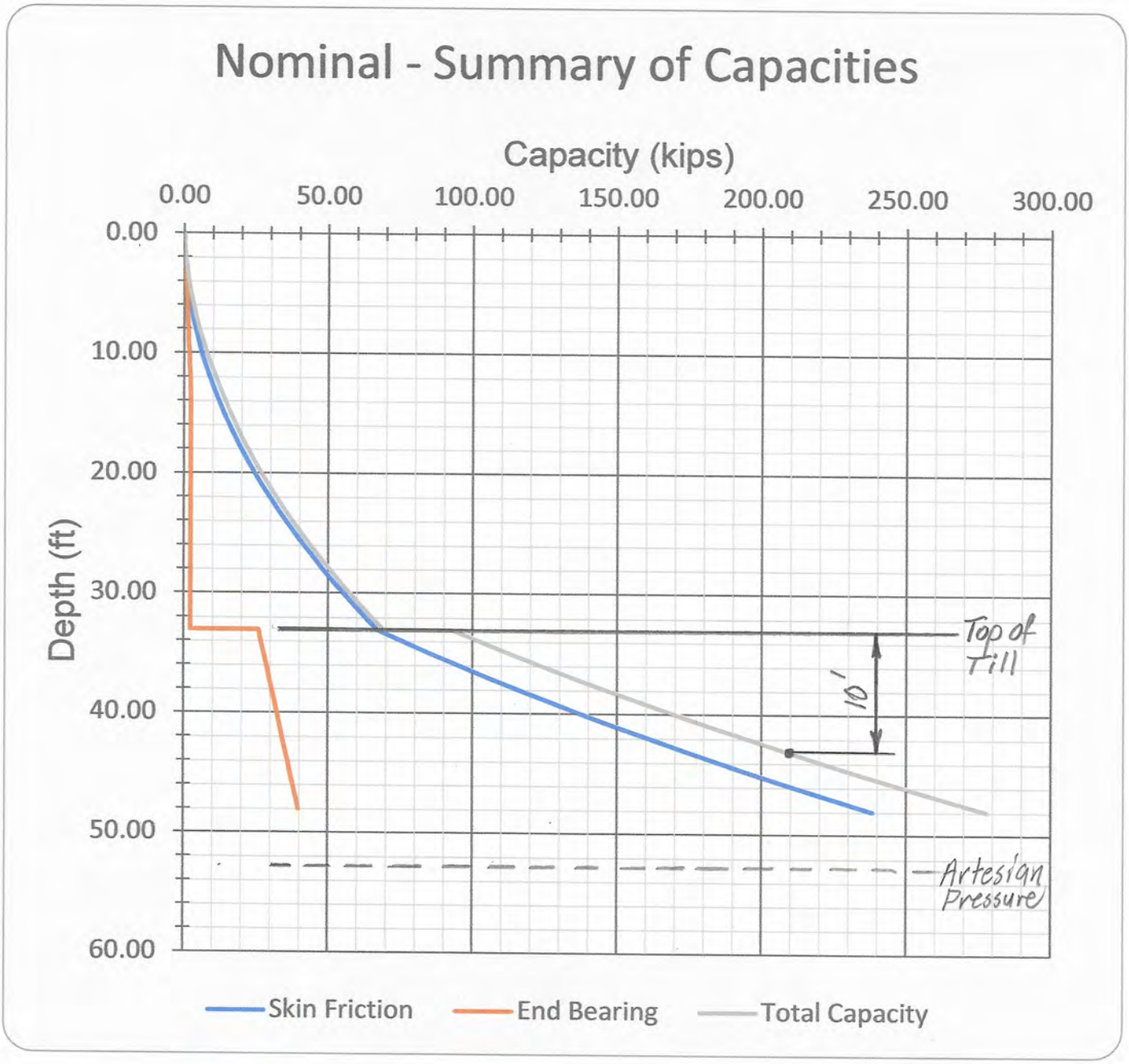
For till use $\gamma = 130$ & $N = 50$ ($\phi = 38°$)

Perform calcs. for 10-ft embedment in till

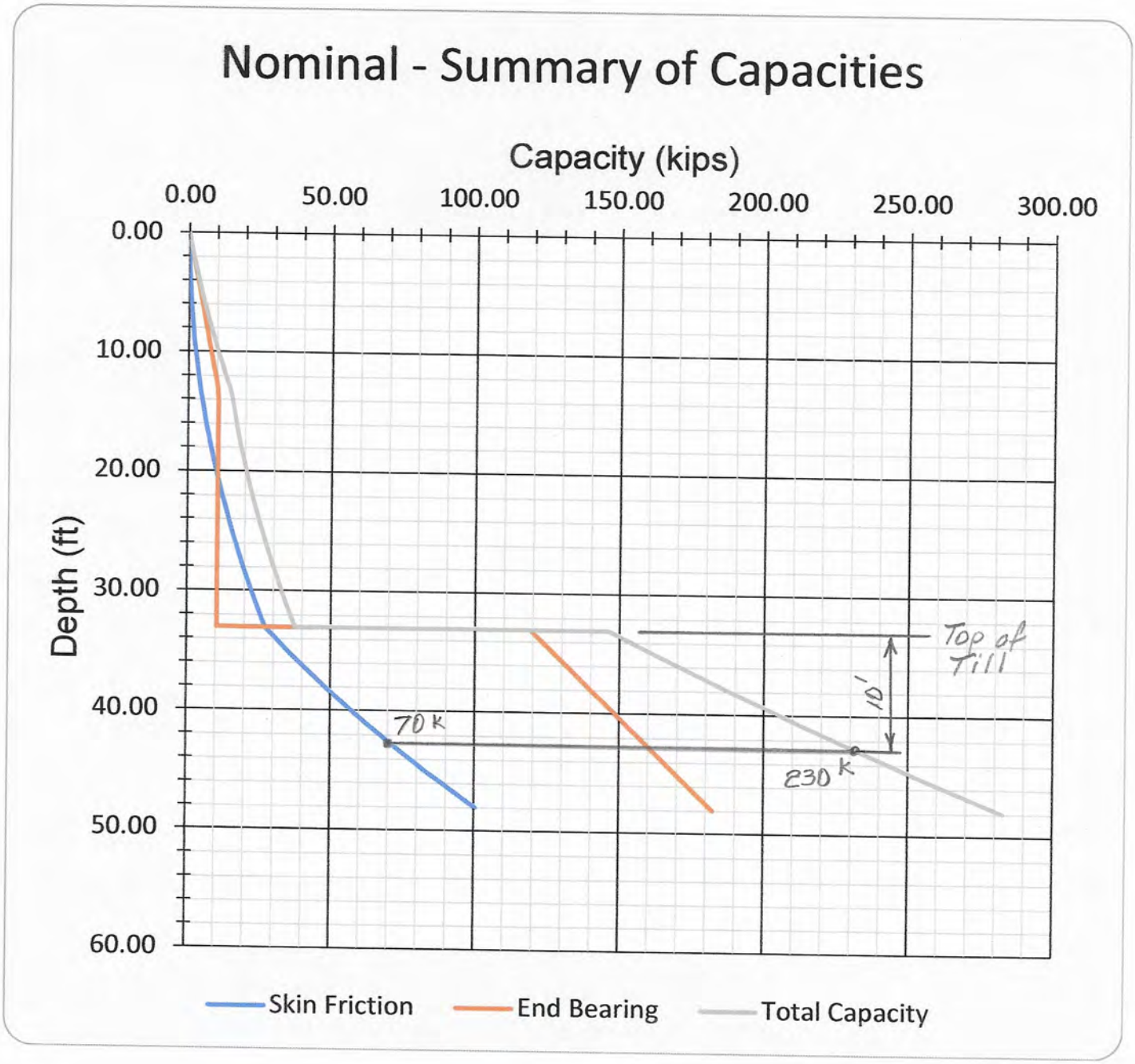
HP 10 x 57


Nominal - Summary of Capacities
Capacity (kips)
0.00
50.00
100.00
150.00
200.00
250.00
Depth (ft)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
Top of Till
10'
Artesion Pressure
Skin Friction
End Bearing
Total Capacity

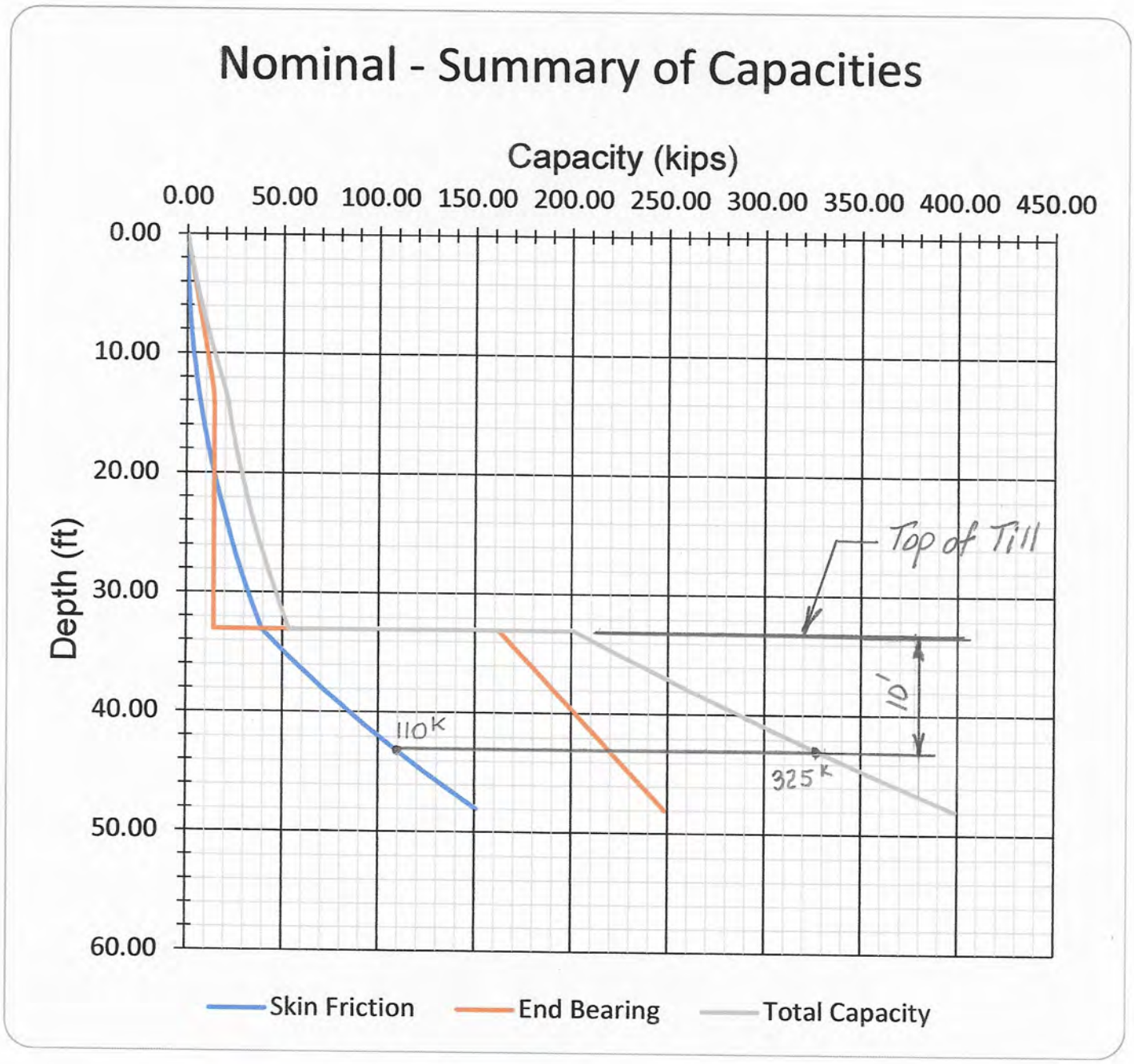
HP 12 x 84


Nominal - Summary of Capacities
Capacity (kips)
0.00
50.00
100.00
150.00
200.00
250.00
300.00
Depth (ft)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
Top of Till
10'
Artesian Pressure
Skin Friction
End Bearing
Total Capacity

