

COMMONWEALTH OF MASSACHUSETTS



CONTRACT DOCUMENTS AND SPECIAL PROVISIONS

PROPOSAL NO.	605356-113892
P.V. =	\$4,850,000.00
PLANS	YES

FOR

**Federal Aid Project No. NHP(BR-ON)-003S(205)X
Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams)
Route 2 (Main Street) over the Green River (Re-Advertised Project)**

in the Town of

WILLIAMSTOWN

In accordance with the STANDARD SPECIFICATIONS
for HIGHWAYS AND BRIDGES dated 2020

This Proposal to be opened and read:

TUESDAY, MARCH 16, 2021 @ 2:00 P.M.

THIS PAGE INTENTIONALLY LEFT BLANK

DOCUMENT 00010

TABLE OF CONTENTS

DOCUMENT 00010	
TABLE OF CONTENTS.....	00010-1 through 2
DOCUMENT 00104	
NOTICE TO CONTRACTORS.....	00104-1 through 4
DOCUMENT 00210	
REQUIREMENTS OF MASSACHUSETTS GENERAL LAWS	
CHAPTER 30, SECTION 39R; CHAPTER 30, SECTION 39O.....	00210-1 through 4
DOCUMENT 00331	
LOCUS MAP.....	00331-1 through 2
DOCUMENT 00439	
CONTRACTOR PROJECT EVALUATION FORM.....	00439-1 through 2
DOCUMENT 00440	
SUBCONTRACTOR PROJECT EVALUATION FORM.....	00440-1 through 2
DOCUMENT 00710	
GENERAL CONTRACT PROVISIONS.....	00710-1 through 2
DOCUMENT 00711	
PRECAST CONCRETE HIGHWAY UNITS.....	00711-1 through 14
DOCUMENT 00713	
SUBSECTION 701 CEMENT CONCRETE SIDEWALKS, WHEELCHAIR RAMPS, AND DRIVEWAYS AND GUIDE TO THE INTERIM SUBSECTION 701.....	00713-1 through 34
DOCUMENT 00715	
SUPPLEMENTAL SPECIFICATIONS.....	00715-1 through 60
DOCUMENT 00719	
SPECIAL PROVISIONS FOR PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES.....	00719-1 through 18
DOCUMENT 00760	
REQUIRED CONTRACT PROVISIONS FOR FEDERAL-AID CONSTRUCTION CONTRACTS.....	00760-1 through 16
DOCUMENT 00811	
MONTHLY PRICE ADJUSTMENT FOR HOT MIX ASPHALT (HMA) MIXTURES.....	00811-1 through 2
DOCUMENT 00812	
MONTHLY PRICE ADJUSTMENT FOR DIESEL FUEL AND GASOLINE.....	00812-1 through 2
DOCUMENT 00813	
PRICE ADJUSTMENTS FOR STRUCTURAL STEEL AND REINFORCING STEEL.....	00813-1 through 4
DOCUMENT 00814	
PRICE ADJUSTMENT FOR PORTLAND CEMENT CONCRETE MIXES.....	00814-1 through 2
DOCUMENT 00820	
THE COMMONWEALTH OF MASSACHUSETTS SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY, NON-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM.....	00820-1 through 6
DOCUMENT 00821	
ELECTRONIC REPORTING REQUIREMENTS CIVIL RIGHTS PROGRAM AND CERTIFIED PAYROLL.....	00821-1 through 2
DOCUMENT 00859	
CONTRACTOR/SUBCONTRACTOR CERTIFICATION FORM.....	00859-1 through 2

DOCUMENT 00860	
COMMONWEALTH OF MASSACHUSETTS PUBLIC EMPLOYMENT LAWS.....	00860-1 through 2
DOCUMENT 00861	
STATE WAGE RATES	00861-1 through 34
DOCUMENT 00870	
STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY	
CONSTRUCTION CONTRACT SPECIFICATIONS.....	00870-1 through 8
DOCUMENT 00875	
TRAINEE SPECIAL PROVISIONS.....	00875-1 through 2
DOCUMENT 00880	
FEDERAL WAGE RATES	00880-1 through 12
DOCUMENT A00801	
SPECIAL PROVISIONS.....	A00801-1 through 166
DOCUMENT A00802	
DETAIL SHEETS	A00802-1 through 18
DOCUMENT A00803	
DRAWINGS AND SKETCHES	A00803-1 through 8
DOCUMENT A00808	
PROJECT UTILITY COORDINATION FORM.....	A00808-1 through 6
DOCUMENT A00815	
WORK ZONE SAFETY	
TEMPORARY TRAFFIC CONTROL.....	A00815-1 through 86
DOCUMENT A00820	
REQUEST FOR RELEASE OF MASSDOT AUTOCAD FILES FORM	A00820-1 through 2
DOCUMENT A00831	
ARMY CORPS OF ENGINEERS GENERAL PERMIT.....	A00831-1 through 72
DOCUMENT A00840	
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION	
WATER QUALITY CERTIFICATION APPLICATION.....	A00840-1 through 32
DOCUMENT A00841	
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION	
WATER QUALITY CERTIFICATION.....	A00841-1 through 10
DOCUMENT A00870	
MASSACHUSETTS DIVISION OF FISHERIES AND WILDLIFE	
NATURAL HERITAGE AND ENDANGERED SPECIES PROGRAM	A00870-1 through 4
DOCUMENT A00880	
CONTRACTOR COVID-19 GUIDELINES COMPLIANCE CHECKLIST	A00880-1 through 4
DOCUMENT B00420	
PROPOSAL	B00420-1 through 18
DOCUMENT B00853	
SCHEDULE OF PARTICIPATION BY DISADVANTAGED	
BUSINESS ENTERPRISES (DBEs)	B00853-1 through 2
DOCUMENT B00854	
DISADVANTAGED BUSINESS ENTERPRISES (DBE) PARTICIPATION	
LETTER OF INTENT	B00854-1 through 2
DOCUMENT B00855	
DBE JOINT CHECK ARRANGEMENT APPROVAL FORM.....	B00855-1 through 2
DOCUMENT B00856	
JOINT VENTURE AFFIDAVIT	B00856-1 through 4
END TABLE OF CONTENTS	

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, MARCH 16, 2021 at 2:00 P.M. **

WILLIAMSTOWN

Federal Aid Project No. NHP(BR-ON)-003S(205)X

Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams)

Route 2 (Main Street) over the Green River

(Re-Advertised Project)

****Date Subject to Change**

PROJECT VALUE = \$4,850,000.00

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, 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 \$495.00 per ton, Portland cement \$142.79 per ton, diesel fuel \$2.015 per gallon, and gasoline \$1.875 per gallon. MassDOT posts the **Price Adjustments** on their Highway Division's website at <https://www.mass.gov/topics/highway-construction-resources>

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: Stephanie Pollack, Secretary and CEO, MassDOT
Jonathan L. Gulliver, Administrator, MassDOT Highway Division
SATURDAY, JANUARY 23, 2021

THIS PAGE INTENTIONALLY LEFT BLANK

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:

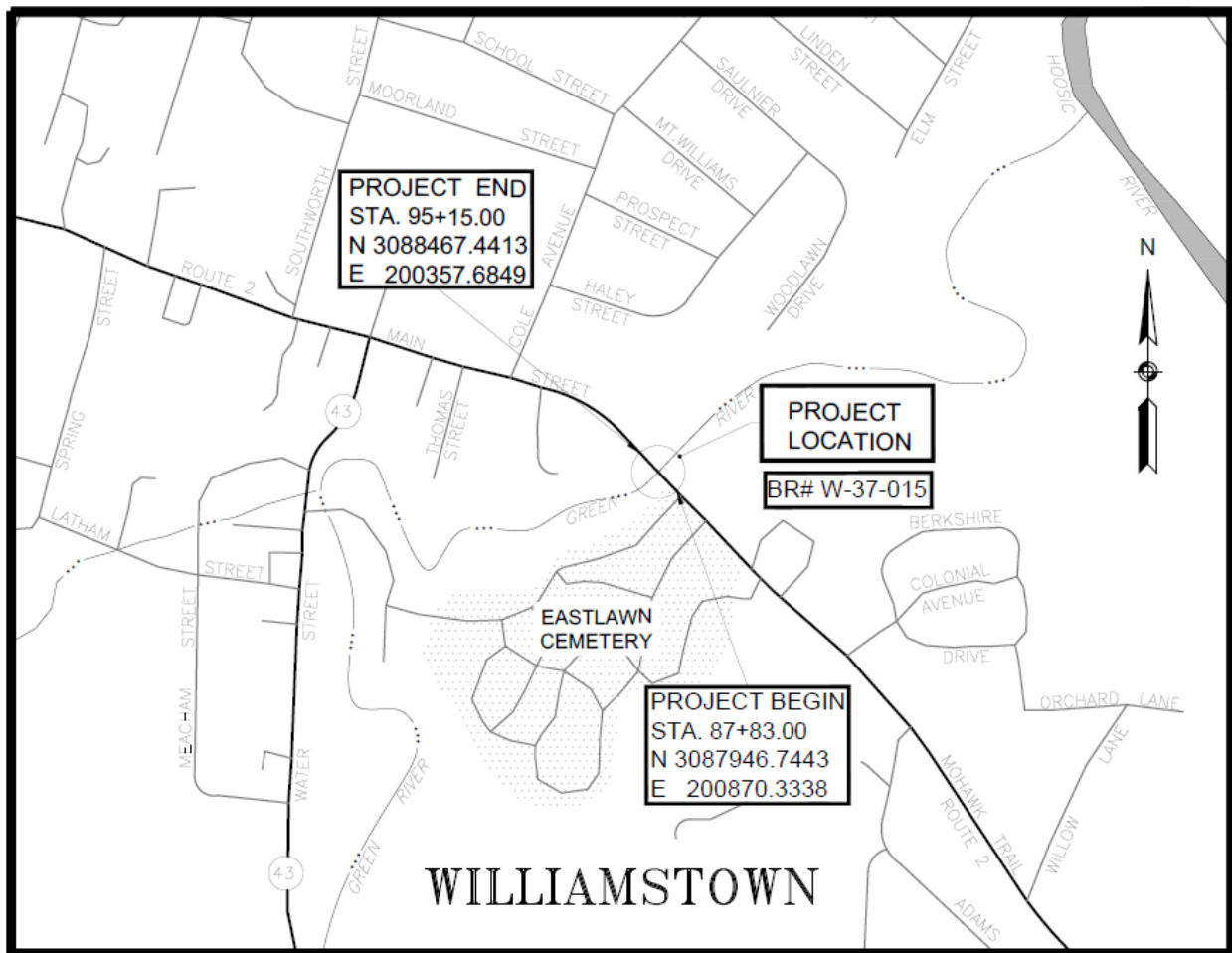
- (1) whether the representations of management in response to this paragraph and paragraph (b) above are consistent with the result of management's evaluation of the system of internal accounting controls; and
- (2) whether such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicant's financial statements.

THIS PAGE INTENTIONALLY LEFT BLANK

DOCUMENT 00331

LOCUS MAP**WILLIAMSTOWN**

Federal Aid Project No. NHP(BR-ON)-003S(205)X
Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams)
Route 2 (Main Street) over the Green River
(Re-Advertised Project)



NOT TO SCALE

THIS PAGE INTENTIONALLY LEFT BLANK

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: _____

[illegible]

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: _____

[illegible]

WORK NOT COMPLETED WITHIN SPECIFIED TIME: _____

Revised: 04/28/17

*** END OF DOCUMENT ***

DOCUMENT 00710
GENERAL CONTRACT PROVISIONS
Revised: 06/02/2020

NOTICE OF AVAILABILITY

The STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES dated 2020, 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.

*** END OF DOCUMENT ***

THIS PAGE INTENTIONALLY LEFT BLANK

DOCUMENT 00711

SUBSECTION M4.02.14

Precast Concrete Highway Units

THIS PAGE INTENTIONALLY LEFT BLANK

SUBSECTION M4.02.14 Precast Units

Replace this Subsection with the following :

SUBSECTION M4.02.14 Precast Concrete Highway Units

The following Precast Concrete Highway Units shall meet the materials and fabrication requirements specified herein:

- (a) Standard Temporary and Permanent Barriers
- (b) Box Culverts with spans less than or equal to 10 feet
- (c) Catch basins
- (d) Drainage Pipes
- (e) Pipe Flared Ends
- (f) Manholes
- (g) Handholes
- (h) Proprietary Retaining Wall Systems
- (i) Traffic Light Pole Bases
- (j) Luminaire Bases

Precast Concrete Highway Units shall be fabricated in conformance with the MassDOT Construction Standard Details, Traffic Standard Drawings for Traffic Signals and Highway Lighting, Overhead Signal Structure and Foundation Standard Drawings, and Standard Drawings for Signs and Supports. Circular vertical precast reinforced concrete manholes and structures used in sewer, drainage, and water works shall conform with the requirements of AASHTO M 199. The outside surface of the tapered or cone section of precast drainage structures shall be dried, cleaned, and coated with an RS-1-H coating meeting the requirements of AASHTO M 140.

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). 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. Plant.

Prior to the fabrication of Precast Concrete Highway Units, the Fabricator's precast concrete plant shall obtain the following:

- (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 Highway Unit(s) being fabricated
- (b) MassDOT Approval

C. Fabricator Quality Control.

Quality Control shall be performed by the Fabricator. The Fabricator shall maintain a Quality Control system to monitor, assess, and adjust placement and fabrication processes to ensure the fabricated Precast Concrete Highway Unit(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 inspection 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.

SUBSECTION M4.02.14 PRECAST UNITS (Continued)**1. Personnel.**

The Fabricator shall provide adequate training for all QC personnel in accordance with the Fabricator's NPCA or PCI Certification. A sufficient amount of QC personnel shall be trained and certified to perform the tests as specified in 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 six (6) months continuous experience in the manufacture of Precast Concrete Highway Products. The QC Manager shall be on site while the batch plant is producing and placing concrete for MassDOT projects.
- (b) Technicians/Inspectors with an active American Concrete Institute (ACI) Concrete Field Testing Technician – Grade I certification, or higher.

The Fabricator shall provide to the MassDOT Plant Inspector copies of the Fabricator's Quality Control Personnel required qualifications, as specified above.

2. 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. The moisture storage room or curing box shall be thermostatically controlled to maintain temperatures consistent with AASHTO T23. The laboratory 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.

3. 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 T152
- (b) Air Content Meter Volumetric Method: AASHTO T196 (Required for Lightweight Concrete)
- (c) Slump Cone: AASHTO T119
- (d) Cylinder Molds: AASHTO M205
- (e) Concrete Testing Machine: AASHTO T22
- (f) Screening Sieve: AASHTO T27, AASHTO T11
- (g) Curing Box: AASHTO T23
- (h) Spread Test Base Plate for Self-Consolidating Concrete (SCC): ASTM 1611
- (i) All other equipment prescribed by AASHTO and ASTM standards for the tests to be performed by the Fabricator as specified

4. Inspection.

Quality Control personnel shall monitor and inspect the fabrication of each Precast Concrete Highway Unit. 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.

5. Temperature Monitoring.

At a minimum, the Fabricator shall monitor, record, and report the temperatures of the form and ambient temperatures surrounding the concrete continuously, without interruption as specified below:

SUBSECTION M4.02.14 PRECAST UNITS (Continued)

- (a) Prior to placement of concrete to verify the temperatures are greater than or equal to 50°F.
- (b) Immediately after placement to verify that the temperatures are greater than or equal to 50°F.
- (c) Throughout the entire duration of the curing cycle, at regular intervals not to exceed one hour until 70% Design Strength (f'_c) is attained.

At a minimum, the temperature measuring devices shall record and report the temperature of the concrete to the nearest 2°F. The Fabricator shall verify all temperature requirements meet the specifications herein. Fabricator Quality Control concrete temperature monitoring records reporting the concrete temperature at the specified minimum frequency shall be provided to the MassDOT Inspector upon request.

6. Sampling and Testing.

At a minimum, the Fabricator shall perform random Quality Control sampling and testing for each Sublot of concrete produced 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 Subsection M4.02.13 and AASHTO R 60.

Table 1: Quality Control Sampling and Testing

Quality Characteristic	Test Method	Sample Size	Specification Limit	Lot Size ^(b)	Sublot Size ^(c)	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 in a year, per Mix Design	50 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.	≥ 70% 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				

Notes:

- (a) Self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.
- (b) Lot shall be defined as a specific quantity of material from a single source, produced or placed by the same controlled process.
- (c) 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.

SUBSECTION M4.02.14 PRECAST UNITS (Continued)**7. Certificate of Compliance.**

The Fabricator shall provide a Certificate of Compliance in accordance with Standard Specifications, Division I, Subsection 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.

8. 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 MassDOT Standard Shop Drawings
- (e) Fabricator Certificate of Compliance for each fabricated Precast Concrete Highway Unit
- (f) Admixture Manufacturer's Certification of Compliance and Technical Data Sheet for each approved Admixture
- (g) Completed QC Inspection Checklist for each fabricated Precast Concrete Highway Unit
- (h) Identification Number for each fabricated Precast Concrete Highway Unit
- (i) Time and date of casting of each fabricated Precast Concrete Highway Unit
- (j) Date of stripping the forms of each fabricated Precast Concrete Highway Unit
- (k) Batch Ticket Printout reporting the quantity of concrete produced for each batch of concrete produced
- (l) QC Test Report Forms for each subplot of concrete produced
- (m) Non-Conformance Reports (NCRs)
- (n) Documentation of Repairs (if applicable)

D. 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 Highway Unit 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 Highway Units shall be determined by MassDOT.

1. Inspection.

A MassDOT Inspector may be assigned to perform Acceptance activities during the fabrication of the Precast Concrete Highway Products, which includes the inspection of the materials, work procedures, and Precast Concrete Highway Units. When a MassDOT Inspector is assigned to the Fabricator's plant, 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 start date. The Fabricator shall perform the following activities 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.

SUBSECTION M4.02.14 PRECAST UNITS (Continued)

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 Highway Unit(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 Highway Unit(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.

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 in a year, per Mix Design	50 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).

SUBSECTION M4.02.14 PRECAST UNITS (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.

MATERIALS**E. Materials.**

Materials shall meet the following specifications, where 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
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
Self-Consolidating Concrete (SCC)	M4.02.17
Slag	AASHTO M-302
High Performance Cement Concrete	M4.06.1
Reinforcing Bars	M8.01.0
Epoxy Coated Reinforcing Bars	M8.01.7
Asphalt Emulsions	M3.03.0

1. Cement Concrete Mix Design.

Cement concrete for Precast Concrete Highway Units shall meet the requirements of M4.02.0. When used, High Performance Cement Concrete shall meet the requirements of M4.06.1 and self-consolidating concrete (SCC) shall meet the requirements of M4.02.17. The cement concrete shall be composed of specified proportions by the mass of aggregates, cement, supplementary cementitious materials (SCMs), water, and QCML approved admixtures to form a homogenous composition. The particular quantities and uniform combination of materials and sources of supply to be used by the Fabricator on MassDOT Highway Construction contracts shall be reported on the MassDOT Cement Concrete Mix Design Sheet and submitted to MassDOT RMS 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.

Prior to the production and placement of the cement concrete for Precast Concrete Highway Units, the Fabricator's proposed mix design shall be approved by MassDOT RMS. Modifications made to the aggregate, cement, supplementary cementitious materials (SCMs), admixtures (including coloring agents), or formulation to previously approved mix designs during fabrication are prohibited. All new mix design formulations and modifications made to previously approved mix designs will require resubmission of the Cement Concrete Mix Design Sheet to MassDOT RMS for review and trial batch testing for the new mix design(s) by the Fabricator. 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:

SUBSECTION M4.02.14 PRECAST UNITS (Continued)

- (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).

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	$50^{\circ}\text{F} \leq ^{\circ}\text{F} \leq 90^{\circ}\text{F}$	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: 130% f'_c at 28 days Batch Mixed: 120% f'_c at 28 days	MassDOT
Alkali-Silica Reaction (ASR) ^(c)	ASTM C 1567	Per ASTM	M4.02.00	Quality Control
Resistance to Chloride Ion Penetration ^(d)	AASHTO T 358 ^(e)	28-day Cylinders: One (1) set of Three (3) 4 x 8 in.	Resistivity $\geq 15 \text{ k}\Omega\text{-cm}$ at 28 days	MassDOT

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. Cylinders shall be haLaboratory 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) 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).
- (d) Resistance to Chloride Ion Penetration testing shall be performed only on proposed High Performance Cement Concrete mix designs. The 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.
- (e) The Wenner probe tip spacing "a" shall be 1.5.

CONSTRUCTION METHODS – PLANT FABRICATION

F. Shop Drawings.

Fabricator shop drawings for Precast Concrete Highway Units shall conform with the MassDOT Construction Standard Details, Traffic Standard Drawings for Traffic Signals and Highway Lighting, Overhead Signal Structure and Foundation Standard Drawings, and Standard Drawings for Signs and Supports. Circular vertical precast reinforced concrete manholes and structures used in sewer, drainage, and water works shall conform with the requirements of AASHTO M 199.

G. Tolerances.

Precast unit tolerances shall be as indicated on the plans, as specified in Subsection 901, or as indicated in the MassDOT Construction Standard Details, as appropriate.

H. Forms.

Concrete shall be cast in rigidly constructed forms, which will maintain the Precast Concrete Highway Units within specified tolerances to the shapes, lines and dimensions shown on the MassDOT Construction Standard Details. 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 minor nature, due to form work, stripping or handling, shall be cause for rejection, as defined in Repairs and Replacement, unless approved for repair through the NCR process. 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 a MassDOT approved mix design. 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. The Quality Control Inspector shall inspect and accept the placement of the reinforcing steel prior to the placement of concrete into the forms. When a MassDOT Inspector is assigned to perform Acceptance activities at the Fabricator's facility, 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.

SUBSECTION M4.02.14 PRECAST UNITS (Continued)**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. Exposed Surfaces of Precast Concrete Highway Units.

As soon as conditions permit and 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.

M. Final Curing Methods.

All exposed concrete surfaces shall meet the requirements of the selected final curing method and maintain the required concrete temperature ranges throughout the duration of the final curing method cycle. Controlled and gradual termination of the final curing method cycle shall occur after all the specified conditions are met.

1. Water Spray Curing.

The final curing method cycle shall begin immediately after the concrete has hardened sufficiently to prevent surface damage from the water spray. After the concrete has sufficiently hardened, all exposed concrete surfaces shall remain moist with a continuous fine spray of water throughout the entire duration of the final curing method cycle. Controlled and gradual termination of the final curing method cycle shall occur after all specified conditions are met (see *Table 4: Termination of Curing Cycle for Water Spray Curing*).

Table 4: Termination of Curing Cycle for Water Spray

Sustained Ambient Temperature	Compressive Strength
$50^{\circ}\text{F} \leq ^{\circ}\text{F} \leq 90^{\circ}\text{F}$	$\geq 70\% f'_c$

2. Saturated Covers for Curing.

The final curing method cycle shall begin immediately after the concrete has hardened sufficiently to prevent surface damage from the saturated burlap. After the concrete has sufficiently hardened, all exposed concrete surfaces shall be covered with water-saturated burlap throughout the entire duration of the final curing method cycle. Controlled and gradual termination of the final curing method cycle shall occur after all specified conditions are met (see *Table 5: Termination of Curing Cycle for Saturated Cover Curing*).

Table 5: Termination of Curing Cycle for Saturated Covers

Sustained Ambient Temperature	Compressive Strength
$50^{\circ}\text{F} \leq ^{\circ}\text{F} \leq 90^{\circ}\text{F}$	$\geq 70\% f'_c$

SUBSECTION M4.02.14 PRECAST UNITS (Continued)

3. Curing Covers.

Curing covers shall be Plastic Coated Fiber Blankets or Polyethylene Curing Covers. Proposed curing covers shall be submitted for approval to the Designer of Record with a copy to the MassDOT Research and Materials Section. The final curing method cycle shall begin immediately after the concrete has hardened sufficiently to prevent surface damage from the curing covers. After the concrete has sufficiently hardened, all exposed concrete surfaces shall be covered with curing covers throughout the entire duration of the final curing method cycle. The Fabricator shall ensure that the surface of the concrete remains wet until the covers are placed. If forms are removed from the Precast Concrete Highway Unit, curing covers shall be placed over the exposed concrete for the remainder of 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 (100% minimum relative humidity). Controlled and gradual termination of the final curing method cycle shall occur after all specified conditions are met (see *Table 6: Termination of Curing Cycle for Curing Covers*).

Table 6: Termination of Curing Cycle for Curing Covers

Sustained Ambient Temperature	Compressive Strength
50°F ≤ °F ≤ 90°F	≥ 70% f'_c

N. Stripping.

The Fabricator shall not strip forms or handle the Precast Concrete Highway Unit until Quality Control compressive strength cylinders attain a minimum compressive strength of 70% Design Strength (f'_c).