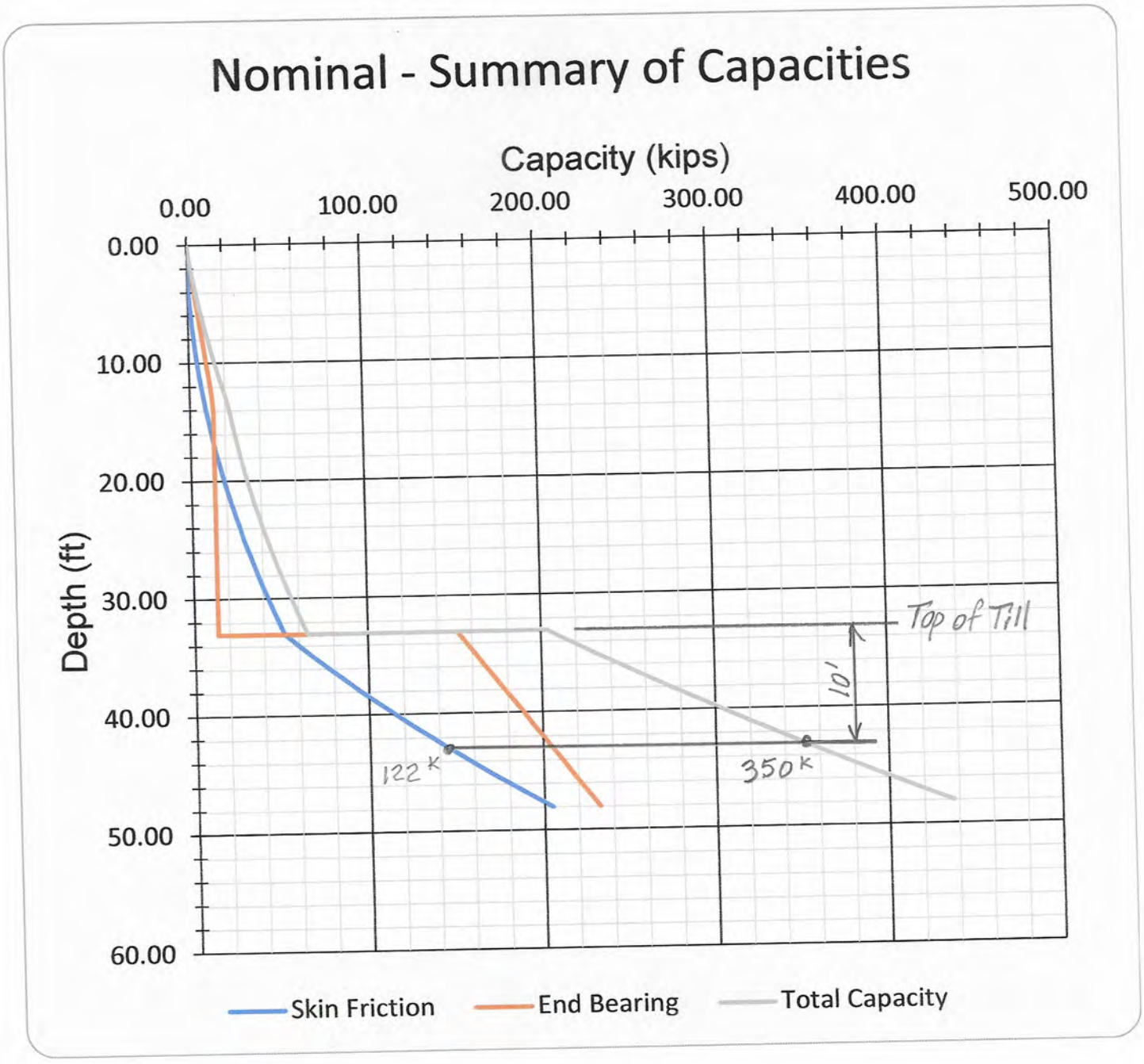
12" ϕ Closed-end Pipe



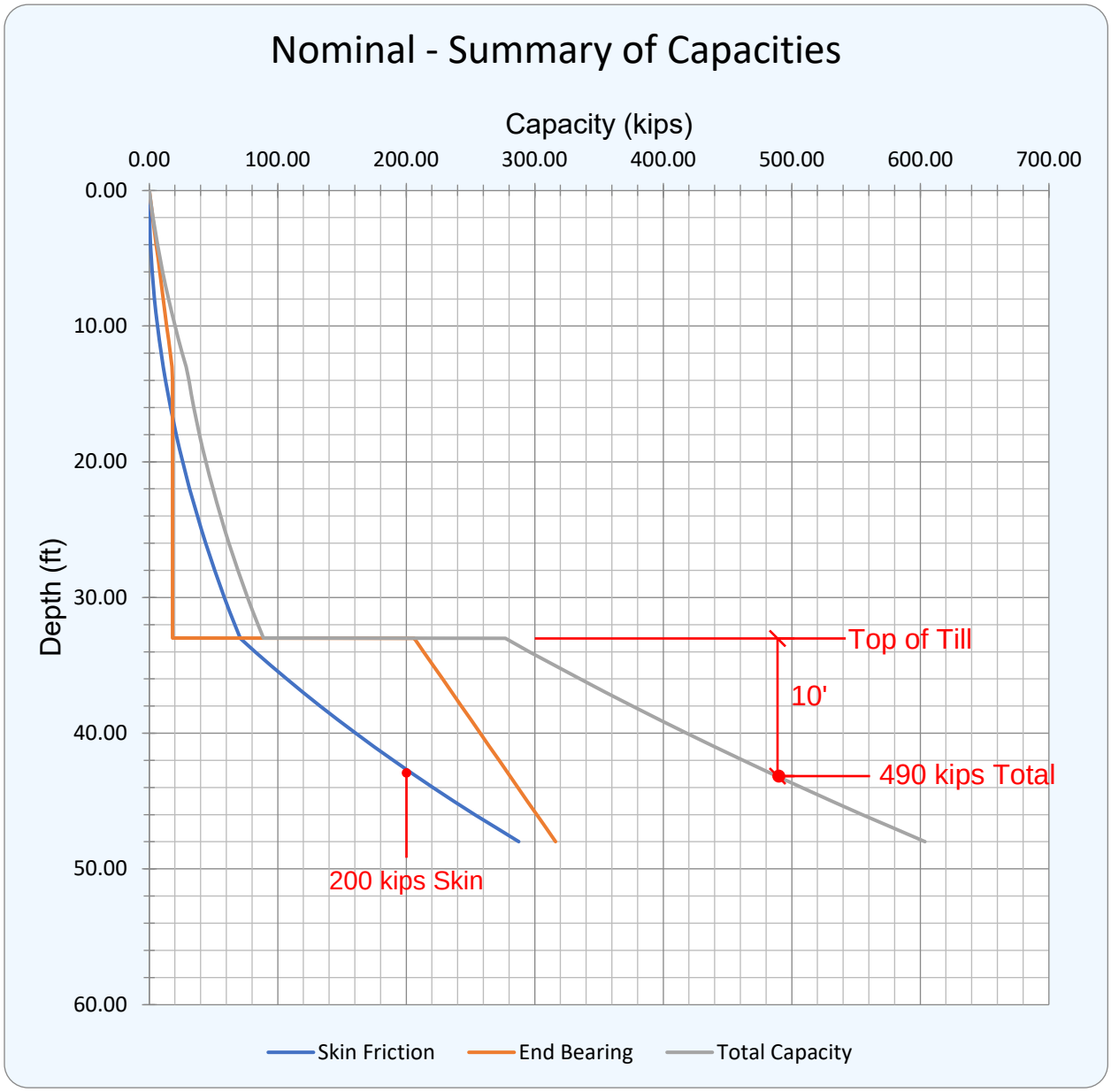
14" ϕ Closed-end Pipe



12-inch Concrete

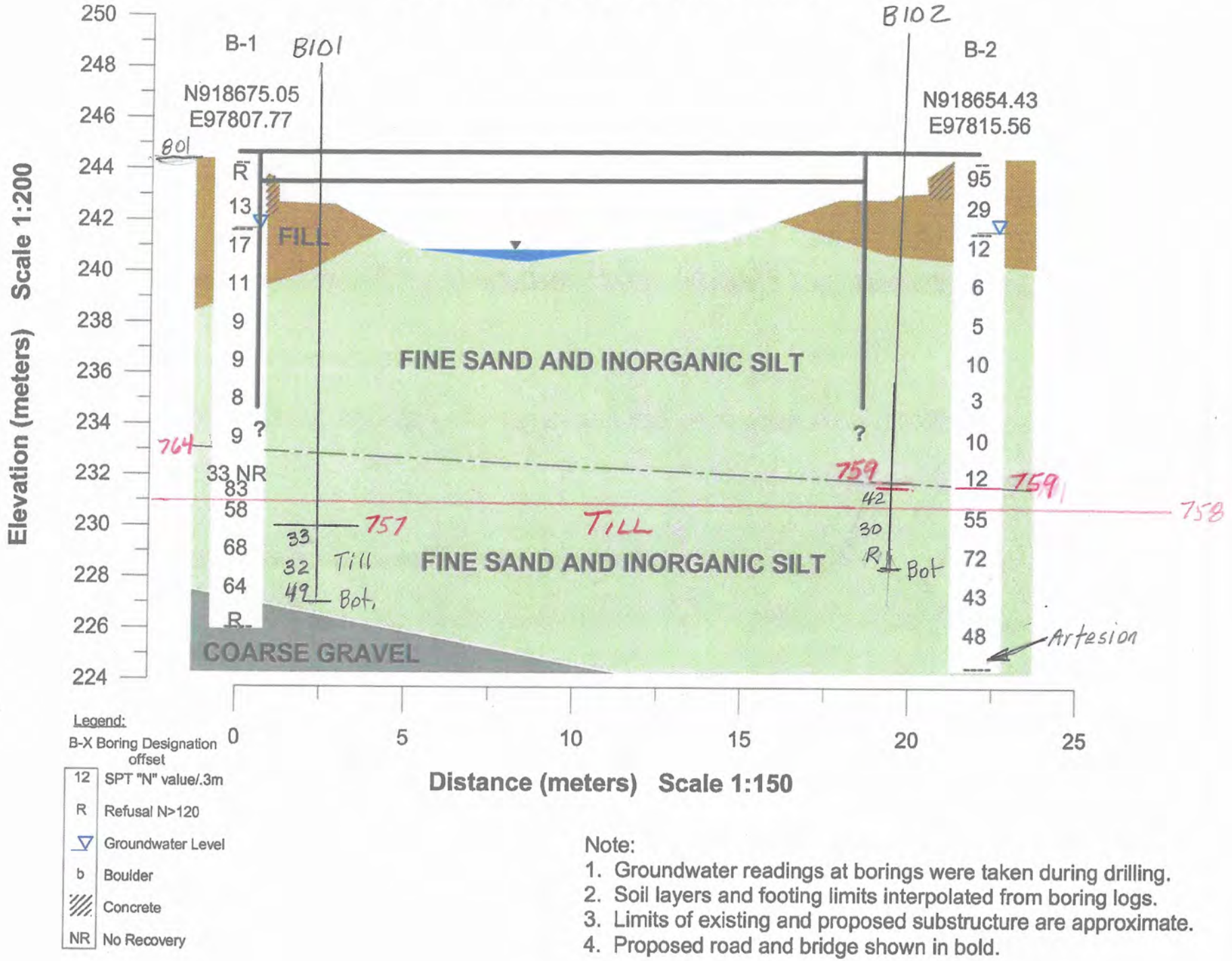


14-inch Concrete Pile




BB-101
BRIDGE NO. C-20-004
POLAND BROOK
BB-102
OCATION OF
MENT (TYP.)
1+00
N29°36'00"W
2+00
EXIST. B-2
EXIST. B-1
WF#B3-112
WF#B1-119
WF#B3-111
WF#B1-118
WF#B3-110
WF#B1-117
WF#B3-109
15"DEAD
10"CON
12"DEC
24"CON

Soil Profile for Bridge C-20-04

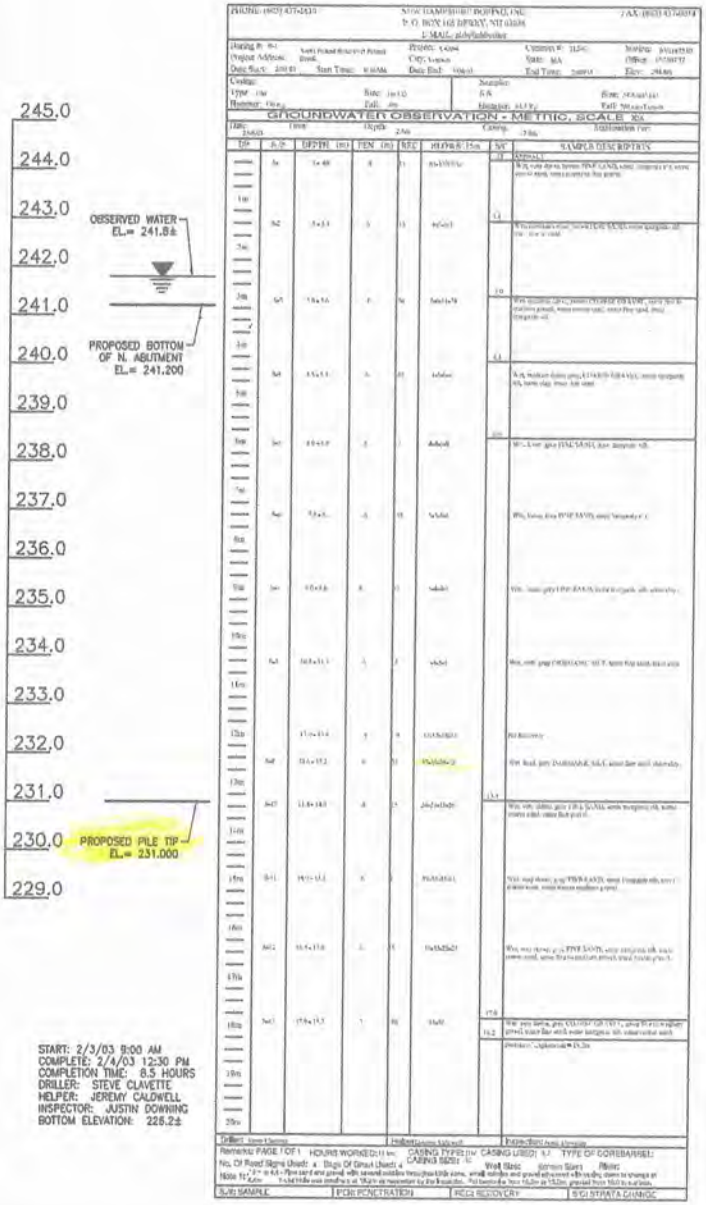


Note:
1. Groundwater readings at borings were taken during drilling.
2. Soil layers and footing limits interpolated from boring logs.
3. Limits of existing and proposed substructure are approximate.
4. Proposed road and bridge shown in bold.

Figure 6. Soil Profile for Bridge C-20-04

BORING B-1

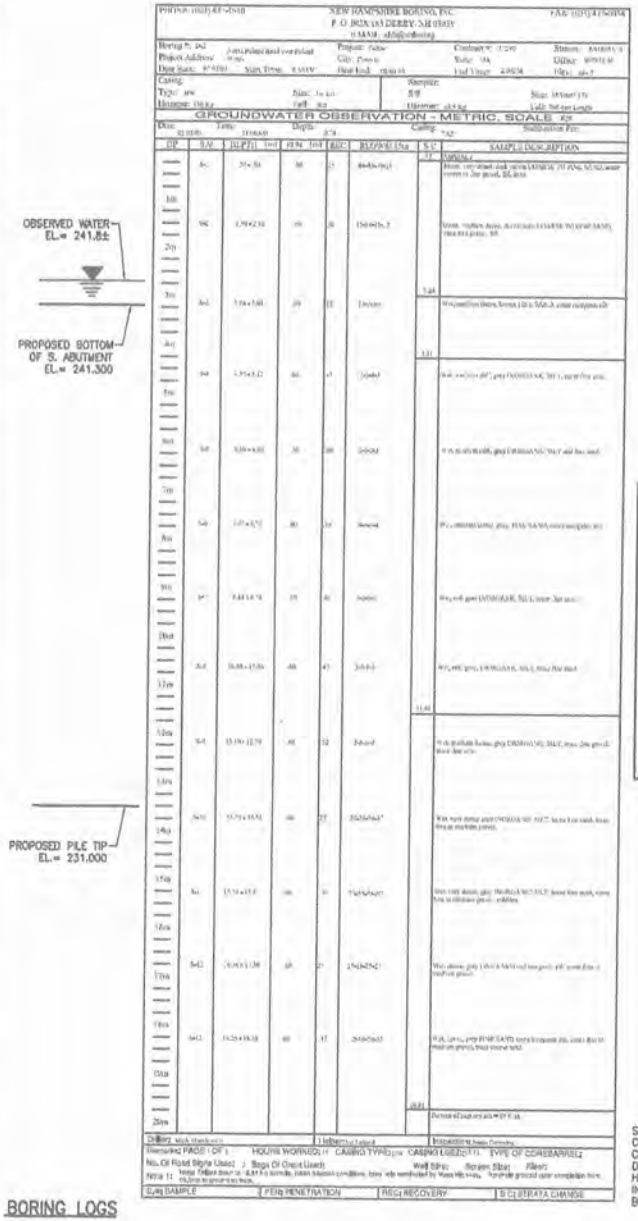
N=918875.045
E=97802.767
GROUND ELEVATION: 244.4±



START: 2/3/03 9:00 AM
COMPLETE: 2/4/03 12:30 PM
COMPLETION TIME: 8.5 HOURS
DRILLER: STEVE CLAVETTE
HELPER: JEREMY CALDWELL
INSPECTOR: JUSTIN DOWNING
BOTTOM ELEVATION: 226.2±

BORING B-2

N=918654.434
E=97815.562
GROUND ELEVATION: 244.5±



START: 2/3/03 9:00 AM
COMPLETE: 2/4/03 1:30 PM
COMPLETION TIME: 9.5 HOURS
DRILLER: MARK D'AMBROSIO
HELPER: JOE LoFOND
INSPECTOR: JUSTIN DOWNING
BOTTOM ELEVATION: 224.69±

BORING LOGS

DRAFT Print
1st Structural
August 2006

STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
MASS.	BR2-XXXXX	2007		
PROJECT FILE NO. 604005				

BORING NOTES:

1. LOCATION OF BORINGS SHOWN ON THE PLAN THUS: B-1
2. BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
3. WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
4. FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 50.8 MILLIMETER SPLIT SPOON SAMPLER 150 MILLIMETERS WITH A 63.5 KILOGRAM MASS FALLING 760 MILLIMETERS.
5. BORING SAMPLES ARE STORED AT A STORAGE FACILITY LOCATED AT 219 WINTHROP AVE. (ROUTE 114) IN LAWRENCE, MA. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING THE MASSACHUSETTS HIGHWAY DEPARTMENT, GEOTECHNICAL SECTION AT 10 PARK PLAZA, ROOM 8500, BOSTON, MA 02116, AT (617) 973-8836.
6. THE BORINGS WERE MADE IN FEBRUARY 2003.
7. BORINGS WERE MADE BY:
   NEW HAMPSHIRE BORING, INC.
   P.O. BOX 165
   DERRY, NEW HAMPSHIRE 03038
8. THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.
9. THE DEPTHS AS SHOWN ON THE ORIGINAL BORING LOGS HAVE BEEN CONVERTED TO ELEVATIONS BY THE ENGINEER.

ESTIMATED QUANTITIES
(NOT GUARANTEED)

ITEM	QTY	UNIT
DEMOLITION OF BRIDGE NO. C-20-004	1	LS
BRIDGE EXCAVATION	205	CM
CLASS B ROCK EXCAVATION	5	CM
GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	52	CM
CRUSHED STONE FOR BRIDGE FOUNDATIONS	35	MG
CRUSHED STONE FOR FILTER BLANKET	26	CM
HOT POURED RUBBERIZED ASPHALT SEALER	16	M
GEOTEXTILE FABRIC FOR SEPARATION	85	SM
STEEL PIPE PILE 300mm O.D.	425	M
RIPRAP	105	MG
CONTROL OF WATER-STRUCTURE NO. C-20-004	1	LS
TEMP. PROTECTIVE SHIELDING BRIDGE NO. C-20-004	1	LS
BRIDGE STRUCTURE, BRIDGE NO. C-20-004	1	LS

HYDRAULIC DATA

DRAINAGE AREA:	17.612 SQUARE KILOMETERS
DESIGN DISCHARGE:	16.85 CUBIC METERS PER SECOND
DESIGN FREQUENCY:	10 YEARS
DESIGN VELOCITY:	1.09 METERS PER SECOND
DESIGN HIGH WATER: ELEVATION:	242.1 METERS