O. Handling and Storage of Precast Concrete Highway Units.

Precast Concrete Highway Units shall not be exposed to temperatures below 50°F until Quality Control compressive strength results have achieved 70% f'_c . Precast units 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 units shall be supported on the ground by means of continuous blocking.

Precast units shall be loaded on a trailer with continuous blocking. Shock-absorbing cushioning material shall be used at all bearing points during transportation of the precast units. Blocking shall be provided at all locations of tie-down straps. The precast units shall not be subject to damaging torsional or impact stresses.

P. Repairs and Replacement (not including Proprietary Retaining Wall Systems)

Where noted, defects shall be repaired according to the PCI Northeast Region Guidelines for Resolution of Non-Conformances in Precast Concrete Highway Units, Report Number PCINE-18-RNPCBE. Please note that reference to PCINE-18-RNPCBE is made for repair details only. In the case of conflict with this specification, this specification shall govern.

Any required repairs shall utilize materials listed on the MassDOT QCML. All repairs shall be completed at the expense of the Contractor.

Q. Repairs and Replacement for Proprietary Retaining Wall Systems.

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.

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:

SUBSECTION M4.02.14 PRECAST UNITS (Continued)

- (a) Surface voids or bug holes that are less than 5/8-inch in diameter and less than 1/4-inch deep, except when classified as Category 3
- (b) cracks less than or equal to 0.006" wide

2. Category 2, Minor Defects.

Category 2 defects shall be repaired and documented. Non-conformance Reports are not required for this category. Documentation of the repair shall be submitted to the MassDOT District Engineer. Minor defects are defined as:

- (a) Spalls, honeycombing, surface voids that are less than 2 inches deep and have no dimension greater than 12 inches
- (b) Cracks greater than 0.006" and less than or equal to 0.060"
- (c) Broken corners without exposed reinforcing steel

Defects and cracks shall be repaired according to the Guidelines for Resolution of Non-Conformances in Precast Concrete Highway Units, Report Number PCINE-18-RNPCBE and this specification. All repairs shall be completed at the expense of the Contractor. Any required repairs shall utilize materials listed on the MassDOT QCML.

3. Category 3, Rejectable Defects.

Rejectable defects as determined by the MassDOT Inspector and MassDOT Resident Engineer will be rejected, unless the Fabricator receives MassDOT approval of a Non-Conformance Report. Some rejectable defects are defined as:

- (a) Surface defects on more than 5% of the surface area
- (b) Minor defects that in total make up more than 5% of the surface area of the unit
- (c) Concentrated area of defects consisting of four or more Category 2 Defects within a 4-square foot area.
- (d) Exposed reinforcing steel
- (e) 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
- (f) Cracks greater than 0.060" in width
- (g) Elements fabricated outside of the specified tolerances
- (h) Compressive strength that does not meet the specified Design Strength, f'_c

R. Loading.

Prior to the Fabricator loading the Precast Concrete Highway Unit 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 Concrete Highway Unit. 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.

S. Shipping.

Prior to shipment, the Fabricator shall perform the following actions and provide the required documentation to the MassDOT Plant Inspector:

SUBSECTION M4.02.14 PRECAST UNITS (Continued)

- (a) Precast Concrete Highway Units 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 Highway Unit'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 and MassDOT Inspector and/or MassDOT RMS.

T. 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 Highway Unit'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 Highway Units upon receipt at the site. Precast Concrete Highway Units damaged during delivery shall be repaired or replaced at MassDOT's direction at no cost to MassDOT..

DOCUMENT 00713

Subsection 701

Cement Concrete Sidewalks, Pedestrian Curb Ramps, and Driveways

Guide to the Interim Subsection 701 Cement Concrete Sidewalk Specification

THIS PAGE INTENTIONALLY LEFT BLANK

INTERIM SUBSECTION 701: CEMENT CONCRETE SIDEWALKS, PEDESTRIAN CURB RAMPS, AND DRIVEWAYS

DESCRIPTION

701.20: General

This work shall consist of the construction of cement concrete sidewalks, pedestrian curb ramps, and driveways in accordance with the specifications and within the tolerances established on the plans.

MATERIALS

701.30: General

Materials shall meet the requirements specified in the following Subsections of Division III, Materials except as noted herein:

Gravel Borrow, Type b.....	M1.03.0
Cement Concrete ($\geq 4,000$ psi)	M4.02.00
Preformed Expansion Joint Filler.....	M9.14.0 ^[1]

^[1] Preformed expansion joint filler shall conform to Subsection M9.14.0 or ASTM D8139.

The following best practices may be incorporated into the cement concrete mix design at no additional cost to the Department as identified herein.

A. Combined Aggregate System.

The combined aggregate system for the mix design may be analyzed using the Tarantula Curve, Shilstone Chart, fineness modulus, and coarse aggregate content to enhance the properties of the concrete.

1. Tarantula Curve.

The combined aggregate system for the mix design may be analyzed using the Tarantula Curve to evaluate potential properties of the concrete, including workability, segregation, edge slumping, surface finishing, and cohesion.

Table 701.30-1: Tarantula Curve Particle Size Distribution

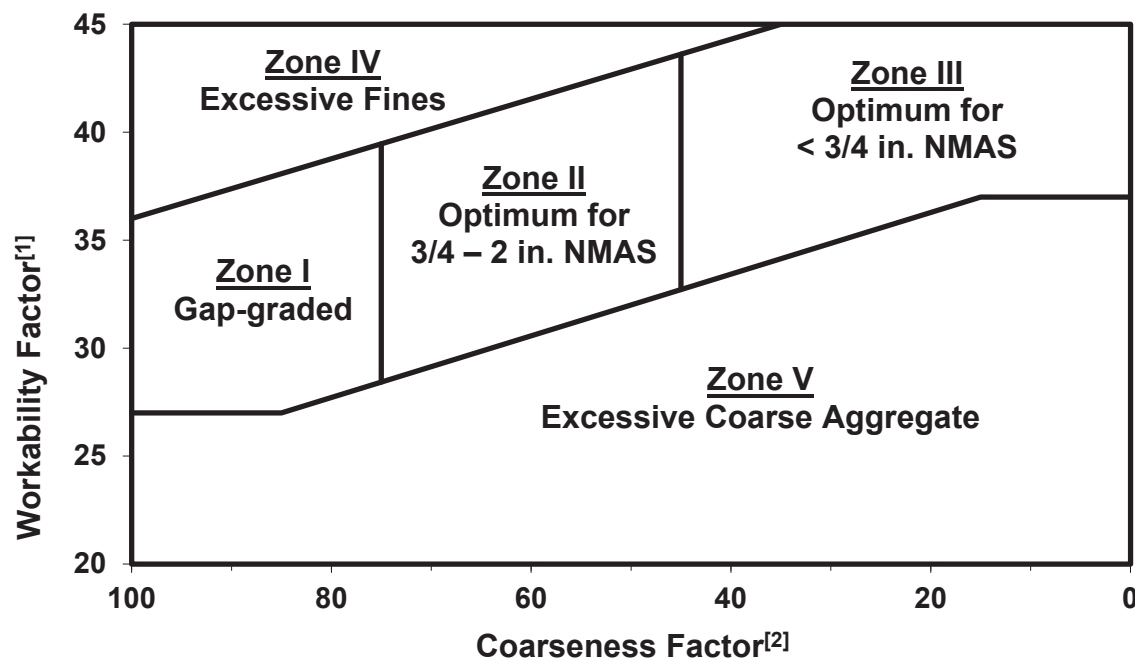
Sieve Opening	Percent by Mass Targets (%)		Percent by Mass Retained (%)		
	Passing	Retained			
1-1/2 in.	100	–	–	–	–
1 in.	92	8	0 – 16	–	–
3/4 in.	82	10	0 – 20	–	–
1/2 in.	69	13	4 – 20	–	–
3/8 in.	56	13	4 – 20	–	–
No. 4	43	13	4 – 20	–	–
No. 8	37	6	0 – 12	Coarse Sand 20 – 40	–
No. 16	31	6	0 – 12		–
No. 30	18	13	4 – 20		Fine Sand 24 – 34
No. 50	5	13	4 – 20	–	
No. 100	0	5	0 – 10	–	
No. 200	0	0	0 – 2	–	

2. Shilstone Workability-Coarseness Chart.

The combined aggregate system for the mix design may be analyzed using the Shilstone Workability-Coarseness Chart, to evaluate potential properties of the concrete, including workability.

Table 701.30-2: Shilstone Workability-Coarseness

Zone	Property	Cause
Zone I	Gap-graded; High potential for segregation during placement and consolidation; Cracking, blistering, spalling, and scaling	Deficiency in intermediate particles; Non-cohesive
Zone II	Optimum mixture for nominal maximum aggregate size from 2 in. – ¾ in.	Optimized workability factor and coarseness factor
Zone III	Optimum mixture for nominal maximum aggregate size < ¾ in.	Optimized workability factor and coarseness factor
Zone IV	Sticky; High potential for segregation during consolidation and finishing; Variable strength, high shrinkage, cracking, curling, spalling, and scaling	Excessive fines
Zone V	Rocky; Lacking plasticity	Excessive amount of coarse and intermediate aggregate

Figure 701.30-1: Shilstone Workability-Coarseness Chart

^[1] The workability factor is determined by the equation $WF = W + (C - 564) / 38$, where WF = workability factor, W = percent passing No. 8 sieve and C = total cementitious materials content.

^[2] The coarseness factor is determined by the equation $CF = (Q/R) / 100$, where CF = coarseness factor, Q = cumulative percent retained on 3/8 in. sieve and R = cumulative percent retained on No. 8 sieve.

3. Fineness Modulus.

The combined aggregate system for the mix design may be analyzed using the fineness modulus, to evaluate potential properties of the concrete, including the fineness or coarseness of the mix design and estimating the design proportions of fine and coarse aggregates. The coarseness of the mix design increases as the fineness modulus increases. The fineness modulus is determined by calculating the total cumulative percentages by mass retained on each designated sieve and dividing by 100.

4. Coarse Aggregate Content.

The combined aggregate system for the mix design may be analyzed using the coarse aggregate content. The coarse aggregate content is determined by calculating the total cumulative percentages by mass retained on the No. 4 sieve.

B. Paste System.

The quality of the paste system is determined by the water-cementitious ratio, air content, cementitious materials, and chemical admixtures incorporated into the mix design.

1. Water-Cementitious Ratio.

The water-cementitious ratio for the mix design may be analyzed to evaluate potential properties of the concrete, including strength, concrete and reinforcement bonding, and resistance to freezing, thawing, de-icing, sulfate reaction, corrosion of steel reinforcement, drying shrinkage, cracking, and volume change from wetting and drying. The water-cementitious ratio is determined by calculating the total water content by mass and dividing by the total cement and supplementary cementitious material (SCM) content by mass. The recommended water-cementitious ratio design target is identified in Table 701.30-3. The water-cementitious ratio shall be less than or equal to 0.45.

Table 701.30-3: Freezing, Thawing, and De-icing Resistance

Exposure Class	Severity	Condition	Water-Cementitious Ratio	
			Recommendation	Requirement
F3	Very Severe	Exposed to freezing and thawing cycles and accumulation of snow, ice, and de-icing chemicals; Frequent exposure to water	≤ 0.40	≤ 0.45

2. Air Content.

The air content for the mix design may be analyzed to evaluate potential properties of the concrete, including strength and resistance to freezing, thawing, de-icing, and sulfate reaction. The recommended air content design targets are identified in Table 701.30-4.

Table 701.30-4: Freezing, Thawing, and De-icing Resistance

Exposure Class	Severity	Condition	Nominal Maximum Aggregate Size (in.)	Air Content Target Recommendation (%)
F3	Very Severe	Exposed to freezing and thawing cycles and accumulation of snow, ice, and de-icing chemicals; Frequent exposure to water	3/8	7.5
			1/2	7.0
			3/4	6.0

3. Cement and Supplementary Cementitious Materials Content.

The cement and supplementary cementitious materials content incorporated into the mix design shall promote quality properties of the cement concrete, including resistance to alkali silica reaction, freezing, thawing, de-icing, and sulfate reaction. Incorporation of supplementary cementitious materials (SCM) in cement concrete may affect workmanship properties, including workability, bleed rate, setting time, and other properties. Adequate adjustments in Contractor workmanship practices, including placement, finishing, curing, and other construction practices shall be required to account for these changes in properties and to prevent scaling due to freezing, thawing, and de-icing cycles. The cement and supplementary cementitious materials content shall meet the design criteria identified in Table 701.30-5.

Table 701.30-5: Alkali Silica Reaction and Freezing, Thawing, and De-icing Resistance^{[1][2]}

Exposure Class	Severity	Condition	Material	Replacement by Weight of Cement (%)
F3	Very Severe	Exposed to freezing and thawing cycles and accumulation of snow, ice, and de-icing chemicals; Frequent exposure to water	Low Alkali Cement ($\leq 0.60\%$ Alkalinity)	–
			Blended Hydraulic Cement ^[3]	–
			Fly Ash (Class F)	15 – 30
			Slag (Grade 100 or 120)	25 – 50
			Silica Fume	5 – 10
			Total SCM	≤ 50
			Total Fly Ash and Silica Fume	≤ 35

^[1] Acceptable replacement by weight of cement for alkali silica reaction resistance shall be determined by the alkali silica reaction resistance performance test results and the criteria identified in Table 701.73-1: Minimum Acceptance Sampling and Testing Requirements.

^[2] Test results meeting the alkali silica reaction resistance performance criteria of Table 701.30-6: Alternative Performance Evaluation to Alkali Silica Reaction Resistance Design Criteria may supersede the replacement by weight of cement design criteria.

^[3] SCMs in blended hydraulic cement shall meet the criteria identified for fly ash, slag, and silica fume.

Table 701.30-6: Alternative Performance Evaluation to Alkali Silica Reaction Resistance Design Criteria

Method	Quality Characteristic	Criteria
C295	Petrographic Examination for Potential Alkali Aggregate Reactive Constituents and Deleterious Materials in Aggregate ^[1]	–
	Optically Strained, Microfractured or Microcrystalline Quartz (%)	≤ 5.0
	Chert or Chalcedony (%)	≤ 3.0
	Trydimite or Cristobalite (%)	≤ 1.0
	Opal (%)	≤ 0.5
	Natural Volcanic Glass (%)	≤ 3.0
T 380	Alkali Silica Reaction Resistance: Expansion of Miniature Concrete Prisms at 56 days (%)	≤ 0.03 ^[2]

^[1] Examination of aggregate shall be performed and reported to identify and quantify potential alkali-aggregate reactive constituents and deleterious materials in aggregate, as defined in ASTM C294 Standard Descriptive Nomenclature for Constituents of Concrete Aggregates and ASTM C295 Standard Guide for Petrographic Examination of Aggregates for Concrete.

^[2] 56-day expansion results greater than 0.03 but less than or equal to 0.04 shall be considered non-reactive if the average two-week rate of expansion from day 56 to day 84 is less than or equal to 0.01%, otherwise, expansion results shall be considered reactive.

4. Chemical Admixtures.

Chemical admixtures may be incorporated into the mix design to enhance the properties of the concrete.

Table 701.30-7: Chemical Admixtures

Spec.	Type	Chemical Admixture	Properties
M 194	A	Water-Reducing	Increases Workability and Air Content; Decreases Water Demand (5 – 10%, 3 – 6 in. Slump)
	B	Retarding	Increases Initial and Final Setting Time, Air Content, Long-Term Strength; Offsetting of Accelerating Effect of Hot Weather; Decreases Early-Age Strength
	C	Accelerating	Increases Early-Age Strength; Decreases Initial and Final Setting Time
	D	Water-Reducing and Retarding	Type A and Type B Admixture Properties
	E	Water-Reducing and Accelerating	Type A and Type C Admixture Properties
	F	High Range Water-Reducing	Increases Workability (More Effective than Type A), Air Content, Early-Age Strength, and Ultimate Strength; Decreases Water Demand (12 – 40%, > 6 in. Slump) and Permeability
	G	High Range Water-Reducing and Retarding	Type F and Type B Admixture Properties
	S-SRA	Shrinkage Reducing	Increases Setting Time; Decreases Drying Shrinkage Cracking and Bleed Rate
	S-CRA	Crack Reducing	Decreases Cracking (More Effective than SRAs) and Crack Width
M 154	AEA	Air-Entraining	Increases Cohesion, Workability, Stabilization of Air Bubbles, Resistance to Freezing, Thawing, and De-icing, Resistance to Alkali-Reactive Environment, and Resistance to Sulfate Reaction
M 194 ^[1]	MRWRA	Mid Range Water-Reducing	Type A and Type F Admixture Properties; Increases Workability (Especially Concrete with SCMs); Decreases Water Demand (6 – 12 %, 5 – 8 in. Slump)
C1622	CWA	Cold Weather	Increases Hydration Rate; Decreases Freezing Point of Mixing Water

^[1] Mid range water-reducing admixtures (MRWRA) may meet either water-reducing (A) or high range water-reducing (F) admixture criteria.

5. Paste Content.

The paste content for the mix design may be optimized to enhance potential properties of the concrete, including workability, strength, permeability, and resistance to drying shrinkage and cracking and volume change from wetting and drying. The volume of paste should adequately fill the voids and provide sufficient separation between the aggregate particles to promote workability and effective bonding of particles.

Table 701.30-8: Paste Content

Mix Design Characteristic	Recommendation
Volume of Cement Concrete (cf) ^[1]	27
Paste Content (%) ^[2]	≤ 28 ^[3]
Paste Content to Aggregate Void Content Ratio ^[4]	1.25 – 1.75
Excess Volume of Paste for Workability (%) ^[5]	–

^[1] The volume of cement concrete is determined by the following equation, where W = Weight (lbs.), SG = Specific Gravity, D = Density (pcf), and V = Volume (cf).

$$\begin{aligned}
 V_{\text{CEMENT}} &= W_{\text{CEMENT}} / SG_{\text{CEMENT}} * D_{\text{WATER}} \\
 V_{\text{SCM}} &= W_{\text{SCM}} / SG_{\text{SCM}} * D_{\text{WATER}} \\
 V_{\text{ADMIXTURE}} &= V_{\text{ADMIXTURE in oz.}} / 957.5 \text{ oz. per cf} \\
 V_{\text{WATER}} &= V_{\text{WATER in gal.}} / 7.48 \text{ gal. per cf} \\
 V_{\text{COARSE}} &= W_{\text{COARSE}} / SG_{\text{COARSE}} * D_{\text{WATER}} \\
 V_{\text{FINE}} &= W_{\text{FINE}} / SG_{\text{FINE}} * D_{\text{WATER}} \\
 V_{\text{CONCRETE}} &= V_{\text{CEMENT}} + V_{\text{SCM}} + V_{\text{ADMIXTURE}} + V_{\text{WATER}} + V_{\text{COARSE}} + V_{\text{FINE}} + V_{\text{AIR}}
 \end{aligned}$$

^[2] The paste content by volume of cement concrete is determined by the following equation, where V = Volume (cf) and PC = Paste Content (%).

$$\begin{aligned}
 V_{\text{PASTE}} &= V_{\text{CEMENT}} + V_{\text{SCM}} + V_{\text{ADMIXTURE}} + V_{\text{WATER}} \\
 PC_{\text{CONCRETE}} &= V_{\text{PASTE}} / V_{\text{CONCRETE}}
 \end{aligned}$$

^[3] The cracking tendency of structural concrete is significantly reduced when the paste content by volume is less than or equal to 28 percent.

^[4] The paste content to aggregate void content ratio is determined by the following equation, where D = Density (pcf), SG = Specific Gravity, BD = Bulk Density (pcf), VC = Void Content (%), V = Volume (cf), AVC = Aggregate Void Content (%), PC = Paste Content (%), and R = Ratio. Workability increases as the paste content to aggregate void content ratio increases. Decreased paste content to aggregate void content ratios will result in decreased workability, where water-reducing admixtures provide no benefit.

$$\begin{aligned}
 VC_{\text{COARSE}} &= SG_{\text{COARSE}} * D_{\text{WATER}} - BD_{\text{COARSE}} / D_{\text{COARSE}} \\
 VC_{\text{FINE}} &= SG_{\text{FINE}} * D_{\text{WATER}} - BD_{\text{FINE}} / D_{\text{FINE}} \\
 VC_{\text{AGGREGATE}} &= [(V_{\text{COARSE}} / (V_{\text{COARSE}} + V_{\text{FINE}})) * VC_{\text{COARSE}} + (V_{\text{FINE}} / (V_{\text{COARSE}} + V_{\text{FINE}})) * VC_{\text{FINE}}] \\
 AVC_{\text{CONCRETE}} &= [VC_{\text{AGGREGATE}} * ((V_{\text{COARSE}} + V_{\text{FINE}}) / V_{\text{CONCRETE}})] \\
 R_{\text{PC-AVC}} &= PC_{\text{CONCRETE}} / AVC_{\text{CONCRETE}}
 \end{aligned}$$

^[5] The excess paste content for workability is determined by the following equation, where PC = Paste Content (%), AC = Air Content (%), AVC = Aggregate Void Content (%), and EPC = Excess Paste Content for Workability (%).

$$EPC_{\text{CONCRETE}} = PC_{\text{CONCRETE}} + AC_{\text{CONCRETE}} - AVC_{\text{CONCRETE}}$$

C. Initial Curing Materials.

The materials and procedures used for initial curing methods of cement concrete shall meet the Manufacturer's instructions and recommendations and the requirements specified herein.

Cement concrete with a low to negligible bleeding rate, exposure to highly evaporative environments, high content of silica fume, fine cement, or other fine cementitious material, low water to cementitious ratio, high air content, or water-reducing admixtures have an increased susceptibility to surface drying and plastic shrinkage between placement and finishing operations. Initial curing materials and procedures shall be applied immediately after the bleed water sheen has disappeared from the surface of the concrete or the concrete surface exhibits loss of moisture and surface drying, between placement and finishing operations. Initial curing materials shall not be worked into the surface in subsequent finishing operations.

1. Liquid-Applied Evaporation Reducers.

Liquid-applied evaporation reducers used for initial curing methods 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 when the evaporation rate equals or exceeds the bleeding rate.

D. Intermediate Curing Materials.

The materials and procedures used for intermediate curing methods of cement concrete shall meet the Manufacturer's instructions and recommendations and the requirements specified herein.

In instances where finishing operations have been completed prior to the concrete achieving final set and the concrete surface exhibits loss of moisture and surface drying, the following curing materials and procedures shall be applied immediately to the concrete surface prior to the application of final curing materials, to prevent the loss of moisture without damaging the concrete surface, until final set of the concrete has been achieved and final curing materials have been applied to the concrete surface.

- 701.30.C.1: Liquid-Applied Evaporation Reducers
- 701.30.E.3.a: Liquid Membrane-Forming Compounds for Curing
- 701.30.E.3.b: Liquid Membrane-Forming Compounds for Curing and Sealing

E. Final Curing Materials.

The materials and procedures used for final curing methods of cement concrete shall meet the Manufacturer's instructions and recommendations and the requirements specified herein.

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. Curing water shall not exceed a temperature differential of more than 20°F from the internal concrete temperature, to prevent cracking due to temperature gradients causing strain that exceeds the strain capacity of concrete. Curing water shall remain above freezing temperatures throughout the duration of the curing cycle.

Final curing materials and procedures shall be applied to the concrete surface immediately after application of initial and intermediate curing materials, finishing operations, and final set of cement concrete, to prevent the loss of moisture and surface drying.

Materials used for final curing methods of cement concrete shall accommodate all exposed cement concrete surfaces with a continuous application of moisture throughout the entire duration of the final curing method cycle and provide controlled and gradual termination of the final curing method cycle.

Final 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. Insufficient application of final curing materials results in decreased strength and durability of the top surface of concrete.

Protection to the concrete surface and curing materials shall be required in instances where adverse weather conditions are present, until curing operations can be initiated without damaging the surface of the concrete.

Final curing materials and procedures shall be applied to the concrete surface throughout the entire duration of the curing cycle and meet minimum sustained temperature, duration, and strength requirements, as specified in applicable Division II: Construction Details and herein. Controlled and gradual termination of the final curing method cycle shall begin only after all specified conditions are met, until the concrete gradually cools to within 20°F of the ambient temperature.

1. Saturated Covers.

Saturated covers used for final curing methods 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 and cementitious materials. 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 cement concrete and cementitious materials. Saturated covers shall have sufficient thickness and proper positioning onto the surface to maximize moisture retention. Saturated covers shall contain a sufficient amount of moisture to prevent moisture loss from the surface of 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 and cementitious materials throughout the entire duration of the final curing method cycle. Saturated covers shall not absorb water from cement concrete and cementitious materials. Polyethylene film may be applied over the saturated cover to limit the amount of continuous watering required for sufficient moisture retainage. Saturated covers shall accommodate uniform and slow drying of cement concrete and cementitious materials surfaces immediately prior to removal.