BASIC FLOOD DATA

Q (100 YEAR):	35.55 CUBIC METERS PER SECOND
WATER SURFACE ELEVATION:	242.57m, NAVD

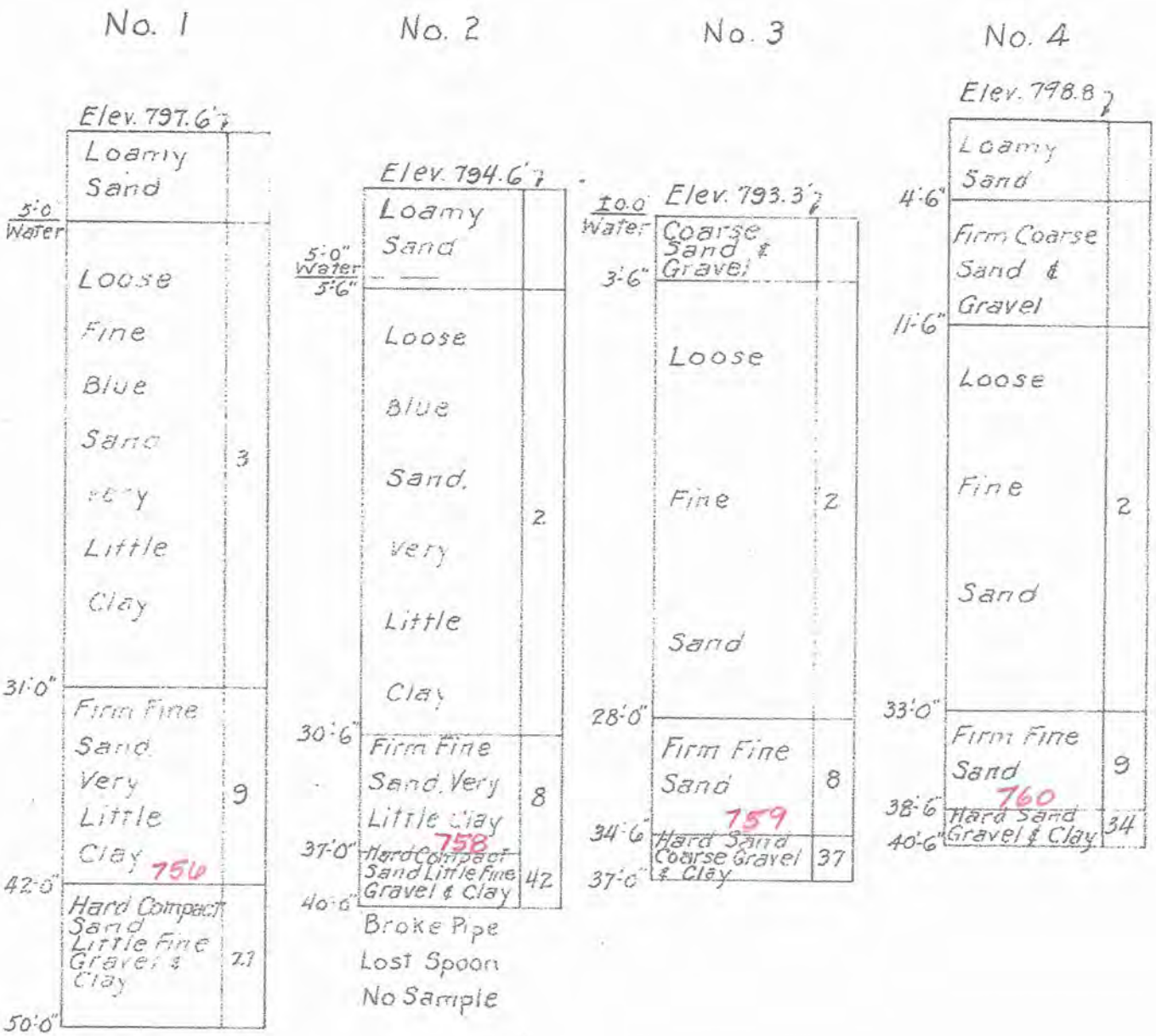
FLOOD OF RECORD

Q =	UNKNOWN CUBIC METERS PER SECOND
FREQUENCY:	UNKNOWN
DATE:	UNKNOWN

HISTORY OF ICE FLOES: NONE DOCUMENTED IN NBIS DATABASE
EVIDENCE OF SCOUR AND EROSION: THE PILINGS OF BOTH EXISTING PIERS ARE EXPOSED AND THEIR INTERSTITIAL CONCRETE WEBBING IS UNDERMINED.

DATE	DESCRIPTION
	ISSUED FOR CONSTRUCTION
	USE ONLY PRINTS OF LATEST DATE

SHEET 2 OF 12 SHEETS BRIDGE NO. C-20-004 (5YQ)



BORING DATA

SCALE 1" = 8'-0"

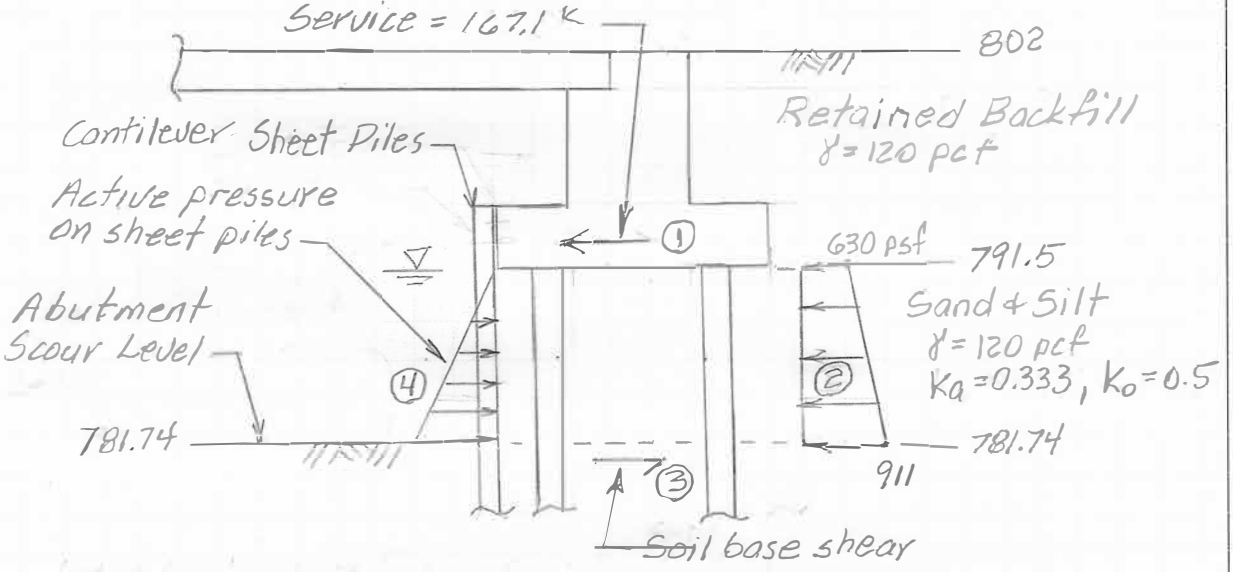
BORINGS TAKEN JAN. 29, 1940

GEI Consultants						
	Client	BETA / Mass DOT			Page	1
	Project	North Poland Road			Pg. Rev.	
	By	D. Shields	Chk.	Sarandis	App.	
	Date	7/22/22	Date	07/26/2022	Date	
Project No.	2004115	Document No.				
Subject	Prelim. LPILE with Abutment Scour (Rev. 2)					

① Lateral load on abut. (from BETA):

Factored = 227.2 K

Service = 167.1 K



Lateral load on piles = ① + ② − ③ − ④

② Unbalanced earth pressure from bot. of pile cap to abutment scour level,

@ EL 791.5, 10.5' (120 pcf)(0.5) = 630 psf

@ EL 781.74, 630 + 9.76' (120 − 62.4)(0.5) = 911 psf

Lateral load on 34' long abutment,

$\frac{1}{2}(0.63 + 0.911)(791.5 - 781.74)(34') = 255.7^{K}$

③ Base shear,

Area of pile cap ≈ 8.5' × 34' = 289 ft²

Area of piles = 21 piles × $\left(\frac{14''}{12''}\right)^2$ = 28.6 ft²

Net soil area = 289 − 28.6 = 260.4 ft²

} Not incl. wingwalls

GEI Consultants						
	Client	BETA / MassDOT			Page	2
	Project	North Poland Road			Pg. Rev.	
	By	D. Shields	Chk.	Sarandis	App.	
	Date	7/22/22	Date	07/26/2022	Date	
Project No.	2004115	Document No.				
Subject	Prelim. LPILE with Abut. Scour (Rev. 2)					

Soil weight = $(260.4)(791.5 - 781.74)(120 - 62.4) = 146{,}391$ lb

Base shear with FS = 1.5,

$$\frac{146.391(\tan 30^\circ)}{1.5} = 56.3^{K}$$

④ Active pressure on sheet piles,

$$\frac{1}{2}(120 - 62.4)(791.5 - 781.74)^2(0.333)(34')\frac{1}{1000} = 31.1^{K}$$

Lateral load on piles,

Factored: $\frac{227.2 + 255.7 - 56.3 - 31.1}{25 \text{ piles}} = 15.8^{K}/\text{pile}$

Service: $\frac{167.1 + 255.7 - 56.3 - 31.1}{25 \text{ piles}} = 13.4^{K}/\text{pile}$

For LPILE analysis assume:

- Piles develop no lateral resistance above scour level.
- Set top of pile at scour level in the analysis.
- No overturning moment from abut. load ①. This overturning moment is resisted by vertical forces in the piles.
- Overturning from loads ① and ② applied at top of pile.
- Use 50% of soil weight between bot. of pile cap and scour level to compute vertical stress in soil at scour level.

GEI Consultants						
	Client	BETA / MassDOT			Page	3
	Project	North Poland Road			Pg. Rev.	
	By	D. Shields	Chk.	Sarandis	App.	
	Date	7/22/22	Date	07/26/2022	Date	
Project No.	2004115	Document No.				
Subject	Prelim. LPILE with Abutment Scour (Rev. 2)					

Overturning moment from ② and ④,

$$M = (0.63)(9.76')\left(\frac{9.76}{2}\right) + \frac{1}{2}(0.911-0.63)(9.76')\left(\frac{9.76}{3}\right) - \frac{1}{2}(120-62.4)(9.76)^2(0.333)\left(\frac{9.76}{3}\right)\left(\frac{1}{1000}\right)$$

$$M = 30.0 + 4.46 - 2.97$$

$$= 22.56 \text{ k-ft/ft}$$

$$M \text{ per pile} = \frac{22.56(34')}{24 \text{ piles}} = 32.0 \text{ k-ft/pile}$$

$$= 384{,}000 \text{ in-lb/pile}$$

25 piles
Okay - conservative

For the LPILE analysis, the top 1 ft of soil below the scour depth / top of pile will be given a high unit weight to apply 50% of the soil weight between bot. of pile cap and scour level as follows:

$$0.5\,(9.76')(120-62.4) = 281 \text{ psf}$$

Use soil unit weight of 281 pcf for the top 1 ft.

GEI Consultants						
	Client	BETA			Page	4
	Project	North Poland Road			Pg. Rev.	
	By	D. Shields	Chk.	Sarandis	App.	
	Date	7/22/22	Date	07/26/2022	Date	
Project No.	2004115	Document No.				
Subject	Prelim. LPILE with Abutment Scour (Rev. 2)					

For sand & silt below water assume:

$\gamma' = 120$ pcf, $N = 10 \rightarrow \phi = 30°$; $k = 40$ pci

Perform analysis for 14-in. concrete pile

P-y reduction for group action,

3 rows of piles

Spacing btwn. rows = 5.5' $\Rightarrow \frac{S}{B} = \frac{66"}{14"} = 4.7$

Use AASHTO (Table 10.7.2.4-1) p-y reduction factors:

1st row (11 piles): $0.8 + \frac{1.7}{2}(0.2) = 0.97$

2nd row (9 piles): $0.4 + \frac{1.7}{2}(0.45) = 0.78$

3rd row (4 piles): $0.3 + \frac{1.7}{2}(0.4) = 0.64$

Aver. p-y reduction $= \frac{11(0.97) + 10(0.78) + 4(0.64)}{25} = 0.84$

LPILE Results:

S_{max} Factored Load = 1.60"

S_{max} Service Load = 1.35"

M_{max} Factored Load = 79.4 ft-k

Properties

The last column on the input grid contain buttons for each input layer. These buttons will provide the user with new sub-screens for entry of the material properties of each layer as shown in Fig. 3.13. The text displayed on the table button will change depending on the selected soil type. The table buttons activate data entry dialog boxes that are unique for each selected soil type. These dialog boxes provide the means to enter effective unit weight, shear strength parameters, and any other required soil/rock property parameters. Descriptions about the required parameters for different types of soils and rocks are presented in the following.

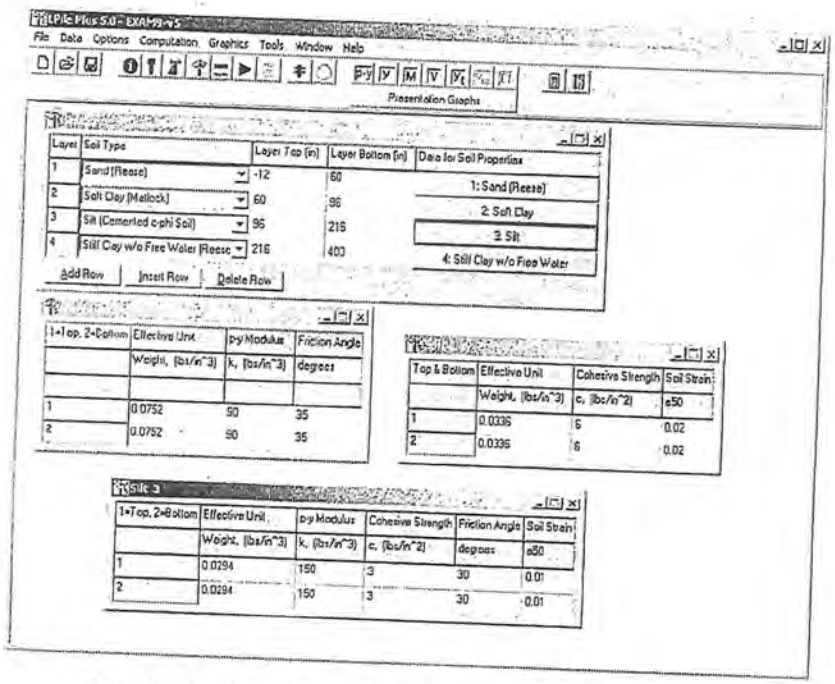


Fig. 3.13 Samples of Soil Property Dialog Boxes

a. Unit Weight

Values of effective unit weight for each soil depth are entered in standard units of force per unit volume. The program will linearly interpolate values of unit weight located between two specified soil depths, but can also accept step changes whenever the depth values are repeated, such as at the water table. The last entry of Unit Weight should be at the same depth as the bottom of the last soil layer.

b. *k* Value for Soil Layers

This is the value for the constant k used in the equation $E_s = kx$. This constant is in units of force per cubic length and depends on the type of soil and lateral loading imposed to the pile group. It has two different uses: (i) to define the initial (maximum) value of E_s on internally-generated p-y curves of stiff clays with free water and/or sands; and (ii) to initialize the E_s array for the first iteration of pile analysis.

Suggested values of the parameter k used for sands are given in Table 3.2. Suggested values of the parameter k used for clays are given in Table 3.3.

c. Undrained Shear Strength

Values of undrained shear strength, c_u, for clays and silts at each depth are entered in standard units of force per unit area. The undrained shear strength is not needed for sand layers. The undrained shear strength is generally taken as half of the unconfined compressive strengths.

Use 40 pci

Relative Density	Loose	Medium	Dense
Submerged Sand	20 lb/in3 5,430 KPa/m	60 lb/in3 16,300 KPa/m	125 lb/in3 33,900 KPa/m
Sand Above WT	25 lb/in3 6,790 KPa/m	90 lb/in3 24,430 KPa/m	225 lb/i3 61,000 KPa/m

Table 3.2 Soil-Modulus Parameter k for Sands

Table 10.7.2.4-1—Pile P-Multipliers, P_m, for Multiple Row Shading (averaged from Hannigan et al., 2006)

Pile *CTC* spacing (in the direction of loading)	*P*-Multipliers, P_m		
	Row 1	Row 2	Row 3 and higher
3*B*	0.8	0.4	0.3
5*B*	1.0	0.85	0.7

Loading direction and spacing shall be taken as defined in Figure 10.7.2.4-1. If the loading direction for a single row of piles is perpendicular to the row (bottom detail in the Figure), a group reduction factor of less than 1.0 should only be used if the pile spacing is 5*B* or less, i.e., a P_m of 0.8 for a spacing of 3*B*, as shown in Figure 10.7.2.4-1.

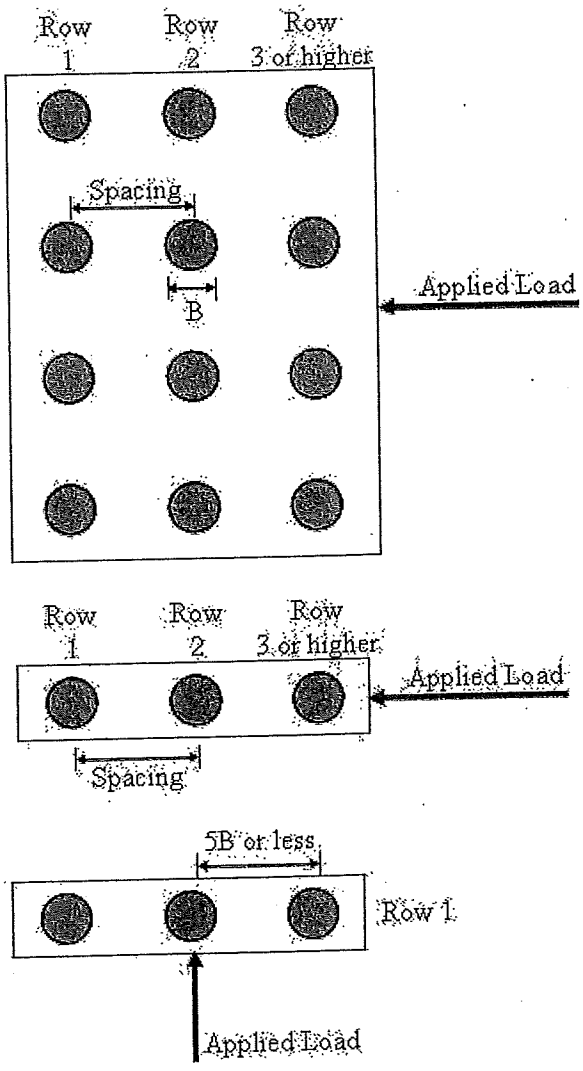


Figure 10.7.2.4-1—Definition of Loading Direction and Spacing for Group Effects

Since many piles are installed in groups, the horizontal resistance of the group has been studied and it has been found that multiple rows of piles will have less resistance than the sum of the single pile resistance. The front piles "shade" rows that are further back.