2. Sheet Materials.

Sheet materials, including polyethylene film, white burlap-polyethylene sheeting, and reinforced paper, used for final curing methods shall meet ASTM C171 and the requirements specified 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 sheet materials shall be secured to maintain a moist environment.

a. 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. 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. Polyethylene film shall accommodate concrete surfaces with constant contact without damage. The film shall be sufficient in length to 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 throughout the entire duration of the final curing method cycle.

i. White Polyethylene Film.

White polyethylene film shall minimize heat gain caused by absorption of solar radiation and shall be exclusively used during warm weather applications.

ii. Clear and Black Polyethylene Films.

Clear and black polyethylene films shall inhibit absorption of solar radiation for cold weather applications.

b. 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.

c. 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.

3. Liquid Membrane-Forming Compounds.

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 seven 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.

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.

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 may 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.

Prior to use, compounds shall be thoroughly mixed, stirred, and agitated per the Manufacturer's instructions and recommendations.

Compounds shall be applied continuously and uniformly to the surface of the concrete per the Manufacturer's instructions and recommendations. Compounds shall be applied immediately after the disappearance of the surface water sheen following final finishing. Applying of the compound immediately after final finishing and before all free water on the surface has evaporated will help prevent the formation of cracks. 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 curing 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 will result in surface drying, absorption of the compound into the concrete, and no forming of a continuous membrane.

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 ft²/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 ft²/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. 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.

a. Liquid Membrane-Forming Compounds for Curing.

Liquid membrane-forming compounds for curing shall meet ASTM C309, the Manufacturer's instructions and recommendations, and the requirements specified herein.

Table 701.30-1: Types of 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 701.30-2: Composition Class of Compounds for Curing

Type	Description
Class A	Unrestricted composition, generally wax-based products
Class B	ASTM D883 resin-based products

b. Liquid Membrane-Forming Compounds for Curing and Sealing.

Liquid membrane-forming compounds for curing and sealing shall meet ASTM C 1315, the Manufacturer's instructions and recommendations, and the requirements specified herein.

In addition to moisture-retention capabilities compounds shall exhibit specific properties, including alkali resistance, acid resistance, adhesion-promoting quality, and resistance to degradation by ultraviolet light.

Table 701.30-3: Types of Compounds for Curing and Sealing

Type	Description
Type I	Clear or translucent
Type II	White pigmented

Table 701.30-4: Class of Compounds for Curing and Sealing

Type	Description
Class A	Non-yellowing

F. Protective Sealing Compounds.

Protective sealing compounds shall maintain valid listing on the Department Qualified Construction Materials List (QCML) and meet AASHTO M 224, NCHRP Report 244 and the requirements specified herein.

Protective sealing compounds shall sufficiently penetrate the concrete to seal the surface pores and fill the capillaries of the concrete by chemically reacting with the concrete and forming a hydrophobic layer. Protective sealing compounds shall limit the penetration of liquids, gases, and harmful substances into hardened concrete, including water, de-icing agents, and carbon dioxide to protect concrete from freezing, thawing, and de-icing cycles, corrosion of reinforcing steel, and acid attack. Protective sealing compounds shall limit the buildup of vapor pressure between the concrete and the applied sealer. Protective sealing compounds shall retard the penetration of harmful substances into hardened concrete. Protective sealing compounds shall maintain their protective properties during environmental exposure to freezing, thawing, and de-icing cycles. Protective sealing compounds shall not reduce the frictional properties of the concrete. Protective sealing compounds shall not affect the original color of the concrete surface if maintaining the original color is desired by the Department. Protective sealers shall meet the local and federal allowable Volatile Organic Compound (VOC) content limits.

Curing methods conforming to Department specifications shall be applied to the concrete prior to the application of protective sealers. Protective sealers shall not be applied to the concrete for a minimum of 28 days after placement and the surface shall be sufficiently prepared, clean, and dry for at least 24 hours with ambient temperatures exceeding 60°F. Protective sealers shall not be applied to concrete placed where freezing, thawing, and de-icing cycles are expected immediately after, due to the retainage of water in the concrete. Periodic re-application shall be required for protective penetrants requiring multiple applications and for concrete surfaces exhibiting wear to ensure long-term protection of the concrete surface.

G. Cold Weather Concreting Materials.

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 weather 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% $f'c$ 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 701.30-5.

Table 701.30-5: Concrete Temperature Requirements for Cold Weather Concreting

Phase	Cold Weather Temperature (°F)	Concrete Temperature (°F)
Mixing	30-39	60-75
	0-30	65-80
	< 0	70-85
Placement	< 40	55-75
Protection Period	< 40	55-75
Termination of Protection Period – Allowable Rate of Decrease in 24 Hours	< 40	≤ 50

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:

- Procedures for protecting the subgrade from frost and the accumulation of ice or snow on reinforcement or forms prior to placement
- Methods and requirements for cold weather protection and temperature control of constituent materials incorporated into the mix design
- Chemical admixtures incorporated into the mix design for cold weather protection and temperature control
- Methods and requirements for cold weather protection and temperature control during mixing, delivery, placement, finishing, curing, and protection period
- Curing methods to be used during and following the protection period
- Types of covering, insulation, heating, or enclosures to be provided
- Methods for verification of in-place strength
- Procedures for measuring and recording concrete temperatures
- 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.

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.

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 meeting 701.30.G.1. 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 meeting 701.30.G.1 shall be applied as a vapor barrier to the concrete surface immediate after final set is attained.

H. Hot Weather Concreting Materials.

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 80°F; concrete temperatures approaching, or expected to approach 90°F; evaporation rates of surface water approaching, or expected to approach the bleeding rate of the concrete; high solar radiation; low relative humidity; and high wind speed.

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 allowable rate of temperature decrease shall not exceed 5°F per hour and meet the allowable rate of temperature decrease specified in 701.30.G: Cold Weather Concreting Materials.

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. Initial materials meeting 701.30.C: Initial Curing Materials shall be applied to the concrete surface while 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 equal to or greater than bleeding rate of the concrete. 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/ft²/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.

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:

- Procedures for preparing the subgrade prior to placement
- Methods and requirements for hot weather protection and temperature control of constituent materials incorporated into the mix design
- Chemical admixtures incorporated into the mix design for hot weather protection and temperature control
- Methods and requirements for hot weather protection and temperature control during mixing, delivery, placement, finishing, curing, and protection period
- Initial curing methods to be used to reduce surface evaporation
- Curing methods to be used during and following the protection period
- Types of covering, insulation, cooling, or enclosures to be provided
- Evaporation rate and bleeding rate of concrete calculations
- Procedures for measuring and recording concrete temperatures
- 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.

CONSTRUCTION METHODS

701.40: Pre-Placement

A. Excavation.

Excavation of the area shall be in accordance with the applicable portions of Subsection 120: Excavation.

B. Subgrade and Subbase.

The subgrade for the sidewalks and driveways shall be shaped parallel to the proposed surface of the sidewalks and driveways and thoroughly compacted. All depressions in the subgrade shall be filled with suitable material and again compacted until the surface is smooth and hard. Prior to the placement of the subbase, the Contractor shall inspect the prepared subgrade to ensure that it is in conformance with the required grade and cross-section. Subgrade shall be fine graded to meet the applicable requirements of Subsection 170: Grading.

After the subgrade has been prepared, a gravel subbase shall be placed upon it. After being compacted thoroughly, the subbase shall be at least 8 inches thick and parallel to the proposed surface of the sidewalk. Prior to the placement of the cement concrete, the Contractor shall inspect the prepared subbase material to ensure that it is in conformance with the required grade and cross-section. Subbase material that is not in accordance with the plans or specifications shall be reworked or replaced to meet the applicable requirements of Subsection 170: Grading before the start of cement concrete placement. When placing cement concrete, the compacted subbase shall not be frozen or have standing water.

C. Forms.

Side forms and transverse forms shall be smooth, free from warp, of sufficient strength to resist springing out of shape, of a depth to conform to the thickness of the proposed sidewalk or pedestrian curb ramp and of a type satisfactory to the Engineer.

All mortar or dirt from previously used forms shall be completely removed prior to use. The forms shall be well staked and thoroughly graded and set to the established lines with their upper edge conforming to the grade of the finished sidewalk or pedestrian curb ramp which shall have sufficient pitch to the roadside edge to provide for surface drainage.

All pedestrian curb ramp joints and transition sections which define grade changes shall be formed staked and checked for dimension, grade and slope conformance prior to placing cement concrete.

All forms shall be oiled before placing concrete.

701.41: Placement

The concrete shall be placed in alternate slabs 30 ft long except as otherwise ordered. The slabs shall be separated by transverse preformed expansion joint filler ½ in. thick.

Preformed expansion joint filler shall be placed adjacent to or around existing structures as directed.

Detectable warning panels conforming to the plans shall be securely incorporated into the work by means acceptable to the Engineer.

On the foundation as specified above, the concrete shall be placed in such quantity that after being thoroughly consolidated in place it shall be 4 in. deep. At driveways, the sidewalks shall be 6 in. deep.

In conveying the concrete from the place of mixing to the place of deposit, the operation shall be conducted in such a manner that no mortar will be lost, and the concrete shall be so handled that the concrete will be of uniform composition throughout, showing neither excess nor lack of mortar in any one place.

The surface of all concrete sidewalks shall be uniformly scored into block units of areas not more than 36 ft². The depth of the scoring shall be at least ½ in. deep and no more than ½ in. wide.

701.42: Initial Curing

In instances where the bleed water sheen has disappeared from the surface of the concrete or the concrete surface exhibits loss of moisture and surface drying between placement and finishing operations, the Contractor shall apply one of the following initial curing materials and procedures meeting 701.30.C: Initial Curing Materials until finishing operations occur.

- 701.30.C.1: Liquid-Applied Evaporation Reducers

Initial curing materials shall not be worked into the surface in subsequent finishing operations.

701.43: Finishing

The finishing of concrete surface shall be done by experienced and competent cement finishers. No finishing operation shall be performed while free water is present. Finishing operations shall be delayed until all bleed water and water sheen has left the surface and the concrete has started to stiffen. After water sheen has disappeared, edging operations, where required, shall be completed. After edging and joining operations, the surface shall be floated. Magnesium floats shall be used for all finishing operations. If necessary tooled joints and edges shall be rerun before and after floating to maintain uniformity. After floating, the surface shall be brushed by drawing a soft-bristled push broom with a long handle over the surface of the concrete to produce a nonslip surface.

701.44: Intermediate Curing

In instances where finishing operations have been completed prior to the concrete achieving final set and the concrete surface exhibits loss of moisture and surface drying, the Contractor shall apply one of the following intermediate curing materials and procedures meeting 701.30.D: Intermediate Curing Materials immediately to the concrete surface prior to the application of final curing materials, to prevent the loss of moisture without damaging the concrete surface, until final set of the concrete has been achieved and final curing materials have been applied to the concrete surface.

- 701.30.C.1: Liquid-Applied Evaporation Reducers
- 701.30.E.3.a: Liquid Membrane-Forming Compounds for Curing
- 701.30.E.3.b: Liquid Membrane-Forming Compounds for Curing and Sealing

701.45: Final Curing

The Contractor shall apply one of the following final curing materials and procedures meeting 701.30.E: Final Curing Materials to the concrete surface immediately after application of initial and intermediate curing materials, finishing operations, and final set of cement concrete, to prevent the loss of moisture and surface drying.

- 701.30.E.1: Saturated Covers
- 701.30.E.2: Sheet Materials
- 701.30.E.3.a: Liquid Membrane-Forming Compounds for Curing
- 701.30.E.3.b: Liquid Membrane-Forming Compounds for Curing and Sealing

The Contractor shall apply final curing materials and procedures to the concrete surface throughout the entire duration of the curing cycle and meet minimum sustained temperature, duration, and strength requirements, as specified in in Table 701.45-1. Controlled and gradual termination of the curing cycle shall begin after all specified conditions are met.

Table 701.45-1: Termination of Curing Cycle

Sustained Concrete Temperature	Final Curing Cycle Duration	Compressive Strength^[1]
50°F ≤ °F ≤ 90°F	≥ Seven (7) days	≥ 70% f _c

^[1] Compressive strength cylinders for termination of curing cycle shall be cast and field cured with the same environmental conditions that the sidewalk is subjected to throughout the entire duration of the final curing cycle, per 701.73: Acceptance Sampling and Testing.