The P-multipliers, P_m, in Table 10.7.2.4-1 are a function of the center-to-center (*CTC*) spacing of piles in the group in the direction of loading expressed in multiples of the pile diameter, *B*. The values of P_m in Table 10.7.2.4-1 were developed for vertical piles only.

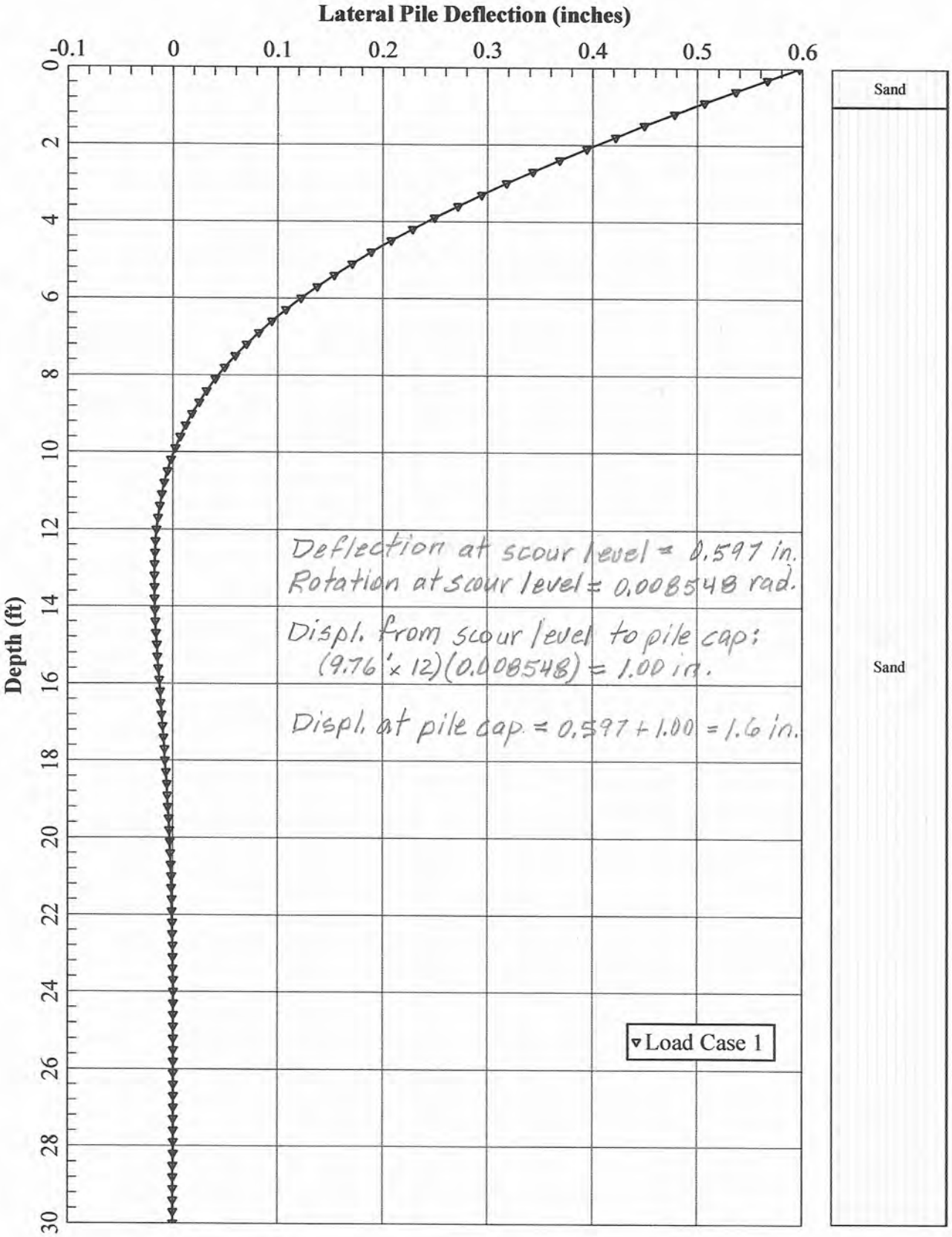
Lateral load tests have been performed on pile groups, and multipliers have been determined that can be used in the analysis for the various rows. Those multipliers have been found to depend on the pile spacing and the row number in the direction of loading. To establish values of P_m for other pile spacing values, interpolation between values should be conducted.

The multipliers are a topic of current research and may change in the future. Values from recent research have been tabulated by Hannigan et al. (2006).

Note that these *P-y* methods generally apply to foundation elements that have some ability to bend and deflect. For large diameter, relatively short foundation elements, e.g., drilled shafts or relatively short stiff piles, the foundation element rotates rather than bends, in which case strain wedge theory (Norris, 1986; Ashour et al., 1998) may be more applicable. When strain wedge theory is used to assess the lateral load response of groups of short, large diameter piles or shaft groups, group effects should be addressed through evaluation of the overlap between shear zones formed due to the passive wedge that develops in front of each shaft in the group as lateral deflection increases. Note that P_m in Table 10.7.2.4-1 is not applicable if strain wedge theory is used.

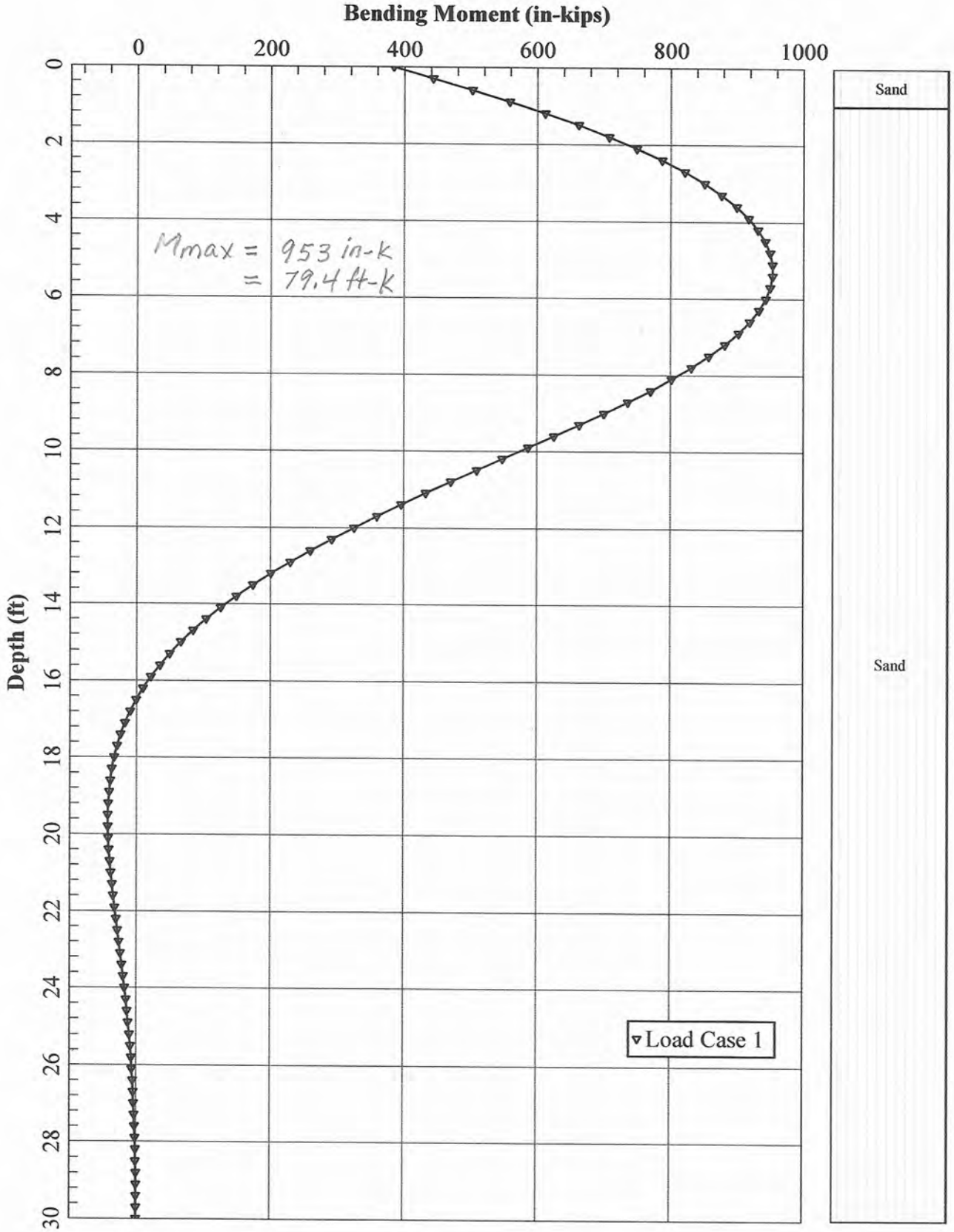
Batter piles provide a much stiffer lateral response than vertical piles when loaded in the direction of the batter.

P.6



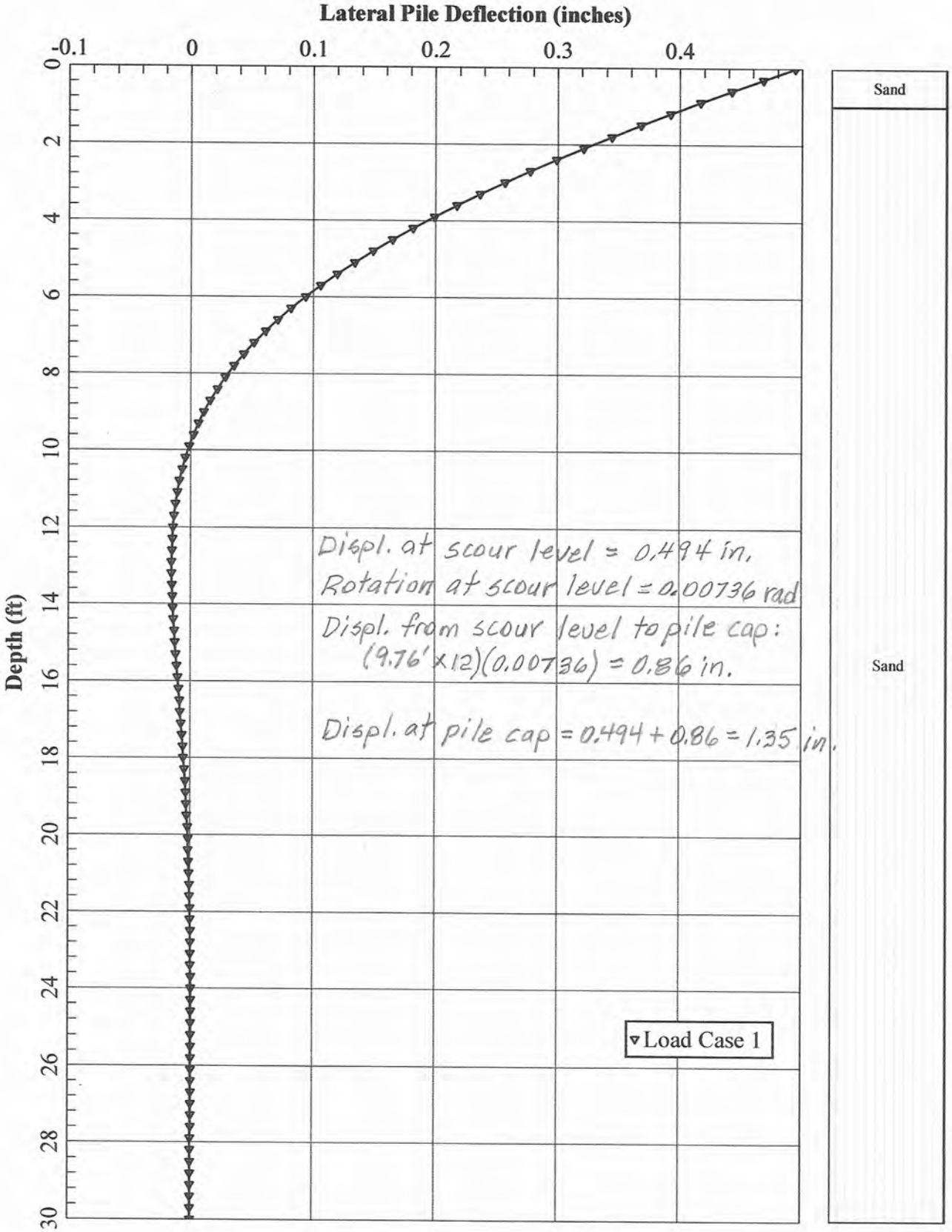
14-in Concrete Factored Lateral Load = 15.8 kips M = 32.0 k-ft at Top

P. 7



14-in Concrete Factored Lateral Load = 15.8 kips M = 32 k-ft at Top

p. 8



14-in Concrete Service Lateral Load = 13.4 kips M = 32.0 k-ft at Top

Precast/Prestressed Concrete Inst.
200 W. Adams St. #2100 Ph. 312.786.0300
Chicago, IL 60606 Fax 312.621.1114
Email: info@pci.org Web www.pci.org

JOB: North Poland Road
SUBJECT: 14-inch Concrete (Rev 2)
DES. BY: DRS DATE:D 7/12/22
CHK. BY: ATE:

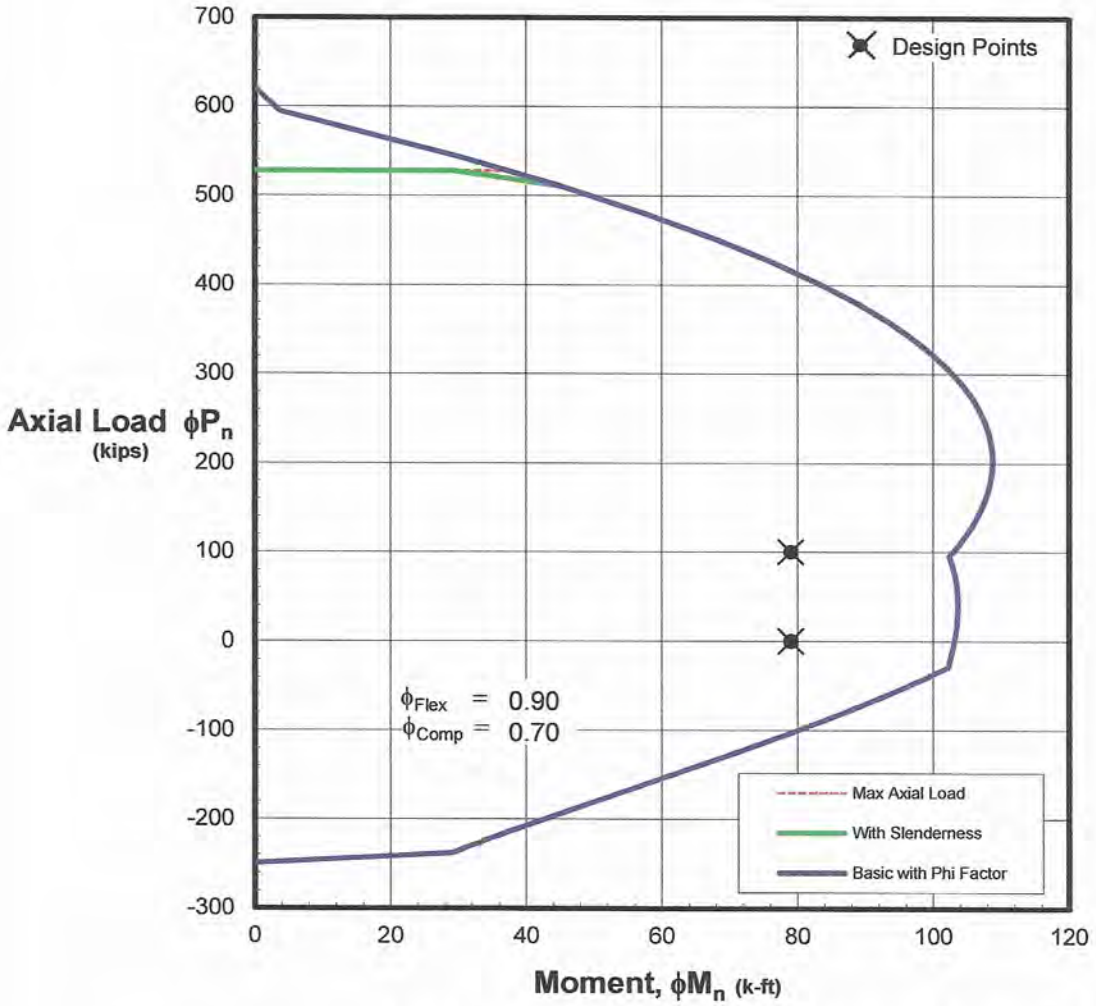
Prestressed Concrete Piling Interaction Diagram

p.9

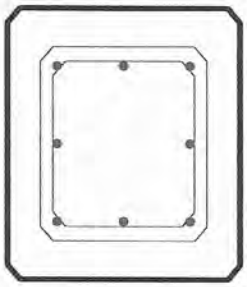
14 in. Solid Pile

8 - 0.5 in. Dia. Strands f'c= 6 ksi

Secant Method for Slenderness, kl/r = 3



Cross-Section



Key Points on Basic Interaction Diagram including ϕ Factors:

	Axial Load, ϕP_n (kips)	Moment, ϕM_n (k-ft)
Pure Compression	620.9	0.0
Maximum Axial Load	527.7	37.3
Maximum Moment*	200.3	108.8
Comp. Controlled Limit	95.4	102.4
Tens. Controlled Limit	-29.0	102.2
Pure Bending	0.0	102.4
Maximum Tension	-238.1	29.0
Pure Tension	-249.5	0.0

* Based on point of maximum moment before ϕ factors are applied

```
================================================================================

                  LPile for Windows(Beta), Version 2018-10.009

                 Analysis of Individual Piles and Drilled Shafts
                Subjected to Lateral Loading Using the p-y Method
                          © 1985-2018 by Ensoft, Inc.
                              All Rights Reserved
                          FACTORED LOAD 15.8 KIPS
================================================================================

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--------------------------------------------------------------------------------
                             Files Used for Analysis
--------------------------------------------------------------------------------

Path to file locations:
\Working\BETA GROUP\2004115 North Poland Road Bridge\11_Calcs\Prelim LPILE\

Name of input data file:
14-in conc with scour (Rev 2).lp10

Name of output report file:
14-in conc with scour (Rev 2).lp10

Name of plot output file:
14-in conc with scour (Rev 2).lp10

Name of runtime message file:
14-in conc with scour (Rev 2).lp10



--------------------------------------------------------------------------------
                           Date and Time of Analysis
--------------------------------------------------------------------------------
```

Date: July 22, 2022 Time: 10:23:29

Problem Title

Project Name: North Poland Road Bridge Replacement

Job Number: 2004115

Client: BETA

Engineer: D Shields

Description: 14-inch Conc Pile - Factored Load = ~~21.9 k~~ 15.8 kips

---

Program Options and Settings

Computational Options:
- Use unfactored loads in computations (conventional analysis)

Engineering Units Used for Data Input and Computations:
- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed	=	500
- Deflection tolerance for convergence	=	1.0000E-05 in
- Maximum allowable deflection	=	100.0000 in
- Number of pile increments	=	100

Loading Type and Number of Cycles of Loading:
- Static loading specified

- Analysis uses p-y modification factors for p-y curves

- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:
- Output files use decimal points to denote decimal symbols.
- Report only summary tables of pile-head deflection, maximum bending moment, and maximum shear force in output report file.
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined	=	1
Total length of pile	=	30.000 ft
Depth of ground surface below top of pile	=	0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	14.0000
2	30.000	14.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is an elastic pile

Cross-sectional shape	=	rectangular
Length of section	=	30.000000 ft
Width of top of section	=	14.000000 in
Width of bottom of section	=	14.000000 in

Top Section Depth	=	14.000000 in
Bottom Section Depth	=	14.000000 in
Top Area	=	196.000000 sq. in
Bottom Area	=	196.000000 sq. in
Moment of Inertia at Top	=	3201. in^4
Moment of Inertia at Bottom	=	3201. in^4
Elastic Modulus	=	4000000. psi

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	1.000000 ft
Effective unit weight at top of layer	=	281.000000 pcf
Effective unit weight at bottom of layer	=	281.000000 pcf
Friction angle at top of layer	=	30.000000 deg.
Friction angle at bottom of layer	=	30.000000 deg.
Subgrade k at top of layer	=	40.000000 pci
Subgrade k at bottom of layer	=	40.000000 pci

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	1.000000 ft
Distance from top of pile to bottom of layer	=	30.000000 ft
Effective unit weight at top of layer	=	57.600000 pcf
Effective unit weight at bottom of layer	=	57.600000 pcf
Friction angle at top of layer	=	30.000000 deg.
Friction angle at bottom of layer	=	30.000000 deg.
Subgrade k at top of layer	=	40.000000 pci
Subgrade k at bottom of layer	=	40.000000 pci

(Depth of the lowest soil layer extends 0.000 ft below the pile tip)

**** Warning - Possible Input Data Error ****

Values entered for effective unit weights of soil were outside the limits of 20 pcf to 140 pcf.

The maximum input value, in layer 1, for effective unit weight = 281.00 pcf

This data may be erroneous. Please check your data.

Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Angle of Friction deg.	kpy pci
1	Sand (Reese, et al.)	0.00 1.0000	281.0000 281.0000	30.0000 30.0000	40.0000 40.0000
2	Sand (Reese, et al.)	1.0000 30.0000	57.6000 57.6000	30.0000 30.0000	40.0000 40.0000

---

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	0.8400
2	30.000	1.0000	0.8400

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 15800. lbs	M = 384000. in-lbs	82000.	No

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer	Top of Layer Below	Equivalent Top Depth Below	Same Layer Type As	Layer is Rock or	F0 Integral	F1 Integral

No.	Pile Head ft	Grnd Surf ft	Layer Above	is Below Rock Layer	for Layer lbs	for Layer lbs
1	0.00	0.00	N.A.	No	0.00	1466.
2	1.0000	0.9998	Yes	No	1466.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals
for Layer n. Layering correction equivalent depths are computed only
for soil types with both shallow-depth and deep-depth expressions for
peak lateral load transfer. These soil types are soft and stiff clays,
non-liquefied sands, and cemented c-phi soil.

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type	Load 1 Pile-head	Load Type 2	Load 2 Pile-head	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	15800.	M, in-lb	384000.	82000.	0.5973	-0.00855	15800.	953409.

Maximum pile-head deflection = 0.5972575830 inches
Maximum pile-head rotation = -0.0085476811 radians = -0.489746 deg.

The analysis ended normally.

```
================================================================================

                  LPile for Windows(Beta), Version 2018-10.009

                 Analysis of Individual Piles and Drilled Shafts
                Subjected to Lateral Loading Using the p-y Method
                          © 1985-2018 by Ensoft, Inc.
                              All Rights Reserved
                          SERVICE LOAD 13.4 KIPS
================================================================================

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--------------------------------------------------------------------------------
                             Files Used for Analysis
--------------------------------------------------------------------------------

Path to file locations:
\Working\BETA GROUP\2004115 North Poland Road Bridge\11_Calcs\Prelim LPILE\

Name of input data file:
14-in conc with scour-service(Rev 2).lp10

Name of output report file:
14-in conc with scour-service(Rev 2).lp10

Name of plot output file:
14-in conc with scour-service(Rev 2).lp10

Name of runtime message file:
14-in conc with scour-service(Rev 2).lp10



--------------------------------------------------------------------------------
                           Date and Time of Analysis
--------------------------------------------------------------------------------
```

Date: July 22, 2022 Time: 10:38:04

Problem Title

Project Name: North Poland Road Bridge Replacement

Job Number: 2004115

Client: BETA

Engineer: D Shields

Description: 14-inch Conc Pile - ~~Factored Load = 21.9 k~~ Service Load = 13.4 kips

---

Program Options and Settings

Computational Options:
- Use unfactored loads in computations (conventional analysis)

Engineering Units Used for Data Input and Computations:
- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed	=	500
- Deflection tolerance for convergence	=	1.0000E-05 in
- Maximum allowable deflection	=	100.0000 in
- Number of pile increments	=	100

Loading Type and Number of Cycles of Loading:
- Static loading specified

- Analysis uses p-y modification factors for p-y curves

```
 - Analysis uses layering correction (Method of Georgiadis)
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Input of moment resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Report only summary tables of pile-head deflection, maximum bending moment,
   and maximum shear force in output report file.
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats



--------------------------------------------------------------------------------
                     Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                        =            1
Total length of pile                                   =       30.000 ft
Depth of ground surface below top of pile              =       0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below           Pile
Point        Pile Head          Diameter
 No.            feet             inches
-----      -------------     -------------
  1             0.000           14.0000
  2            30.000           14.0000


Input Structural Properties for Pile Sections:
----------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional shape                               =     rectangular
   Length of section                                   =    30.000000 ft
   Width of top of section                             =    14.000000 in
   Width of bottom of section                          =    14.000000 in
```

Top Section Depth	=	14.000000 in
Bottom Section Depth	=	14.000000 in
Top Area	=	196.000000 sq. in
Bottom Area	=	196.000000 sq. in
Moment of Inertia at Top	=	3201. in^4
Moment of Inertia at Bottom	=	3201. in^4
Elastic Modulus	=	4000000. psi

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	1.000000 ft
Effective unit weight at top of layer	=	281.000000 pcf
Effective unit weight at bottom of layer	=	281.000000 pcf
Friction angle at top of layer	=	30.000000 deg.
Friction angle at bottom of layer	=	30.000000 deg.
Subgrade k at top of layer	=	40.000000 pci
Subgrade k at bottom of layer	=	40.000000 pci

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	1.000000 ft
Distance from top of pile to bottom of layer	=	30.000000 ft
Effective unit weight at top of layer	=	57.600000 pcf
Effective unit weight at bottom of layer	=	57.600000 pcf
Friction angle at top of layer	=	30.000000 deg.
Friction angle at bottom of layer	=	30.000000 deg.
Subgrade k at top of layer	=	40.000000 pci
Subgrade k at bottom of layer	=	40.000000 pci

(Depth of the lowest soil layer extends 0.000 ft below the pile tip)

**** Warning - Possible Input Data Error ****

Values entered for effective unit weights of soil were outside the limits of 20 pcf to 140 pcf.

The maximum input value, in layer 1, for effective unit weight = 281.00 pcf

This data may be erroneous. Please check your data.

Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Angle of Friction deg.	kpy pci
1	Sand (Reese, et al.)	0.00 1.0000	281.0000 281.0000	30.0000 30.0000	40.0000 40.0000
2	Sand (Reese, et al.)	1.0000 30.0000	57.6000 57.6000	30.0000 30.0000	40.0000 40.0000

---

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	0.8400
2	30.000	1.0000	0.8400

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 13400. lbs	M = 384000. in-lbs	82000.	No

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer	Top of Layer Below	Equivalent Top Depth Below	Same Layer Type As	Layer is Rock or	F0 Integral	F1 Integral

No.	Pile Head ft	Grnd Surf ft	Layer Above	is Below Rock Layer	for Layer lbs	for Layer lbs
1	0.00	0.00	N.A.	No	0.00	1466.
2	1.0000	0.9998	Yes	No	1466.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals
for Layer n. Layering correction equivalent depths are computed only
for soil types with both shallow-depth and deep-depth expressions for
peak lateral load transfer. These soil types are soft and stiff clays,
non-liquefied sands, and cemented c-phi soil.

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type	Load 1 Pile-head	Load Type 2	Load 2 Pile-head	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	13400.	M, in-lb	384000.	82000.	0.4945	-0.00736	13400.	834830.

Maximum pile-head deflection = 0.4944644489 inches
Maximum pile-head rotation = -0.0073625926 radians = -0.421845 deg.

The analysis ended normally.

GEI Consultants						
	Client	BETA / MassDOT			Page	5
	Project	North Poland Road			Pg. Rev.	
	By	D. Shields	Chk.		App.	
	Date	7/22/22	Date		Date	
Project No.	2004115	Document No.				
Subject	Prelim. LPILE with Abut. Scour (Rev. 2)					

Analyse sheet piles using WALLAP computer program,

Assume PZ27 sheet piles

$I = 184.2\ in^4/ft = 0.00888\ ft^4/ft$

$M_{allow} = SF_b = (30.2\ in^3/ft)(0.6 \times 50\ ksi)(\frac{1}{12}) = 75.5\ \frac{k\text{-}ft}{ft}$

Assume 15' toe embedment below scour level

Results:

Stability $FS = 2.4$

$S_{max} = 1.2$

$Max = 7.6\ \frac{k\text{-}ft}{ft} < 75.5$ (OK)

```
GEI CONSULTANTS, INC.                                          | Sheet No.
Program: WALLAP  Version 6.06  Revision A52.B71.R55            | Job No. 2004115
                            Licensed from GEOSOLVE             | Made by :   DRS
Data filename/Run ID: Cantilever_Sheet_Piles_for Abut Scour     |
North Poland Brook Bridge Replacement                          | Date:21-07-2022
Cantilever Sheet Piles for Abutment Scour                      | Checked :
-----------------------------------------------------------------------------
                                                          Units: lb,ft
```

INPUT DATA

SOIL PROFILE

Stratum no.	Elevation of top of stratum	Soil types Left side	Soil types Right side
1	791.50	1 Sand & Silt	1 Sand & Silt

SOIL PROPERTIES

No.	Soil type / Description	Bulk density lb/ft3	Young's Modulus Eh,lb/ft2 (dEh/dy)	At rest coeff. Ko (dKo/dy)	Consol state. NC/OC (Nu)	Active limit Ka (Kac)	Passive limit Kp (Kpc)	Cohesion lb/ft2 (dc/dy)
	(Datum elev.)							
1	Sand & Silt	120.0	0	0.500	NC	0.333	4.288	
			(20000)		(0.333)	(0.000)	(0.000)	

Additional soil parameters associated with Ka and Kp

No.	Soil type / Description	--- parameters for Ka --- Soil friction angle	Wall adhesion coeff.	Back-fill angle	--- parameters for Kp --- Soil friction angle	Wall adhesion coeff.	Back-fill angle
1	Sand & Silt	30.03	0.000	0.00	30.00	0.464	0.00

GROUND WATER CONDITIONS

Density of water = 62.40 lb/ft3

	Left side	Right side
Initial water table elevation	791.50	791.50

Automatic water pressure balancing at toe of wall : No

WALL PROPERTIES

```
                    Type of structure = Fully Embedded Wall
                Elevation of toe of wall = 767.00
           Maximum finite element length =   1.20 ft
                Youngs modulus of wall E = 4.1760E+09 lb/ft2
             Moment of inertia of wall I = 8.8800E-03 ft4/ft run
                                   E.I = 3.7083E+07 lb.ft2/ft run
                    Yield Moment of wall = Not defined
```

CONSTRUCTION STAGES

Construction stage no.	Stage description
1	Excavate to elevation 781.74 on RIGHT side

FACTORS OF SAFETY and ANALYSIS OPTIONS

Stability analysis:
- Method of analysis - CP2
- Factor on passive for calculating wall depth = 1.00

Parameters for undrained strata:
- Minimum equivalent fluid density = 5.00 lb/ft3
- Maximum depth of water filled tension crack = 0.00 ft

Bending moment and displacement calculation:
- Method - Subgrade reaction model using Influence Coefficients
- Open Tension Crack analysis? - No
- Non-linear Modulus Parameter (L) = 20.00 ft

Boundary conditions:
- Length of wall (normal to plane of analysis) = 1000.00 ft
- Width of excavation on Left side of wall = 100.00 ft
- Width of excavation on Right side of wall = 100.00 ft

Distance to rigid boundary on Left side = 100.00 ft
Distance to rigid boundary on Right side = 100.00 ft