701.46: Protective Sealing

The Contractor shall apply sealing materials and procedures meeting 701.30.F: Protective Sealing Compounds only if one or more of the following final curing materials and procedures were applied:

- 701.30.E.1: Saturated Covers
- 701.30.E.2: Sheet Materials
- 701.30.E.3.a: Liquid Membrane-Forming Compounds for Curing

Protective sealing compounds shall not be applied to concrete surfaces applied with a final curing material and procedure meeting 701.30.E.3.b: Liquid Membrane-Forming Compounds for Curing and Sealing.

701.47: Cold Weather Concreting

The Contractor shall conduct cold weather concreting procedures, operations, materials, and equipment required for the mixing, delivery, placement, finishing, curing, and protection of concrete, while surfaces are exposed to air temperatures falling below, or expected to fall below 40°F in accordance with 701.30.G: Cold Weather Concreting Materials. All procedures, operations, materials, and equipment required for adequate protection and curing shall be present and ready for use prior to concrete production.

701.48: Hot Weather Concreting

The Contractor shall conduct hot weather concreting procedures, operations, materials, and equipment required for the mixing, delivery, placement, finishing, curing, and protection of concrete, while surfaces are exposed to air temperatures exceeding, or expected to exceed 80°F; concrete temperatures approaching, or expected to approach 90°F; evaporation rates of surface water approaching, or expected to approach the bleeding rate of the concrete; high solar radiation; low relative humidity; and high wind speed in accordance with 701.30.H: Hot Weather Concreting Materials. All procedures, operations, materials, and equipment required for adequate protection and curing shall be present and ready for use prior to concrete production.

CONTRACTOR QUALITY CONTROL**701.60: General**

The Contractor shall provide adequate Quality Control (QC) to ensure that all materials and workmanship conform with the specification requirements. The Contractor shall perform QC activities as outlined further below.

701.61: Contractor Quality Control Plan

The Contractor shall provide and maintain a Quality Control Plan (QC Plan). The QC Plan should sufficiently document the QC processes of all Contractor parties (i.e. Prime Contractor, Subcontractors, Producers) performing work required under this specification.

701.62: Production Personnel**A. Foreman.**

A foreman shall be present throughout the entire duration of the construction operation with at least one of the following personnel certifications.

- NRMCA Concrete Exterior Finisher Certification
- ACI Concrete Flatwork Technician and Flatwork Finisher

The foreman is responsible for the oversight of the construction operation per the requirements specified in Table 701.62-1.

Table 701.62-1: Minimum Foreman Activities

Operation	Foreman	Activity
Oversight	One (1)	Review and compare batch ticket quantities and sources to approved mix design
		Monitors conformance to AASHTO M 157 Standard Specification for Ready-Mixed Concrete
		Monitors conformance to Department specifications
		Monitors Production Personnel activities
		Verifies proper equipment is on hand prior to start of construction
		Monitors equipment, environmental conditions, materials, and workmanship
		Prohibits the use of prohibited equipment and practices
		Acknowledges sampling, testing, and inspection results

B. Operators.

Concrete sidewalk shall be constructed by sufficiently staffed, trained, experienced, and qualified equipment operators and craftsmen, who are presently involved in sidewalk construction, throughout the entire duration of the construction operation, per the requirements specified in Table 701.62-2.

Table 701.62-2: Minimum Operator Activities

Operation	Operators ^[1]	Activity
701.40: Pre-Placement	Two (2)	Apply sufficient base compaction
		Moisten sub-base, free of standing water
		Secure forms, straight and level
		Mark expansion locations
		Prohibited Practices: Placement on frozen sub-grade
701.41: Placement (Concrete Discharging)	Two (2)	Direct concrete trucks
		Handle chute discharge and truck movement
		Assist in preparing concrete for testing
		Direct trucks to washout area
		Provide general help
		Prohibited Practices: Adding constituent materials not in conformance with AASHTO M 157 or without Department consent
701.41: Placement	Two (2)	Localize placement to minimize moving material
		Level concrete in front of the screed
		Operate come-alongs or flat headed shovel to move concrete in form
		Consolidate concrete along form edge to avoid honeycombing
		Operate screed over top of forms in sawing action for surface leveling
		Operate magnesium bull float to push coarse aggregate below the surface and fill in the low spots or depressions
		Prohibited Practices: Toothed raking, dragging of internal vibrator, and internal vibrator to move concrete; steel troweling or floating
701.42: Initial Curing	Apply an initial curing material and procedure per 701.42	
	One (1)	701.30.C.1: Liquid-Applied Evaporation Reducers
701.43: Finishing	Two (2)	Permit bleed water to dissipate and concrete to set
		Operate a hose drag or squeegee to remove water from the surface
		Check surface for flatness, fill/cut as necessary
		Finish surface with magnesium float
		Apply pulled broom finish at proper time to acceptable texture
		Clean broom when excessive mortar adheres
		Remove excess water from broom before use
		Finish edges and joints
		Finish well formed, properly spaced joints to sufficient depth
		Prohibited Practices: Steel troweling or floating; adding water to the surface; excessive working of surface; pushing broom across surface

^[1] Recommended number of operators.

Table 701.62-2: Minimum Operator Activities (Continued)

Operation	Operators ^[1]	Activity
701.44: Intermediate Curing	If applicable, apply an intermediate curing material and procedure per 701.44	
	One (1)	701.30.C.1: Liquid-Applied Evaporation Reducers
	One (1)	701.30.E.3.a: Liquid Membrane-Forming Compounds
	One (1)	701.30.E.3.b: Liquid Membrane-Forming Compounds for Curing and Sealing
701.45: Final Curing	Apply a final curing material and procedure meeting 701.45	
	Four (4)	701.30.E.1: Saturated Covers
	Four (4)	701.30.E.2: Sheet Materials
	One (1)	701.30.E.3.a: Liquid Membrane-Forming Compounds
	One (1)	701.30.E.3.b: Liquid Membrane-Forming Compounds for Curing and Sealing
701.46: Protective Sealing	One (1)	If applicable, apply a protective sealing material and procedure per 701.46
701.47: Cold Weather Concreting	Four (4)	If applicable, apply cold weather concreting materials and procedures per 701.47 and the Department approved Contractor cold weather concreting plan
701.48: Hot Weather Concreting	Four (4)	If applicable, apply hot weather concreting materials and procedures per 701.48 and the Department approved Contractor hot weather concreting plan

^[1] Recommended number of operators.

701.63: Quality Control Inspection

Quality Control inspection shall be performed and reported on inspection report forms by qualified Quality Control Technicians, to confirm conformance to specifications and to visually inspect equipment, environmental conditions, materials, and workmanship. Quality Control Technicians shall obtain at least one of the following personnel certifications.

- NRMCA Concrete Exterior Finisher Certification
- ACI Concrete Flatwork Technician and Flatwork Finisher

Quality Control inspection report forms shall be completed by the Contractor and submitted to the Department for review.

DEPARTMENT ACCEPTANCE

701.70: General

Acceptance shall be performed by the Department, including consultants under direct contract with the Department independent of the Contractor, to evaluate the degree of compliance with contract requirements, to monitor each Contractor entity's Quality Control activities, to determine the corresponding value for a given product, and to determine the acceptability of all material produced and placed.

701.71: Acceptance of Contractor Quality Control Plan

The Department will review the Contractor Quality Control Plan. Department approval shall be subject to conformance with the requirements specified herein.

701.72: Acceptance Inspection

Acceptance inspection will be performed and reported by qualified Department (or designee) Acceptance Technicians, to confirm conformance to specifications and to visually inspect equipment, environmental conditions, materials, and workmanship.

701.73: Acceptance Sampling and Testing

Acceptance sampling and testing will be performed and reported by qualified Department (or designee) Acceptance Technicians, to provide quality characteristic data used for Department Acceptance determination, per the requirements specified herein.

Table 701.73-1: Minimum Acceptance Sampling and Testing Requirements

Property	Method	Quality Characteristic	Sublot Size	Minimum Test Frequency	Point of Sampling	Criteria
Uniformity	T 119	Slump Allowable Tolerance (in.) ^[1]	100 cy	1 per Sublot	Point of Discharge	Target ± 1.5
Workability	T 119	Segregation Resistance ^[2]	100 cy	1 per Sublot	Point of Discharge	Pass
Thermal	T 309	Concrete Temperature (°F)	100 cy	1 per Sublot	Point of Discharge	50 – 90
Strength	T 22	Compressive Strength at 7 Days for Curing Termination (psi) ^[3]	100 cy	1 per Sublot	Point of Discharge	$\geq 70\% f'_c$
		Compressive Strength at 28 Days (psi) ^[3]	100 cy	1 per Sublot	Point of Discharge	$\geq 100\% f'_c$
		Compressive Strength at 56 Days (psi) ^{[3][4]}	100 cy	1 per Sublot	Point of Discharge	$\geq 100\% f'_c$
Durability	T 121 T 152 T 196	Freezing and Thawing Resistance: Air Content (%)	100 cy	1 per Sublot	Point of Discharge	5.5 – 8.5
	T 303 or C1567	Alkali Silica Reaction Resistance: Expansion at 14 Days (%)	–	1 per Annual Mix Design Submission Cycle	–	≤ 0.08

^[1] Test result and the Producer's mix design target shall be within the specified allowable tolerances. Slump shall be reported on the Producer's mix design batch ticket for each delivery.

^[2] Testing for segregation resistance shall be performed while the concrete is being discharged and during AASHTO T 119 Standard Method of Test for Slump of Hydraulic Cement Concrete. Visual signs of segregation include coarse particles advancing in front of or behind the fine particles and mortar and a tendency for coarse aggregate to separate from the mortar, particularly when the mixture is being consolidated.

^[3] Three (3) 4 x 8 in. compressive strength cylinders shall be cast and tested for each age per sublot.

^[4] Testing only required if compressive strength results at 28 days do not conform with specifications.

COMPENSATION

701.80: Method of Measurement

Cement Concrete Sidewalks, Pedestrian Curb Ramps, and Driveways will be measured in square yards.

Excavation will be measured by the cubic yard as specified in 120.80: Method of Measurement.

Gravel Borrow will be measured by the cubic yard as specified in 150.80: Method of Measurement.

Fine grading and compacting will be measured by the square yard as specified in 170.88: Method of Measurement.

701.81: Basis of Payment

Cement Concrete Sidewalk, Cement Concrete Pedestrian Curb Ramp, and Cement Concrete Driveway will be paid for at the contract unit price per square yard complete in place, including detectable warning panels and all incidental materials, labor, and equipment necessary to complete the work to the satisfaction of the Engineer.

Gravel will be paid for at the contract unit price per cubic yard under Item 151: Gravel Borrow.

Fine grading and compacting will be paid for at the contract unit price per square yard under Item 170: Fine Grading and Compacting – Subgrade Areas.

Excavation will be paid for at the contract unit price per cubic yard under the excavation items.

701.82: Payment Items

701.	Cement Concrete Sidewalk	Square Yard
701.1	Cement Concrete Sidewalk Driveways	Square Yard
701.2	Cement Concrete Pedestrian Curb Ramp.....	Square Yard

GUIDE TO THE INTERIM SUBSECTION 701 CEMENT CONCRETE SIDEWALK SPECIFICATION

MATERIALS ACTIVITIES

Section	Activity	
701.30.A	Combined Aggregate System	
701.30.A.1	The mix design's combined aggregate system should meet Table 701.30-1: Tarantula Curve Particle Size Distribution.	Recommendation
701.30.A.2	The mix design's combined aggregate system should meet Table 701.30-2 / Figure 701.30-1: Shilstone Workability-Coarseness.	Recommendation
701.30.A.3	The mix design's combined aggregate system should be analyzed using the Fineness Modulus.	Recommendation
701.30.A.4	The mix design's combined aggregate system should be analyzed using the Coarse Aggregate Content.	Recommendation
701.30.B	Paste System	
701.30.B.1	The mix design's Water-Cementitious Ratio should be ≤ 0.40 (Table 701.30-3: Freezing, Thawing, and De-icing Resistance).	Recommendation
701.30.B.1	The mix design's Water-Cementitious Ratio shall be ≤ 0.45 (Table 701.30-3: Freezing, Thawing, and De-icing Resistance).	Required
701.30.B.2	The mix design's Air Content should approach the recommended Air Content Targets identified in Table 701.30-4: Freezing, Thawing, and De-icing Resistance.	Recommendation
701.30.B.3	The mix design's Cement and Supplementary Cementitious Materials (SCM) Content shall meet Table 701.30-5: Alkali Silica Reaction and Freezing, Thawing, and De-icing Resistance requirements.	Requirement
701.30.B.3	Test results meeting Table 701.30-6: Alternative Performance Evaluation to Alkali Silica Reaction Resistance requirements may be used in lieu of the mix design requirements identified in Table 701.30-5: Alkali Silica Reaction and Freezing, Thawing, and De-icing Resistance requirements.	Optional
701.30.B.4	The mix design should incorporate Chemical Admixtures identified in Table 701.30-7: Chemical Admixtures to enhance the properties of the concrete.	Recommendation
701.30.B.5	The mix design's Paste Content should approach the recommended targets identified in Table 701.30-8: Paste Content.	Recommendation