OUTPUT OPTIONS

Stage no.	Stage description	Output options: Displacement, Bending mom., Shear force	Active, Passive pressures	Graph. output
1	Excav. to elev. 781.74 on RIGHT side	Yes	Yes	Yes
*	Summary output	Yes	-	Yes

```
GEI CONSULTANTS, INC.                                          | Sheet No.
Program: WALLAP  Version 6.06  Revision A52.B71.R55            | Job No. 2004115
                            Licensed from GEOSOLVE             | Made by :   DRS
Data filename/Run ID: Cantilever_Sheet_Piles_for Abut Scour     |
North Poland Brook Bridge Replacement                          | Date:21-07-2022
Cantilever Sheet Piles for Abutment Scour                      | Checked :
-------------------------------------------------------------------------------
                                                          Units: lb,ft
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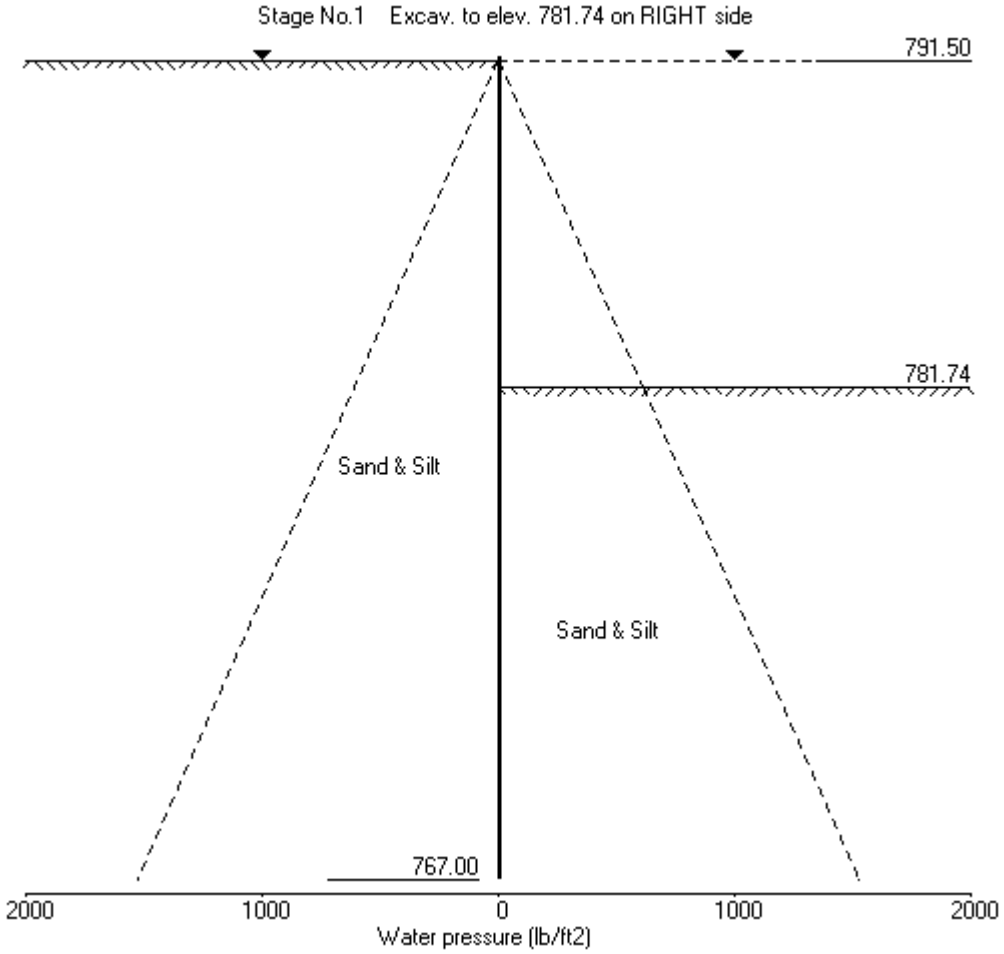

GEI CONSULTANTS, INC. | Sheet No.
Program: WALLAP Version 6.06 Revision A52.B71.R55 | Job No. 2004115
Licensed from GEOSOLVE | Made by : DRS
Data filename/Run ID: Cantilever_Sheet_Piles_for Abut Scour |
North Poland Brook Bridge Replacement | Date:21-07-2022
Cantilever Sheet Piles for Abutment Scour | Checked :

Units: lb,ft

Stage No. 1 Excavate to elevation 781.74 on RIGHT side

STABILITY ANALYSIS of Fully Embedded Wall according to CP2 method
Factor of safety on gross pressure (excluding water pressure)

Stage No.	Ground level Act.	Ground level Pass.	Prop Elev.	FoS for toe elev. = 767.00 Factor of Safety	FoS for toe elev. = 767.00 Moment equilib. at elev.	Toe elev. for FoS = 1.000 Toe elev.	Wall Penetr-ation	Direction of failure
1	791.50	781.74	Cant.	2.409	768.70	773.60	8.14	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall
Analysis options
Length of wall perpendicular to section = 1000.00ft
Subgrade reaction model - Boussinesq Influence coefficients
Soil deformations are elastic until the active or passive limit is reached
Open Tension Crack analysis - No

Rigid boundaries: Left side 100.00 from wall
Right side 100.00 from wall

Node no.	Y coord	Nett pressure lb/ft2	Wall disp. ft	Wall rotation rad.	Shear force lb/ft	Bending moment lb.ft/ft	Prop forces lb/ft
1	791.50	0.00	0.098	4.94E-03	0.0	0.0	
2	790.55	18.22	0.093	4.94E-03	8.7	2.7	
3	789.60	36.44	0.088	4.94E-03	34.6	21.9	
4	788.40	59.46	0.082	4.94E-03	92.2	95.2	
5	787.20	82.48	0.077	4.93E-03	177.3	254.2	
6	786.00	105.49	0.071	4.92E-03	290.1	531.9	
7	784.80	128.51	0.065	4.90E-03	430.5	961.5	
8	783.60	151.53	0.059	4.85E-03	598.5	1576.1	
9	782.67	169.37	0.054	4.81E-03	747.8	2200.9	
10	781.74	187.20	0.050	4.74E-03	913.6	2972.1	
11	780.87	55.49	0.046	4.66E-03	1019.1	3836.6	
12	780.00	-54.24	0.042	4.56E-03	1019.7	4743.2	
13	778.80	-171.71	0.036	4.39E-03	884.1	5925.0	
14	777.60	-252.30	0.031	4.18E-03	629.7	6859.5	
15	776.40	-299.13	0.026	3.95E-03	298.8	7430.7	
16	775.20	-315.56	0.022	3.71E-03	-70.0	7571.2	
17	774.00	-304.90	0.017	3.47E-03	-442.3	7257.2	
18	772.80	-270.05	0.013	3.25E-03	-787.2	6504.2	
19	771.60	-213.19	0.010	3.05E-03	-1077.2	5362.3	
20	770.40	-135.58	0.006	2.90E-03	-1286.4	3913.4	
21	769.20	40.12	0.003	2.80E-03	-1343.7	2320.8	
22	768.10	461.31	-0.000	2.76E-03	-1067.9	866.9	
23	767.00	1480.38	-0.003	2.74E-03	0.0	-0.0	

		LEFT side						
			Effective stresses				Total	Coeff. of
Node no.	Y coord	Water press. lb/ft2	Vertic-al lb/ft2	Active limit lb/ft2	Passive limit lb/ft2	Earth pressure lb/ft2	earth pressure lb/ft2	subgrade reaction lb/ft3
1	791.50	0.00	0.00	0.00	0.00	0.00	0.00	364
2	790.55	59.28	54.72	18.22	234.62	18.22	77.50a	2184
3	789.60	118.56	109.44	36.44	469.24	36.44	155.00a	4369
4	788.40	193.44	178.56	59.46	765.60	59.46	252.90a	7128

Run ID. Cantilever_Sheet_Piles_for Abut Scour | Sheet No.
North Poland Brook Bridge Replacement | Date:21-07-2022
Cantilever Sheet Piles for Abutment Scour | Checked :

(continued)

Stage No.1 Excavate to elevation 781.74 on RIGHT side

LEFT side

Node no.	Y coord	Water press.	Effective stresses: Vertic-al	Active limit	Passive limit	Earth pressure	Total earth pressure	Coeff. of subgrade reaction
		lb/ft2	lb/ft2	lb/ft2	lb/ft2	lb/ft2	lb/ft2	lb/ft3
5	787.20	268.32	247.68	82.48	1061.97	82.48	350.80a	9887
6	786.00	343.20	316.80	105.49	1358.33	105.49	448.69a	12647
7	784.80	418.08	385.92	128.51	1654.69	128.51	546.59a	15406
8	783.60	492.96	455.04	151.53	1951.05	151.53	644.49a	18165
9	782.67	550.99	508.61	169.37	2180.73	169.37	720.36a	20304
10	781.74	609.02	562.18	187.20	2410.41	187.20	796.23a	22442
11	780.87	663.31	612.29	203.89	2625.28	203.89	867.20a	24442
12	780.00	717.60	662.40	220.58	2840.14	220.58	938.18a	26443
13	778.80	792.48	731.52	243.60	3136.50	243.60	1036.08a	29202
14	777.60	867.36	800.64	266.61	3432.86	266.61	1133.97a	31961
15	776.40	942.24	869.76	289.63	3729.23	289.63	1231.87a	34721
16	775.20	1017.12	938.88	312.65	4025.59	312.65	1329.77a	37480
17	774.00	1092.00	1008.00	335.66	4321.95	335.66	1427.66a	40239
18	772.80	1166.88	1077.12	358.68	4618.31	358.68	1525.56a	42998
19	771.60	1241.76	1146.24	381.70	4914.68	381.70	1623.46a	45758
20	770.40	1316.64	1215.36	404.71	5211.04	404.71	1721.35a	48517
21	769.20	1391.52	1284.48	427.73	5507.40	505.22	1896.74	51276
22	768.10	1460.16	1347.84	448.83	5779.07	788.23	2248.39	295988
23	767.00	1528.80	1411.20	469.93	6050.73	1763.36	3292.16	309902

RIGHT side

Node no.	Y coord	Water press.	Effective stresses: Vertic-al	Active limit	Passive limit	Earth pressure	Total earth pressure	Coeff. of subgrade reaction
		lb/ft2	lb/ft2	lb/ft2	lb/ft2	lb/ft2	lb/ft2	lb/ft3
1	791.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	790.55	59.28	0.00	0.00	0.00	0.00	59.28	0.0
3	789.60	118.56	0.00	0.00	0.00	0.00	118.56	0.0
4	788.40	193.44	0.00	0.00	0.00	0.00	193.44	0.0
5	787.20	268.32	0.00	0.00	0.00	0.00	268.32	0.0
6	786.00	343.20	0.00	0.00	0.00	0.00	343.20	0.0
7	784.80	418.08	0.00	0.00	0.00	0.00	418.08	0.0
8	783.60	492.96	-0.00	0.00	0.00	0.00	492.96	0.0
9	782.67	550.99	0.00	0.00	0.00	0.00	550.99	0.0
10	781.74	609.02	0.00	0.00	0.00	0.00	609.02	0.0
		609.02	0.00	0.00	0.00	0.00	609.02	447
11	780.87	663.31	50.11	16.69	214.86	148.40	811.71	2682
12	780.00	717.60	100.23	33.38	429.73	274.82	992.42	5363
13	778.80	792.48	169.35	56.39	726.11	415.31	1207.79	9062
14	777.60	867.36	238.48	79.41	1022.52	518.91	1386.27	12761
15	776.40	942.24	307.62	102.44	1318.97	588.76	1531.00	16460
16	775.20	1017.12	376.77	125.46	1615.46	628.21	1645.33	20159
17	774.00	1092.00	445.93	148.50	1912.01	640.57	1732.57	23858
18	772.80	1166.88	515.11	171.53	2208.62	628.73	1795.61	27557
19	771.60	1241.76	584.31	194.58	2505.32	594.89	1836.65	31255
20	770.40	1316.64	653.53	217.62	2802.09	540.30	1856.94	34954
21	769.20	1391.52	722.77	240.68	3098.97	465.10	1856.62	38653
22	768.10	1460.16	786.26	261.82	3371.19	326.92	1787.08	172533
23	767.00	1528.80	849.77	282.97	3643.51	282.97	1811.77a	186447

Note: 1811.77a Soil pressure at active limit
123.45p Soil pressure at passive limit

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Data filename/Run ID: Cantilever_Sheet_Piles_for Abut Scour     |
North Poland Brook Bridge Replacement                          | Date:21-07-2022
Cantilever Sheet Piles for Abutment Scour                      | Checked :
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                                                          Units: lb,ft
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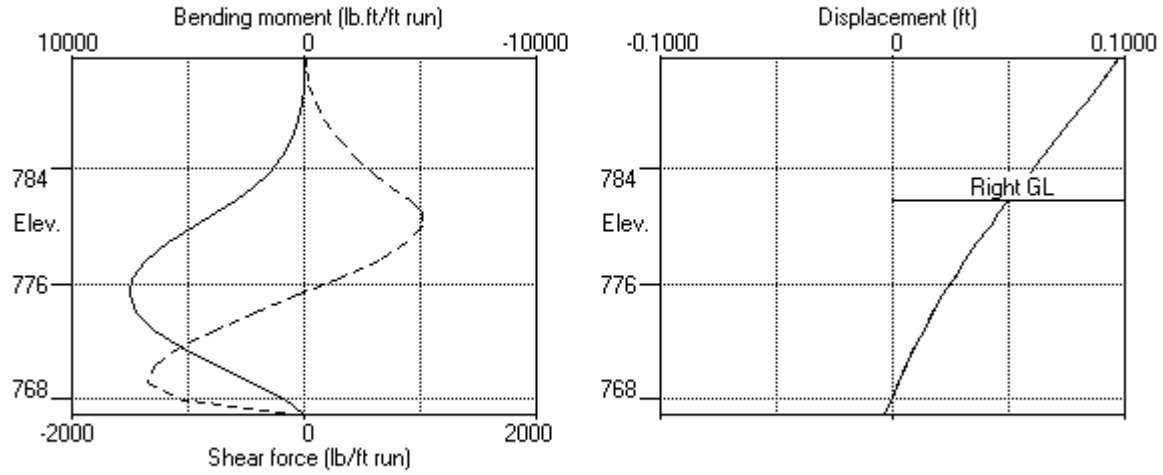
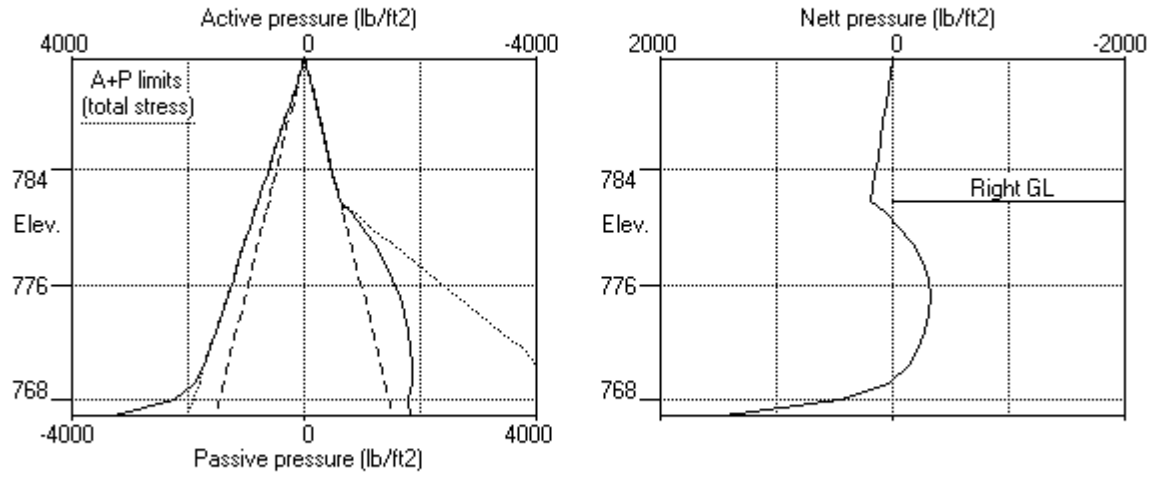
Stage No.1 Excav. to elev. 781.74 on RIGHT side



Stage No.1 Excav. to elev. 781.74 on RIGHT side



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Program: WALLAP Version 6.06 Revision A52.B71.R55 | Job No. 2004115
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Data filename/Run ID: Cantilever_Sheet_Piles_for Abut Scour |
North Poland Brook Bridge Replacement | Date:21-07-2022
Cantilever Sheet Piles for Abutment Scour | Checked :

Units: lb,ft

Summary of results

STABILITY ANALYSIS of Fully Embedded Wall according to CP2 method
Factor of safety on gross pressure (excluding water pressure)

Stage No.	Ground level Act.	Ground level Pass.	Prop Elev.	FoS for toe elev. = 767.00 Factor of Safety	FoS for toe elev. = 767.00 Moment equilib. at elev.	Toe elev. for FoS = 1.000 Toe elev.	Wall Penetr -ation	Direction of failure
1	791.50	781.74	Cant.	2.409	768.70	773.60	8.14	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall
Analysis options
Length of wall perpendicular to section = 1000.00ft
Subgrade reaction model - Boussinesq Influence coefficients
Soil deformations are elastic until the active or passive limit is reached
Open Tension Crack analysis - No

Rigid boundaries: Left side 100.00 from wall
Right side 100.00 from wall

Bending moment, shear force and displacement envelopes

Node no.	Y coord	Displacement maximum ft	Displacement minimum ft	Bending moment maximum lb.ft/ft	Bending moment minimum lb.ft/ft	Shear force maximum lb/ft	Shear force minimum lb/ft
1	791.50	0.098	0.000	0.0	0.0	0.0	0.0
2	790.55	0.093	0.000	2.7	0.0	8.7	0.0
3	789.60	0.088	0.000	21.9	0.0	34.6	0.0
4	788.40	0.082	0.000	95.2	0.0	92.2	0.0
5	787.20	0.077	0.000	254.2	0.0	177.3	0.0
6	786.00	0.071	0.000	531.9	0.0	290.1	0.0
7	784.80	0.065	0.000	961.5	0.0	430.5	0.0
8	783.60	0.059	0.000	1576.1	0.0	598.5	0.0
9	782.67	0.054	0.000	2200.9	0.0	747.8	0.0
10	781.74	0.050	0.000	2972.1	0.0	913.6	0.0
11	780.87	0.046	0.000	3836.6	0.0	1019.1	0.0
12	780.00	0.042	0.000	4743.2	0.0	1019.7	0.0
13	778.80	0.036	0.000	5925.0	0.0	884.1	0.0
14	777.60	0.031	0.000	6859.5	0.0	629.7	0.0
15	776.40	0.026	0.000	7430.7	0.0	298.8	0.0
16	775.20	0.022	0.000	7571.2	0.0	0.0	-70.0
17	774.00	0.017	0.000	7257.2	0.0	0.0	-442.3
18	772.80	0.013	0.000	6504.2	0.0	0.0	-787.2
19	771.60	0.010	0.000	5362.3	0.0	0.0	-1077.2
20	770.40	0.006	0.000	3913.4	0.0	0.0	-1286.4
21	769.20	0.003	0.000	2320.8	0.0	0.0	-1343.7
22	768.10	0.000	-0.000	866.9	0.0	0.0	-1067.9
23	767.00	0.000	-0.003	0.0	-0.0	0.0	0.0

Maximum and minimum bending moment and shear force at each stage

Stage no.	Bending moment maximum lb.ft/ft	Bending moment elev.	Bending moment minimum lb.ft/ft	Bending moment elev.	Shear force maximum lb/ft	Shear force elev.	Shear force minimum lb/ft	Shear force elev.
1	7571.2	775.20	-0.0	767.00	1019.7	780.00	-1343.7	769.20

Maximum and minimum displacement at each stage

Stage no.	Displacement maximum ft	elev.	Displacement minimum ft	elev.	Stage description
1	0.098	791.50	-0.003	767.00	Excav. to elev. 781.74 on RIGHT side

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GEI CONSULTANTS, INC.                                          | Sheet No.
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North Poland Brook Bridge Replacement                          | Date:21-07-2022
Cantilever Sheet Piles for Abutment Scour                      | Checked :
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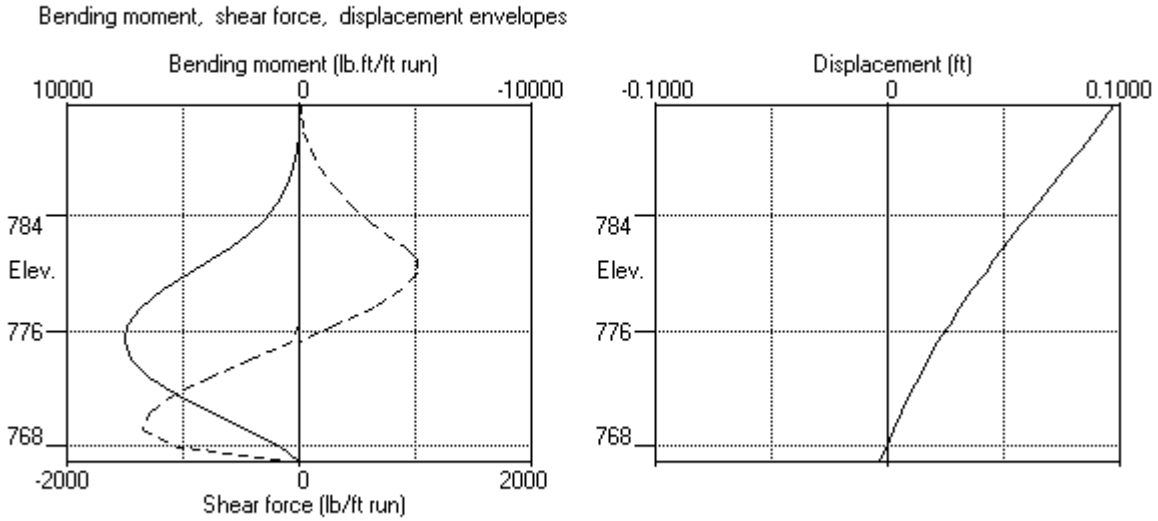

DOCUMENT A00875

POLICY DIRECTIVE P-22-001
AND
POLICY DIRECTIVE P-22-002

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massDOT Massachusetts Department of Transportation Highway Division

Number: P-22-001
Date: 9/23/22

POLICY DIRECTIVE

Jonathan Gulliver (signature on original)
HIGHWAY ADMINISTRATOR

Off-Site Stockpiling of Soil from MassDOT Construction Projects

Purpose

The purpose of this Policy Directive is to formally establish a policy and procedures for managing and stockpiling soil generated and transported from MassDOT construction projects. This Policy Directive does not supersede any Federal, State, or Local regulations.

Date of Effect

This Policy Directive is effective immediately for all projects, including active construction projects.

For active construction projects and for other projects advertised prior to October 15, 2022, changes to the contract documents needed to implement the requirements of this Policy Directive will be considered on a case-by-case basis and shall be approved by the District Highway Director, as necessary.

For projects advertised on or after October 15, 2022, MassDOT will include the requirements and implementation procedures of this Policy Directive in the construction contract documents.

Policy Requirements

This policy is intended to prevent the off-site relocation of excavated soil generated from MassDOT projects to areas near residential receptors and to control potential fugitive dusts and/or contaminants. To that end, excavated soil may not be moved from the project site without knowledge of the content of the material. Knowledge may include visual field observations for presence of staining, odor, and/or debris, screening with a photoionization detector (PID), laboratory analysis, and/or site history. Pavement millings and other non-soil materials are not subject to the requirements of this Policy Directive.

Moving soil from a MassDOT project site to a temporary off-site storage location must be approved in writing by the District Highway Director.

The Contractor must select a storage location that is at least 500 feet away from residential receptors, as defined herein to include, but not be limited to, residential dwellings, residentially

zoned property, schools, daycare facilities, playgrounds, parks, recreational areas, hospitals, elderly housing and convalescent facilities.

Temporary off-site storage of excavated soil from a MassDOT project is only permissible at a location approved and permitted by MassDOT. The temporary storage location should be located within the same municipality where the soil was excavated, where possible. Stockpiled soil must be securely covered, and appropriate measures must be taken to minimize fugitive dust and erosion.

Signs indicating the source of the soil, the date the soil was generated, and contact information must be erected and maintained until the stockpiled soils are transported to a disposal facility or reused on the project site.

Implementation Procedures

To ensure that off-site storage of excavated soils is managed properly on MassDOT projects, this policy requires the following:

1. **Off-Site Stockpile Storage Locations**
    a. The Contractor shall provide proposed off-site storage locations to the Engineer for approval at least 30 days prior to transporting soil off site. Off-site storage locations should be in the same municipality as the work site.
    b. The Contractor shall keep excavated soil on site until adequately characterized to the satisfaction of the Engineer.
    c. The Contractor shall provide notification of the approved off-site storage location to the local Board of Health and the Town Manager's/Mayor's Office at least 7-days prior to transporting soil off site.
    d. The Contractor shall provide the Engineer with at least 3-days' notice prior to transporting soil off site.
    e. For off-site storage locations on MassDOT property, the Contractor is required to obtain an Access Permit through the District Permits Office prior to storage of soil or other materials. MassDOT will issue these permits at no cost to the Contractor. Information to be submitted by the Contractor as part of the permit application shall include:
        i. A description of material to be stored off-site, including available analytical data;
        ii. A figure of the location with distances to residences and residential receptors; and
        iii. Anticipated duration of temporary storage.
    f. Stockpile locations should not be within 500 feet of residential receptors (e.g., residential dwellings, residentially zoned property, schools, daycare facilities, playgrounds, parks, recreational areas, hospitals, elderly housing and convalescent facilities).
        i. If the stockpile location must be within 500 feet of residential receptors, then soil must be less than RCS-1 (per 310 CMR 40.1600) and free of potentially hazardous or regulated items.

g. For off-site storage locations on non-MassDOT property, the Contractor must notify the property owner(s) at least 7 days prior to transporting material.
h. Exceptions to these rules will be reviewed by MassDOT and may be approved by the District Highway Director on a case-by-case basis.

2. Off-Site Stockpile Management

a. The Contractor shall keep soil stockpiles on impermeable surfaces (e.g., asphalt or concrete) or on 10-mil polyethylene sheeting.
b. The Contractor shall cover soil stockpiles with 10-mil polyethylene sheeting and surround with a berm made of hay bales, straw wattles, or similar.
    i. Piles that are actively being worked on must be covered and re-secured at the end of the work shift.
c. The Contractor shall label stockpiles with signs, including:
    i. Location of origin (including any Release Tracking Numbers)
    ii. Stockpile ID number (including MassDOT District office-assigned tracking ID, if different)
    iii. Date of initial accumulation
    iv. Applicable telephone numbers for the Contractor and MassDOT.
d. The Contractor shall mitigate fugitive dust at storage locations under the direction of an appropriately trained/certified environmental professional.
e. The Contractor shall remedy noncompliance with this policy within 48 hours.
f. The Contractor shall remedy noncompliance with this policy on the SAME DAY for potentially hazardous material, as determined by the Engineer.
g. The Contractor shall handle excavated soil according to federal, state, and local regulations.
h. The Contractor shall use appropriate shipping documents for all movements of excavated soil on public roadways (e.g., Bill of Lading, Material Shipping Record, Manifest, Asbestos Waste Shipment Record, etc.).

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massDOT Massachusetts Department of Transportation Highway Division

Number: P-22-002
Date: 9/23/22

POLICY DIRECTIVE

Jonathan Gulliver (signature on original)
HIGHWAY ADMINISTRATOR

Use of MassDOT Property for Staging and other Construction-Related Operations

Purpose

This Policy Directive is intended to address the use of MassDOT property by MassDOT Contractors for construction staging and other construction-related operations that are not specifically defined in the construction contract. Such use of MassDOT property will only be allowed if permitted by the District Office in accordance with 700 CMR 13.00, Approval of Access to MassDOT Highways and Other Property. This includes the use of MassDOT property for staging, laydown, and storage of equipment and materials, including soil excavated from a project site.

This Policy Directive requires the Contractor/applicant to obtain a Non-Vehicular Access Permit from MassDOT to use MassDOT property for these purposes.

This Policy Directive is effective immediately and applies to all MassDOT construction projects.

General Permit Considerations and Conditions

In addition to other normal MassDOT Access Permit procedures, MassDOT shall consider the following during the application, review, implementation and monitoring processes of Access Permits required by this Policy Directive:

- Storage and placement of the Contractor's equipment and materials should not be allowed within the clear zone of the roadway.
- Stockpiled soils should not be located within 500 feet of residential receptors, as defined herein to include, but not be limited to, residential dwellings, residentially zoned property, schools, daycare facilities, playgrounds, parks, recreational areas, hospitals, elderly housing and convalescent facilities.
- The Contractor/applicant shall identify the access/egress locations of the proposed storage areas. MassDOT will only approve locations determined to be safe for roadway users, construction workers and the general public.
- The Contractor may be required to submit a Traffic Management Plan and/or Lighting Plan for MassDOT review and approval as part of the permit application, depending on the proposed use of the area.

- The Contractor shall submit the permit application through MassDOT's online State Highway Access Permit System (SHAPS).
- MassDOT will waive the permit application fee for any application received from a MassDOT Contractor for any permit required by this Policy Directive and will waive any subsequent amendment and extension fees that may otherwise be required.
- MassDOT will review the permit application in accordance with applicable standard procedures and will apply standard permit terms and conditions, as necessary.
- The Resident Engineer will verify that the permit is approved before allowing the Contractor to use the affected area for the requested purpose.
- Areas permitted are for use by the approved applicant only and are not to be shared with or used by other vendors. Subcontractors specifically engaged with the applicant working on the specific MassDOT project will be allowed to use the area in accordance with the terms of the permit.
- Permits are issued on an annual basis and will require the Contractor to file for an extension each year to continue use.

Exemptions from Permit Requirements

Equipment and materials being used for active construction operations and located within the work zone of the construction contract are exempt from this permit requirement, provided they do not interfere with the safety or operation of the roadway or the work zone. Examples of these types of exempt uses are:

- Equipment and materials parked or stored within a protected (barriered) work zone.
- Materials placed in the work zone prior to same-day installation or use.
- Soils excavated temporarily and scheduled to be replaced, such as for trenching operations or for installation of drainage structures.

DOCUMENT B00420

PROPOSAL

CONWAY

For: **Bridge Replacement, C-20-004, North Poland Road over Poland Brook**

COMMONWEALTH OF MASSACHUSETTS

LOCATION

The work referred to herein is in the Town of CONWAY in Franklin County, in the Commonwealth of Massachusetts, and is shown by the locus map (Document 00331) in the Proposal Pamphlet, the work locations extend as follows:

North Poland Road

Beginning – Station 10+10.00 +/-
Ending –Station 16+00.00 +/-

The contract prices shall include the furnishing of all materials (except as otherwise herein specified), the performing of all the labor requisite or proper, the providing of all necessary machinery, tools, apparatus and other means of construction, the doing of all the abovementioned work in the manner set forth, described and shown in the specifications and on the drawings for the work, and in the form of contract, and the completion thereof within **388 CALENDAR DAYS** upon receipt of a Notice to Proceed, except that if the completion date falls between December 1 and March 15 then the same number of days beyond December 1st will be extended after March 15th.

The Work of this project is described by the following Items and quantities.

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Project # 609082	Contract # 127511			
Location : CONWAY				
Description : Bridge Replacement, C-20-004, North Poland Road over Poland Brook				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
100.	1	SCHEDULE OF OPERATIONS - FIXED PRICE $33500 AT Thirty Three Thousand Five Hundred Dollars LUMP SUM	$33,500.00	$33,500.00
101.	0.1	CLEARING AND GRUBBING AT _____ PER ACRE		
102.	0.2	SELECTIVE CLEARING AND THINNING AT _____ PER ACRE		
102.2	1	TREE TRIMMING AT _____ LUMP SUM		
102.3	16	HERBICIDE TREATMENT OF INVASIVE PLANTS AT _____ PER HOUR		
102.33	16	INVASIVE PLANT MANAGEMENT STRATEGY AT _____ PER HOUR		
103.	1	TREE REMOVED - DIAMETER UNDER 24 INCHES AT _____ EACH		
104.	1	TREE REMOVED - DIAMETER 24 INCHES AND OVER AT _____ EACH		
115.11	1	DEMOLITION OF BRIDGE NO. C-20-004 AT _____ LUMP SUM		

Project # 609082	Contract # 127511			
Location : CONWAY				
Description : Bridge Replacement, C-20-004, North Poland Road over Poland Brook				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
120.1	870	UNCLASSIFIED EXCAVATION AT _____ PER CUBIC YARD		
123.	20	MUCK EXCAVATION AT _____ PER CUBIC YARD		
140.	410	BRIDGE EXCAVATION AT _____ PER CUBIC YARD		
142.	35	CLASS B TRENCH EXCAVATION AT _____ PER CUBIC YARD		
144.	76	CLASS B ROCK EXCAVATION AT _____ PER CUBIC YARD		
151.	500	GRAVEL BORROW AT _____ PER CUBIC YARD		
151.2	70	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES AT _____ PER CUBIC YARD		
151.9	1	STREAMBED RESTORATION AT _____ LUMP SUM		
156.	234	CRUSHED STONE AT _____ PER TON		

Project # 609082	Contract # 127511			
Location : CONWAY				
Description : Bridge Replacement, C-20-004, North Poland Road over Poland Brook				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
156.1	60	CRUSHED STONE FOR BRIDGE FOUNDATIONS AT _____ PER TON		
170.	1,800	FINE GRADING AND COMPACTING - SUBGRADE AREA AT _____ PER SQUARE YARD		
180.01	1	ENVIRONMENTAL HEALTH AND SAFETY PROGRAM AT _____ LUMP SUM		
180.02	10	PERSONAL PROTECTION LEVEL C UPGRADE AT _____ PER HOUR		
180.03	60	LICENSED SITE PROFESSIONAL SERVICES AT _____ PER HOUR		
181.11	640	DISPOSAL OF UNREGULATED SOIL AT _____ PER TON		
181.12	90	DISPOSAL OF REGULATED SOIL - IN-STATE FACILITY AT _____ PER TON		
181.13	90	DISPOSAL OF REGULATED SOIL - OUT-OF-STATE FACILITY AT _____ PER TON		
181.14	50	DISPOSAL OF HAZARDOUS WASTE AT _____ PER TON		

Project # 609082	Contract # 127511			
Location : CONWAY				
Description : Bridge Replacement, C-20-004, North Poland Road over Poland Brook				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
184.1	1	DISPOSAL OF TREATED WOOD PRODUCTS AT _____ PER TON		
201.	3	CATCH BASIN AT _____ EACH		
205.1	3	LEACHING BASIN - 6 FOOT DIAMETER AT _____ EACH		
222.	3	FRAME AND GRATE - MASSDOT BAR TYPE AT _____ EACH		
222.1	2	FRAME AND GRATE - MASSDOT CASCADE TYPE AT _____ EACH		
227.4	1	MASONRY PLUG AT _____ PER SQUARE FOOT		
234.12	20	12 INCH DRAINAGE PIPE - OPTION AT _____ PER FOOT		
238.10	40	10 INCH DUCTILE IRON PIPE AT _____ PER FOOT		
242.12	1	12 INCH REINFORCED CONCRETE PIPE FLARED END AT _____ EACH		

Project # 609082	Contract # 127511			
Location : CONWAY				
Description : Bridge Replacement, C-20-004, North Poland Road over Poland Brook				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
402.1	250	DENSE GRADED CRUSHED STONE FOR SUB-BASE AT _____ PER TON		
415.2	200	PAVEMENT FINE MILLING AT _____ PER SQUARE YARD		
443.	10	WATER FOR ROADWAY DUST CONTROL AT _____ PER 1000 GALLONS		
450.22	120	SUPERPAVE SURFACE COURSE - 9.5 (SSC - 9.5) AT _____ PER TON		
450.31	175	SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC -12.5) AT _____ PER TON		
450.42	280	SUPERPAVE BASE COURSE - 37.5 (SBC - 37.5) AT _____ PER TON		
450.601	22	SUPERPAVE BRIDGE SURFACE COURSE - 9.5 POLYMER (SSC-B - 9.5 - P) AT _____ PER TON		
450.701	22	SUPERPAVE BRIDGE PROTECTIVE COURSE - 9.5 POLYMER (SPC-B - 9.5 - P) AT _____ PER TON		
451.	50	HMA FOR PATCHING AT _____ PER TON		

Project # 609082	Contract # 127511			
Location : CONWAY				
Description : Bridge Replacement, C-20-004, North Poland Road over Poland Brook				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
452.	200	ASPHALT EMULSION FOR TACK COAT AT _____ PER GALLON		
453.	1,900	HMA JOINT ADHESIVE AT _____ PER FOOT		
506.	150	GRANITE CURB TYPE VB - STRAIGHT AT _____ PER FOOT		
514.	1	GRANITE CURB INLET - STRAIGHT AT _____ EACH		
620.132	90	GUARDRAIL, DEEP POST (SINGLE FACED AND POWDER COATED) AT _____ PER FOOT		
620.14	160	GUARDRAIL, TL-3 (SINGLE FACED POWDER COATED) AT _____ PER FOOT		
627.12	4	TRAILING ANCHORAGE (POWDER COATED) AT _____ EACH		
628.241	4	TRANSITION TO BRIDGE RAIL (POWDER COATED) AT _____ EACH		
657.	200	TEMPORARY FENCE AT _____ PER FOOT		

Project # 609082	Contract # 127511			
Location : CONWAY				
Description : Bridge Replacement, C-20-004, North Poland Road over Poland Brook				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
697.1	5	SILT SACK AT _____ EACH		
698.1	351	GEOTEXTILE FABRIC FOR STABILIZATION AT _____ PER SQUARE YARD		
698.2	310	GEOTEXTILE FABRIC FOR SUBSURFACE DRAINAGE AT _____ PER SQUARE YARD		
702.	25	HOT MIX ASPHALT SIDEWALK OR DRIVEWAY AT _____ PER TON		
715.	1	RURAL MAIL BOX REMOVED AND RESET AT _____ EACH		
740.	13	ENGINEER'S FIELD OFFICE AND EQUIPMENT (TYPE A) AT _____ PER MONTH		
748.	1	MOBILIZATION AT _____ LUMP SUM		
751.	100	LOAM FOR ROADSIDES AT _____ PER CUBIC YARD		
765.	650	SEEDING AT _____ PER SQUARE YARD		

Project # 609082	Contract # 127511			
Location : CONWAY				
Description : Bridge Replacement, C-20-004, North Poland Road over Poland Brook				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
767.121	1,200	SEDIMENT CONTROL BARRIER AT _____ PER FOOT		
767.31	650	STRAW MULCH AT _____ PER SQUARE YARD		
769.	450	PAVEMENT MILLING MULCH UNDER GUARD RAIL AT _____ PER FOOT		
832.	2	WARNING-REGULATORY AND ROUTE MARKER - ALUMINUM PANEL (TYPE A) AT _____ PER SQUARE FOOT		
847.1	1	SIGN SUP (N/GUIDE)+RTE MKR W/1 BRKWAY POST ASSEMBLY - STEEL AT _____ EACH		
852.	400	SAFETY SIGNING FOR TRAFFIC MANAGEMENT AT _____ PER SQUARE FOOT		
853.1	10	PORTABLE BREAKAWAY BARRICADE TYPE III AT _____ EACH		
853.2	110	TEMPORARY BARRIER (TL-2) AT _____ PER FOOT		
853.21	60	TEMPORARY BARRIER REMOVED AND RESET AT _____ PER FOOT		

Project # 609082	Contract # 127511			
Location : CONWAY				