701.73	Acceptance Sampling and Testing	
T 119	The Slump shall meet Table 701.71-1: Minimum Acceptance Sampling and Testing Requirements (± 1.5 from Slump Target identified by the Concrete Producer on the Batch Ticket).	Requirement
T 119	The Segregation Resistance shall meet Table 701.71-1: Minimum Acceptance Sampling and Testing Requirements.	Requirement
T 309	The Concrete Temperature shall meet Table 701.71-1: Minimum Acceptance Sampling and Testing Requirements.	Requirement
T 22	The Compressive Strength (7, 28, and 56 days) shall meet Table 701.71-1: Minimum Acceptance Sampling and Testing Requirements.	Requirement
T 121 T 152 T 196	The Air Content shall meet Table 701.71-1: Minimum Acceptance Sampling and Testing Requirements (5.5 – 8.5%).	Requirement
T 303 or C1567	The resistance to Alkali Silica Reaction shall meet Table 701.71-1: Minimum Acceptance Sampling and Testing Requirements (One per year for mix design verification).	Requirement

CONTRACTOR ACTIVITIES

Section	Activity	
701.40	Pre-Placement	
	The Contractor should have a minimum of two (2) Operators.	Recommendation
	The Contractor shall apply sufficient base compaction.	Requirement
	The Contractor shall moisten sub-base, free of standing water.	Requirement
	The Contractor shall secure forms, straight and level.	Requirement
	The Contractor shall mark expansion locations.	Requirement
	The Contractor shall be prohibited from performing the following practices: Placement on frozen sub-grade.	Requirement
701.41	Placement (Concrete Discharging)	
	The Contractor should have a minimum of two (2) Operators.	Recommendation
	The Contractor shall direct concrete trucks.	Requirement
	The Contractor shall handle chute discharge and truck movement.	Requirement
	The Contractor shall assist in preparing concrete for testing.	Requirement
	The Contractor shall direct trucks to washout area.	Requirement
	The Contractor shall provide general help.	Requirement

	The Contractor / Concrete Producer shall be prohibited from performing the following practices: Adding constituent materials not in conformance with AASHTO M 157 or without Department consent.	Requirement
701.41	Placement	
	The Contractor should have a minimum of two (2) Operators.	Recommendation
	The Contractor shall localize placement to minimize moving material.	Requirement
	The Contractor shall level concrete in front of the screed.	Requirement
	The Contractor shall operate come-alongs or flat headed shovel to move concrete in form.	Requirement
	The Contractor shall consolidate concrete along form edge to avoid honeycombing.	Requirement
	The Contractor shall operate screed over top of forms in sawing action for surface leveling.	Requirement
	The Contractor shall operate magnesium bull float to push coarse aggregate below the surface and fill in the low spots or depressions.	Requirement
	The Contractor shall be prohibited from performing the following practices: Toothed raking, dragging of internal vibrator, and internal vibrator to move concrete; steel troweling or floating.	Requirement
701.42	Initial Curing (When Applicable)	
	The Contractor should have a minimum of one (1) Operator.	Recommendation
	The Contractor shall apply 701.30.C.1: Liquid-Applied Evaporation Reducers when applicable.	Required when applicable
701.43	Finishing	
	The Contractor should have a minimum of two (2) Operators.	Recommendation
	The Contractor shall permit bleed water to dissipate and concrete to set.	Requirement
	The Contractor shall operate a hose drag or squeegee to remove water from the surface.	Requirement
	The Contractor shall check surface for flatness, fill/cut as necessary.	Requirement
	The Contractor shall finish surface with magnesium float.	Requirement
	The Contractor shall apply pulled broom finish at proper time to acceptable texture.	Requirement
	The Contractor shall clean broom when excessive mortar adheres.	Requirement
	The Contractor shall remove excess water from broom before use.	Requirement

	The Contractor shall finish edges and joints.	Requirement
	The Contractor shall finish well formed, properly spaced joints to sufficient depth.	Requirement
	The Contractor shall be prohibited from performing the following practices: Steel troweling or floating; adding water to the surface; excessive working of surface; pushing broom across surface.	Requirement
701.44	Intermediate Curing (When Applicable, Apply One of the Methods)	
	The Contractor should have a minimum of one (1) Operator.	Recommendation
	The Contractor shall apply 701.30.C.1: Liquid-Applied Evaporation Reducers when applicable and if selected.	Required when applicable
	The Contractor shall apply 701.30.E.3.a: Liquid Membrane-Forming Compounds when applicable and if selected.	Required when applicable
	The Contractor shall apply 701.30.E.3.b: Liquid Membrane-Forming Compounds for Curing and Sealing when applicable and if selected.	Required when applicable
701.45	Final Curing (Apply One of the Methods)	
	The Contractor should meet the minimum number of operators identified in Table 701.62-2: Minimum Operator Activities.	Recommendation
	The Contractor shall apply 701.30.E.1: Saturated Covers if selected.	Requirement
	The Contractor shall apply 701.30.E.2: Sheet Materials if selected.	Requirement
	The Contractor shall apply 701.30.E.3.a: Liquid Membrane-Forming Compounds if selected.	Requirement
	The Contractor shall apply 701.30.E.3.b: Liquid Membrane-Forming Compounds for Curing and Sealing if selected.	Requirement
701.46	Protective Sealing (If Required)	
	The Contractor should have a minimum of one (1) Operator.	Recommendation
	The Contractor shall apply 701.30.F: Protective Sealing Compounds at least 28 days after placement. Application of 701.30.F: Protective Sealing Compounds is NOT REQUIRED IF 701.30.E.3.b: Liquid Membrane-Forming Compounds for Curing and Sealing was applied.	Required if 701.30.E.3.b Curing and Sealing Compound was Not Applied
701.47	Cold Weather Concreting (When Applicable)	
	The Contractor should have a minimum of four (4) Operators.	Recommendation
	The Contractor shall submit a Cold Weather Concreting Plan meeting 701.47.	Required when applicable

	The Contractor shall apply cold weather concreting materials and procedures meeting 701.47 and the Department approved Contractor cold weather concreting plan.	Required when applicable
701.48	Hot Weather Concreting (When Applicable)	
	The Contractor should have a minimum of four (4) Operators.	Recommendation
	The Contractor shall submit a Hot Weather Concreting Plan meeting 701.48.	Required when applicable
	The Contractor shall apply hot weather concreting materials and procedures meeting 701.47 and the Department approved Contractor hot weather concreting plan.	Required when applicable
701.61	Contractor Quality Control Plan	
	The Contractor shall prepare and submit a Quality Control Plan (QC Plan) to the Department for review.	Requirement
701.62	Production Personnel	
701.62.A	Foreman	
	The Contractor shall have a minimum of One (1) Foreman.	Requirement
	<p>A Foreman shall be present throughout the entire duration of the construction operation with at least one of the following personnel certifications.</p> <ul style="list-style-type: none"> • NRMCA Concrete Exterior Finisher Certification • ACI Concrete Flatwork Technician and Flatwork Finisher 	Requirement
	The Contractor's Foreman shall review and compare batch ticket quantities and sources to approved mix design.	Requirement
	The Contractor's Foreman shall monitor conformance to AASHTO M 157 Standard Specification for Ready-Mixed Concrete.	Requirement
	The Contractor's Foreman shall monitor conformance to Department specifications.	Requirement
	The Contractor's Foreman shall monitor Production Personnel activities.	Requirement
	The Contractor's Foreman shall verify that proper equipment is on hand prior to start of construction.	Requirement
	The Contractor's Foreman shall monitors equipment, environmental conditions, materials, and workmanship.	Requirement
	The Contractor's Foreman shall prohibit the use of prohibited equipment and practices.	Requirement
	The Contractor's Foreman shall acknowledge sampling, testing, and inspection results.	Requirement

701.62.B	Operators	
	Concrete sidewalk shall be constructed by sufficiently staffed, trained, experienced, and qualified equipment operators and craftsmen, who are presently involved in sidewalk construction, throughout the entire duration of the construction operation, per the requirements specified in Sections 701.40 to 701.48.	Requirement
701.63	Quality Control Inspection	
	<p>Quality Control inspection shall be performed and reported on inspection report forms by qualified Quality Control Technicians, to confirm conformance to specifications and to visually inspect equipment, environmental conditions, materials, and workmanship. Quality Control Technicians shall obtain at least one of the following personnel certifications.</p> <ul style="list-style-type: none">• NRMCA Concrete Exterior Finisher Certification• ACI Concrete Flatwork Technician and Flatwork Finisher <p>Quality Control inspection report forms shall be completed by the Contractor and submitted to the Department for review</p>	Requirement

DOCUMENT 00715



SUPPLEMENTAL SPECIFICATIONS

(English Units)

DATE: SEPTEMBER 30, 2020

The 2020 *Standard Specifications for Highways and Bridges* are amended by the following modifications, additions and deletions. This Supplemental Specifications prevail over those published in the Standard Specifications.

The MassDOT–Highway Specifications Committee has issued these Supplemental Specifications for inclusion into each proposal until such time as they are approved as Standard Specifications.

Contractors are cautioned that these Supplemental Specifications are dated and may vary from time to time as they are updated.

GLOBAL MODIFICATIONS

Replace the term “wheelchair ramp” with “pedestrian curb ramp” at each occurrence throughout the *Standard Specifications*

DIVISION I GENERAL REQUIREMENTS AND COVENANTS

SECTION 4.00: SCOPE OF WORK

Subsection 4.04 Changed Conditions.

(page I.22) Delete the two sequential paragraphs near the end that begin “The Contractor shall be estopped...” and “Any unit item price determined ...”

SECTION 8.00: PROSECUTION AND PROGRESS

Subsection 8.08 Preservation of Roadside Growth

(page I.74) Delete the last paragraph of this subsection which reads; All scars on trees shall be painted as soon as possible with an approved tree paint.

DIVISION II CONSTRUCTION DETAILS

SECTION 200: DRAINAGE

SUBSECTION 230: CULVERTS, STORM DRAINS, AND SEWAR PIPES

SUBSECTION 230: CULVERTS, STORM DRAINS, AND SEWAR PIPES

(page II.63) Change SEWAR to SEWER in the title of this subsection.

Subsection 230.20 General.

(page II.63) Delete the words Reinforced Concrete or Metal.

Subsection 230.40 General.

Subsection 230.62 Pipe Joints.

Subsection 230.82 Payment Items

(page II.63, II.64 and II.68) Replace the words Corrugated Plastic (Polyethylene) Pipe with the words Corrugated Plastic Pipe.

Subsection 230.64 Field Testing of Corrugated Plastic Pipe

(page II.65) Delete the word thermoplastic in the first sentence of this subsection.

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

SUBSECTION 440: ROADWAY DUST CONTROL

SUBSECTION 440 Roadway Dust Control.

(page II.101) Item 441. Bitumen for Roadway Dust control has been deleted. Replace the entire subsection with the following;

440.20: General

This work: shall consist of furnishing and applying approved dust control material to the surface of the subgrade or elsewhere as directed in accordance with these specifications.

440.40: General

Calcium Chloride shall meet the requirements of Division III, Materials, M9.01.0.

CONSTRUCTION METHODS

440.60: General

The required material shall be properly applied where directed by the Engineer and distributed uniformly at the rate specified or ordered. The means of distribution shall depend upon the kind of material used, and the method and equipment used shall be satisfactory to the Engineer. The number and frequency of applications shall be as determined by the Engineer.

440.61: Treatment with Calcium Chloride

Calcium chloride shall be uniformly applied at the rate of 1½ lb per yd² or at any other rate as directed by means of a mechanical spreader, or other approved methods.

440.62: Treatment with Water

Water shall be applied at locations at such times, and in the amount as directed by the Engineer. Quantities of water wasted or applied without authorization will not be paid for.

Watering equipment shall consist of pipelines, tanks, tank trucks, or other devices, approved by the Engineer, which are capable of applying a uniform spread of water over the surface. A suitable device for a positive shut-off and for regulating the flow of water shall be located so as to permit positive operator control.

COMPENSATION**440.80: Method of Measurement**

Calcium chloride will be measured by the pound.

Water will be measured for payment by the number of M gallons (1,000 gallons). The water will be measured in tanks or tank trucks of predetermined capacity, or by means of satisfactorily installed meters. Any and all measuring devices shall be furnished by the Contractor.