Description : Bridge Replacement, C-20-004, North Poland Road over Poland Brook				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
856.12	360	PORTABLE CHANGEABLE MESSAGE SIGN AT _____ PER DAY		
859.	500	REFLECTORIZED DRUM AT _____ PER DAY		
860.106	830	6 INCH REFLECTORIZED WHITE LINE (PAINTED) AT _____ PER FOOT		
861.106	1,000	6 INCH REFLECTORIZED YELLOW LINE (PAINTED) AT _____ PER FOOT		
946.141	100	PRECAST-PRESTRESSED CONCRETE PILE - 14 INCH AT _____ PER FOOT		
948.41	2	DYNAMIC LOAD TEST BY CONTRACTOR AT _____ EACH		
952.	96,600	STEEL SHEETING AT _____ PER POUND		
983.	499	DUMPED RIPRAP AT _____ PER TON		
986.	15	MODIFIED ROCKFILL AT _____ PER TON		

Project # 609082	Contract # 127511			
Location : CONWAY				
Description : Bridge Replacement, C-20-004, North Poland Road over Poland Brook				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
991.1	1	CONTROL OF WATER - STRUCTURE NO. C-20-004 AT _____ LUMP SUM		
993.11	1	TEMPORARY BRIDGE NO. C-20-004 REMOVED AND STACKED AT _____ LUMP SUM		
995.01	1	BRIDGE STRUCTURE, BRIDGE NO. C-20-004 AT _____ LUMP SUM		
Total Qty:	113,214.3			

DOCUMENT B00853

SCHEDULE OF PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES (DBES)

PRIME BIDDER: _____

DATE OF BID OPENING: _____ PROJECT NO.: 609082

FEDERAL AID PROJECT NO. HIP(BR)-003S(779)X

PROJECT LOCATION: CONWAY

Name, Address, and Phone Number(s) of DBE	Name of Activity	(a)† DBE Contractor Activity Amount *Construction Work*	(b) DBE Other Business Amount *Services, Supplies, Material*	(c) Total amount eligible for credit under rules in Section 6 of Document 00719 - DBE Special Provisions
Total Bid Amount	TOTALS:	$	$	$
$	DBE Percentage of Total Bid:	%	%	%

†*Column (a) must be at least one-half of the DBE participation goal. Attach additional sheets as necessary.*

Is MassDOT Document B00855 (Joint Check Approval) being submitted for any of the above? ☐ Yes ☐ No ☐ Not Known at This Time

Will any of the contractors listed above be using a third party (i.e. manufacturer) to deliver materials or perform any portion of work by a third party? ☐ Yes ☐ No

CERTIFICATION: I HEREBY DECLARE, TO THE BEST OF MY KNOWLEDGE, THAT **I HAVE READ THE SPECIAL PROVISIONS FOR PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES - DOCUMENT 00719.** BOTH THIS SCHEDULE AND THE RELEVANT AND ACCOMPANYING LETTER(S) OF INTENT ARE IN FULL COMPLIANCE WITH THE PROVISIONS OF, AND IN ACCORDANCE WITH, TITLE 49 CODE OF FEDERAL REGULATIONS, PART 26 (49 CFR Part 26).

SIGNATURE:_____ DATE_____

NAME AND TITLE (*PRINT*):_____

EMAIL ADDRESS: _____TEL NO.:_____

*** END OF DOCUMENT ***

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DOCUMENT B00854

DISADVANTAGED BUSINESS ENTERPRISES (DBE) PARTICIPATION
LETTER OF INTENT
(To be completed by the DBE – Page 1 of 2)

TO: _____ (Prime Bidder)

FROM: _____ (DBE Firm)

RE: PROJECT NO.: 609082 FEDERAL AID PROJECT NO.: HIP(BR)-003S(779)X

PROJECT LOCATION: CONWAY

DATE OF BID OPENING: _____

I, _____, authorized signatory of the above-referenced DBE firm hereby declare:
Print Name

1. My company is currently certified as a Disadvantaged Business Enterprise (DBE) by the Massachusetts Supplier Diversity Office ("SDO"), formerly known as the State Office of Minority and Women Business Assistance (SOMWBA), as a: (check all applicable, see Section 1 of the Special Provisions For Participation By Disadvantaged Business Enterprises, MassDOT Document 00719 additional guidance is available at Title 49, Code of Federal Regulations, Part 26.55 (49 CFR Part 26.55)):

   ( ) CONTRACTOR ( ) REGULAR DEALER ( ) BROKER
   ( ) MANUFACTURER ( ) TRUCKING OPERATIONS ( ) PROFESSIONAL SERVICES

2. My firm has the ability to manage, supervise and perform the activity described on page 2 of this Letter of Intent. If you are awarded the contract, my company intends to enter into a contract with your firm to perform the items of work or other activity described on the following sheet for the prices indicated.

3. There have been no changes affecting the ownership, control or independence of my company since my last certification review on _____ ___, 20___. If any such change is planned or occurs prior to my company's completion of this proposed work, I will give prior written notification to your firm and to the Massachusetts Department of Transportation ("MassDOT") Office of Civil Rights and SDO.

4. I have read the MassDOT proposal for the Project which may be entitled "Project Contract Documents and Special Provisions" or the draft "Contract" which includes MassDOT Document 00719, and acknowledge that my company will comply with that document and the requirements of 49 CFR Part 26.

5. For the purpose of obtaining subcontractor approval from MassDOT, my firm will provide to you:

   A. ***The following construction work:***
      (i) a resume, stating the qualifications and experience, of the superintendent or foreperson who will supervise on site-work;
      (ii) a list of equipment owned or leased by my firm for use on this project; and
      (iii) a list of all projects (public or private) upon which my firm is currently performing, is committed to perform, or intends to make a commitment to perform. I shall also include, for each project: the name and telephone number of a contact person for the contracting authority, person, or organization; the dollar value of the work; a description of the work; and my firm's work schedule for the project.

   B. ***The following services, materials or supplies***:
      (i) a written agreement and invoices for the materials or supplies, and any other documents evidencing the terms of providing such items;
      (ii) information concerning brokers fees and commissions for providing services or materials; and
      (iii) a statement concerning whether my firm intends or will be required to use a joint check arrangement; and any other documents that may be required by MassDOT.

_____ Date_____
DBE Company Authorized Signature

DISADVANTAGED BUSINESS ENTERPRISES (DBE) PARTICIPATION
LETTER OF INTENT
(To be completed by the DBE – Page 2 of 2)

DATE OF BID OPENING: _____

PROJECT NUMBER: 609082

FEDERAL AID PROJECT NUMBER: HIP(BR)-003S(779)X

PROJECT LOCATION: CONWAY

PRIME BIDDER: _____

DBE COMPANY NAME: _____

Item number if applicable	NAICS Code	Description of Activity with notations such as Services, or Brokerage, Installation Only, Material Only, or Complete	Quantity	Unit Price	Amount
			TOTAL AMOUNT:		

Please give full explanations, attach additional sheets if necessary.

I HEREBY VERIFY THAT _____ WILL SOLELY
(DBE company name)
PERFORM THE WORK, OR PROVIDE THE SERVICES OR MATERIALS, AS DESCRIBED ABOVE.

DBE AUTHORIZED SIGNATURE: _____

NAME AND TITLE (PRINT):_____

TELEPHONE NUMBER: _____FAX NUMBER: _____

EMAIL ADDRESS: _____

Rev'd 9/20/19

*** END OF DOCUMENT ***

DOCUMENT B00855

DBE JOINT CHECK ARRANGEMENT APPROVAL FORM

(to be submitted by Prime Contractor)

Contract No: 127511 **Project No.** 609082 **Federal Aid No.:** HIP(BR)-003S(779)X

Location: CONWAY **Bid Opening Date:** _____

Project Description: Bridge Replacement, C-20-004, North Poland Road over Poland Brook

We have received the attached request for the use of a joint check arrangement from _____ _____ , a DBE on the above- referenced Contract and _____ _____, a Material Supplier/Vendor for the subject Contract. The DBE has complied with the requirements of 49 CFR Part 26.55(c)(1). In particular, the DBE has:

- a written agreement with the material supplier/vendor;
- applied for credit with the subject material supplier and has supplied the vendor's response;
- shown that it will place all orders to the subject material supplier/vendor;
- made and retains all decision-making responsibilities concerning the materials; and
- provided a Joint Check Agreement that is acceptable to MassDOT;

As the Contractor for the Project, we agree to issue joint checks (made payable to the Material Supplier/Vendor and the DBE) for payment of sums due pursuant to invoices from the Supplier/Vendor and DBE.

Contractor:

_____ _____
Company Name Signature
Duly Authorized

_____
Printed Name

_____ _____
Date Title

SubContractor:

_____ _____
Company Name Signature –
Duly Authorized

_____
Printed Name

_____ _____
Date Title

*** END OF DOCUMENT ***

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DOCUMENT B00856

JOINT VENTURE AFFIDAVIT

(All Firms)

- All Information Requested By This Schedule Must Be Answered. Additional Sheets May Be Attached.
- If, there is any change in the information submitted, the Joint Venture parties must inform MassDOT Pre-Qualifications Office (and, if one of the companies is a DBE, the Director of Contract Compliance, Office of Civil Rights) *prior* to such change, in writing, either directly or through the Prime Contractor if the Joint Venture is a subcontractor.
- If the Joint Venture Entity will be the bidder on a prime Contract, it must bid and submit all required documents (insurance, worker's compensation, bonds, etc.) in the name of the Joint Venture Entity.

I. Name of Joint Venture: _____

Type of Entity if applicable (Corp., LLC):_____Filing State _____

Address of joint venture: _____

_____

Phone No(s) for JV Entity: _____E-mail:_____

Contact Person(s)_____

Tax ID/EIN of Joint Venture: _____Vendor Code:_____

II. Identify each firm or party to the Joint Venture:

Name of Firm: _____

Address: _____

Phone : _____E-mail:_____

Contact person(s) _____

Name of Firm: _____

Address: _____

Phone: _____E-mail:_____

Contact Person(s)_____

III. Describe the role(s) of the each party to the Joint Venture:

_____

_____

IV. Attach a copy of the Joint Venture Agreement. The proposed Joint Venture Agreement should include specific details including, but not limited to: (1) the contributions of capital and equipment; (2) work items to be performed by each company's forces, (3) work items to be performed under the supervision of any DBE Venturer; (4) the commitment of management, supervisory and operative personnel employed by the DBE to be dedicated to the performance of the Project; and (5) warranty, guaranty, and indemnification clauses.

V. Attach any applicable Corporate or LLC Votes, Authorizations, etc.

VI. Ownership of the Joint Venture:

A. What is the percentage(s) of each company's ownership in the Joint Venture?

ownership percentage(s): _____

ownership percentage(s): _____

B. Specify percentages for each of the following (provide narrative descriptions and other detail as applicable):

1. Sharing of profit and loss: _____
2. Capital contributions:

(a) Dollar amounts of initial contribution: _____

(b) Dollar amounts of anticipated on-going contributions: _____

(c) Contributions of equipment (specify types, quality and quantities of equipment to be provided by each firm): _____

_____

4. Other applicable ownership interests, including ownership options or other agreements, which restrict or limit ownership and/or control:

_____

_____

5. Provide copies of all other written agreements between firms concerning bidding and operation of this Project or projects or contracts.

6. Identify all current contracts and contracts completed during the past two (2) years by either of the Joint Venture partners to this Joint Venture:

_____

_____

VII. Control of and Participation in the Joint Venture. Identify by name and firm those individuals who are, or will be, responsible for and have the authority to engage in the following management functions and policy decisions. (Indicate any limitations to their authority such as dollar limits and co-signatory requirements.):

A. Joint Venture check signing:

_____

_____

B. Authority to enter Contracts on behalf of the Joint Venture:

_____

_____

C. Signing, co-signing and/or collateralizing loans:

_____

_____

D. Acquisition of lines of credit:

_____

_____

E. Acquisition and indemnification of payment and performance bonds:

_____

_____

F. Negotiating and signing labor agreements:

_____

_____

G. Management of contract performance. *(Identify by name and firm only)*:

1. Supervision of field operations: _____
2. Major purchases: _____
3. Estimating: _____
4. Engineering: _____

VIII. Financial Controls of Joint Venture:

A. Which firm and/or individual will be responsible for keeping the books of account?

_____

_____

B. Identify the "Managing Partner," if any, and describe the means and measure of their compensation:

_____

_____

C. What authority does each firm have to commit or obligate the other to insurance and bonding companies, financing institutions, suppliers, subcontractors, and/or other parties participating in the performance of this Contract or the work of this Project?

_____

IX. Personnel of Joint Venture: State the approximate number of personnel (by trade) needed to perform the Joint Venture's work under this Contract. Indicate whether they will be employees of the majority firm, DBE firm, or the Joint Venture.

	Firm 1 (number)	Firm 2 (number)	Joint Venture (number)
Trade			
Professional			
Administrative/Clerical			
Unskilled Labor			

Will any personnel proposed for this Project be employees of the Joint Venture?: _____

If so, who: _____

A. Are any proposed Joint Venture employees currently employed by either firm?

Employed by Firm 1: _____ Employed by firm 2 _____

B. Identify by name and firm the individual who will be responsible for Joint Venture hiring: ____

_____

X. Additional Information. Please state any material facts and additional information pertinent to the control and structure of this Joint Venture.

_____

_____

XI. AFFIDAVIT OF JOINT VENTURE PARTIES. The undersigned affirm that the foregoing statements and attached documents are correct and include all material information necessary to identify and explain the terms and operations of our Joint Venture and the intended participation of each firm in the undertaking. Further, the undersigned covenant and agree to provide to MassDOT current, complete and accurate information regarding actual Joint Venture work, payments, and any proposed changes to any provisions of the Joint Venture, or the nature, character of each party to the Joint Venture. We understand that any material misrepresentation will be grounds for terminating any Contract awarded and for initiating action under Federal or State laws concerning false statements.

Firm 1	Firm 2
Signature Duly Authorized	Signature Duly Authorized
Printed Name and Title	Printed Name and Title
Date	Date

*** END OF DOCUMENT ***