440.81: Basis of Payment

Calcium chloride will be paid for at the contract unit price per pound under the item for Calcium Chloride for Roadway Dust Control, complete in place.

Water will be paid for at the contract price per "M" gallons for Water for Roadway Dust Control which price shall include all water, labor, tools and equipment required to furnish and measure the water applied to surfaces designated by the Engineer and at the times specified.

440.82: Payment Items

440.	Calcium Chloride for Roadway Dust Control.....	Pound
443.	Water for Roadway Dust Control.....	M. Gallons

SUBSECTION 450: HOT MIX ASPHALT PAVEMENT**Subsection 453.93 Payment Items.**

(page II.181) Change the pay unit of item 452. Tack Coat from Ton to Gallons and the pay unit of item 453. HMA Joint Sealant from Ton to Foot.

SUBSECTION 477: MILLED RUMBLE STRIPS**SUBSECTION 477 Milled Rumble Strips.**

(page II.261) Replace sections 477.20, 477.62, 477.80, 477.81 and 477.82 with the following;

477.20: General

The work consists of constructing rumble strips on paved highway shoulders by milling grooves into finished hot mix asphalt surfaces. Milled Rumble Strips are categorized as Type A, Type B, or Type C. Type A are rectangular milled grooves at regular intervals in the paved surface, Type B rumble strips are rectangular grooves at regular intervals with designed gaps between intervals to accommodate bicyclists and Type C rumble strips form continuous grooves in the paved surface in the form of a vertical sinusoidal wave pattern.

477.62: Installation of Milled Rumble Strips

Rumble strips shall be installed in accordance with the locations, dimensions, and Type shown on the plans.

477.80: Method of Measurement

Milled Rumble Strip (Type A) and Milled Rumble Strip (Type C) will be measured by the total length of installed rumble strip. Milled Rumble Strip (Type B) will be measured by the total length of installed rumble strip excluding the designed gaps. Breaks at castings, bridge decks, intersections or other breaks will not be measured for payment for all types.

477.81: Basis of Payment

Payment for Milled Rumble Strip (Type A), Milled Rumble Strip (Type B), and Milled Rumble Strip (Type C) will be made at the contract unit price per foot of rumble strips, complete in place. Such payment will be full compensation for furnishing all equipment and labor for satisfactorily performing the work including cleanup and disposal of excess materials.

477.82: Payment Items

477.	Milled Rumble Strip (Type A).....	Foot
477.1	Milled Rumble Strip (Type B).....	Foot
477.2	Milled Rumble Strip (Type C).....	Foot

SECTION 600: HIGHWAY GUARD, FENCES AND WALLS**SUBSECTION 601: GUARDRAIL****Subsection 601.82 Payment Items.**

(page II.278) Add the following payment item in numerical order,

620.131	Guardrail, Deep Post (Single Faced)	Foot
---------	---	------

SUBSECTION 628: PERMANENT IMPACT ATTENUATORS**Subsection 628.80 Method of Measurement.**

(page II.280) Delete the last sentence which reads "There will be a separate bid item for each location.".

SUBSECTION 630: MAINTENANCE OF HIGHWAY GUARD**Subsection 630.82 Payment Items.**

(page II.286) Add the following payment item in numerical order,

632.11	Guardrail, Deep Post - Steel.....	Each
--------	-----------------------------------	------

SECTION 700: INCIDENTAL WORK**SUBSECTION 701: CEMENT CONCRETE SIDEWALKS, PEDESTRIAN CURB RAMPS AND DRIVEWAYS****Subsection 701.82 Payment Items**

(page II.302) Revise the description of pay item 701.1 to read as follows,

701.1	Cement Concrete Sidewalk At Driveways.....	Square Yard
-------	--	-------------

SUBSECTION 702: HOT MIX ASPHALT SIDEWALKS AND DRIVEWAYS

Subsection 702.41 Preparation of Underlying Surface.

(page II.303) Add the following sentence to the end of the first paragraph;

Existing pavements shall be sawcut in accordance with 450.49: Hot Mix Asphalt Joints.

Subsection 702.81 Basis of Payment.

(page II.314) Add the following after the last paragraph;

All required sawcutting in the existing pavement in accordance with this specification will be included in the contract unit price for Hot Mix Asphalt Sidewalks and Driveways.

SUBSECTION 765: SEEDING

Subsection 765.40 General.

(page II.332) Add the following material to the end of this subsection;

Short Term Erosion Control Seed..... M6.03.1

Subsection 765.63 Seeding Grass.

(page II.333) Replace the first sentence with the following;

After the loamed or topsoil areas have been prepared and treated as hereinbefore described, grass seed conforming to the respective formulas hereinbefore specified shall be carefully sown thereon at the rate as specified by the supplier.

Subsection 765.65 Seeding Grass by Spray Machine.

(page II.333) Change the title of this subsection to Hydroseeding. Delete the last paragraph of this subsection that begins with "If the results ...", and Replace the first two sentences of the first paragraph with the following;

A hydroseed machine approved by the Engineer and designed specifically for seed dissemination may be utilized. The application of limestone as necessary, fertilizer as necessary and grass seed may be accomplished in one operation by the use of the approved hydroseed machine.

Subsection 765.81 Basis of Payment.

(page II.334) Replace this subsection with the following;

Payment for Seeding and Seeding for Short Term Erosion Control, including all mowing, will be paid for at the contract unit price per square yard, complete in place. When a satisfactory stand of grass has not been established at the time of acceptance, no payment for seeding shall be allowed at the time of acceptance. At the time the final estimate is ready to be forwarded to the Contractor the seeded areas will again be inspected by the Engineer and the seeded areas with a satisfactory stand of grass will be included for payment.

Subsection 765.82 Payment Items.

(page II.334) Add the following payment item;

765.2 Seed for Short Term Erosion Control..... Square Yard

SUBSECTION 766: REFERTILIZATION

SUBSECTION 766 Refertilization.

(page II.335) Delete this entire subsection.

SUBSECTION 767: MULCHING; SEED FOR EROSION CONTROL

Subsection 767 Mulching; Seed for Erosion Control.

(page II.336) Change the title of this subsection to Mulching and Erosion Control.

Subsection 767.40 General.

(page II.336) Delete Seeding for Erosion Control ... M6.03.1.

Subsection 767.62 Hay Mulch with Seed for Erosion Control.

(page II.337) Change the title of this subsection to Hay Mulch with Seed for Short Term Erosion Control.

Subsection 767.80 Method of Measurement.

(page II.338) Delete the last paragraph of this subsection which reads "Seed for Erosion Control will be measured by the pound."

Subsection 767.81 Basis of Payment.

(page II.338) Delete the last paragraph of this subsection which reads "Seed for Erosion Control will be paid for at the contract unit price per pound."

Subsection 767.82 Payment Items.

(page II.339) Delete item 765.2 Seed for Erosion Control.

SUBSECTION 771: PLANTING TREES, SHRUBS AND GROUND COVER

Subsection 771.40 General.

(page II.338) Replace the last three paragraphs of third, fourth and fifth paragraphs of this subsection with the following;

All plants shall be northern grown nursery stock. The American Standards for Nursery Stock (ANSI Z60.1 shall serve as the Department's standard for plants and for plant, root ball, and container size, as well as growth and form requirements.

The latest editions of ANSI A300 Standards Part 1 Pruning and Part 6 Planting and Transplanting shall apply for all work of planting and pruning.

Trees and shrubs shall be balled and burlapped (B&B) or containerized. The caliper, height, age and other dimensions as specified for all planting material shall apply at the time planting is done and the plants will be inspected by the Engineer at this time as to these requirements as well as the quality or grade and varieties required. The Contractor shall remove all plants not approved by the Engineer from the project.

Subsection 771.61 Seasons for Planting.

(page II.346) In table 771.61-1: Calendar Guidance for Planting replace "March 21 through May 15" with "March 21 through June 15".

SECTION 900: STRUCTURES

SUBSECTION 901: CEMENT CONCRETE

Subsection 901.40 Materials.

(page II.429) Delete the reference to Silica Fume Modified Cement Concrete ... M4.06.0.

Subsection 901.82 Payment Items.

(page II.466) Delete payment items 904.2 and 905.1.

Subsection 901.66 Placement, Finishing and Curing of Concrete Bridge Decks

(page II.449) Replace A. Placement and Curing Plan Submission Requirements., B. Limitations on Placement, and D. Consolidation with the following;

A. Placement and Curing Plan Submission Requirements.

At least 30 days prior to the proposed start of placing the concrete bridge deck, the Contractor shall submit to the Engineer for approval a Placement and Curing Plan that will specify all of the steps, methods, equipment and personnel that Contractor shall use to construct the concrete deck in compliance with these specifications. Approval of this plan will not relieve the Contractor of the responsibility for the satisfactory performance of his/her methods and equipment. The Placement and Curing Plan shall, at a minimum, specify:

1. The method that will be used to convey the concrete from the truck to all locations on the deck where it will be placed. This will also include the conveyance equipment, rate of concrete placement and the estimated time for the completion of all concrete placement, consolidation and finishing operations up to the start of curing.
2. The type and number of finishing machines and work bridges including the plan for erecting the rails and operating the finishing machine. This will include proof of the following minimum operator qualifications for the bridge deck finishing machine:
 - a) Five years experience operating machines or similar type and manufacturer as that proposed.
 - b) Proof of no less than five bridge decks of similar size, placed using a machine of the same manufacturer as that proposed.Or, as a substitute for a. and b.:
 - c) A representative of the manufacturer of the bridge deck finishing machine shall be present on the site a minimum of 24 hours in advance of the proposed deck placement to approve the setup of the machine and rail system, and the representative shall be present for the entire duration of the placement of the deck concrete using the bridge deck finishing machine.
3. The sequence of concrete pours, including any retarders or other concrete admixtures and dosage rates required to complete the placement, consolidation and finishing operations prior to curing in accordance with the Contractor's intended sequence of operations.
4. The provisions for consolidating the concrete including the number of vibrators and number of personnel that will be dedicated exclusively for this operation.
5. The method for curing the concrete deck. This will include the number of personnel that will be exclusively dedicated for this operation, the means for pre-wetting the burlap, the location of the wet burlap at the work site, the means for conveying the wet burlap to the work bridges and the amount of wet burlap that will be required to completely cover the deck. It shall also include a letter certifying that the fogging equipment attached to the finishing machine produces atomized water droplets with an average droplet diameter of 0.003 inches or less that are uniformly distributed at a rate of at least 0.10 gallons/square foot/hour
6. Consideration of weather conditions that can be anticipated at the time of placement of the deck concrete. When cold weather can be reasonably expected either within 7 days before the anticipated concrete placement, or during the 14 day wet curing period, the Contractor shall include detailed procedures for the production, transportation, and placement of the concrete, including: provisions for enclosures to protect the placed concrete, including a plan of heating devices, types and locations around structure and the means for holding the enclosure securely in place; cold weather curing procedures; and the means for monitoring the temperature of concrete during cold weather.

7. Equipment that will be used to measure ambient air temperature, concrete temperature and relative humidity of the air at the construction site.
8. The number of all other personnel, in addition to the ones already identified in bullets 4 and 5, who will be engaged in the concrete placement operation and their assigned tasks. All personnel, including the ones already identified in bullets 4 and 5, shall have the experience and skills appropriate to their working assignment
9. A contingency and backup plan in case of equipment failure.

A pre-placement meeting shall be held between the Contractor and the Engineer at least 2 weeks prior to the start of any concrete placement for the deck slab. The Contractor and the Engineer shall review all aspects of the approved Placement and Curing Plan.

Twenty four hours before the scheduled start of concrete placement, the Engineer shall verify that all equipment and materials identified in the Placement and Curing Plan are onsite and have been tested to insure that they are in working order and are functioning as required. Upon the successful completion of this verification, the Engineer shall allow the concrete placement to proceed. If any equipment or material such as burlap is missing or equipment is malfunctioning, the concrete placement operations shall be canceled and shall not be re-scheduled until such time as the missing equipment or material is delivered to the site or the equipment has been repaired and is demonstrated to be in working order and functioning as required. The Contractor shall be responsible for any costs associated with the cancellation and rescheduling of the concrete placement operation that is due to missing equipment or material or malfunctioning equipment.

B. Limitations on Placement.

The requirements of 901.64 shall be satisfied in addition to the requirement of this section. Cement concrete for bridge decks shall not be placed when the ambient air temperature exceeds 85°F (29°C) or is expected to exceed 85°F (29°C) during the placement of the deck.

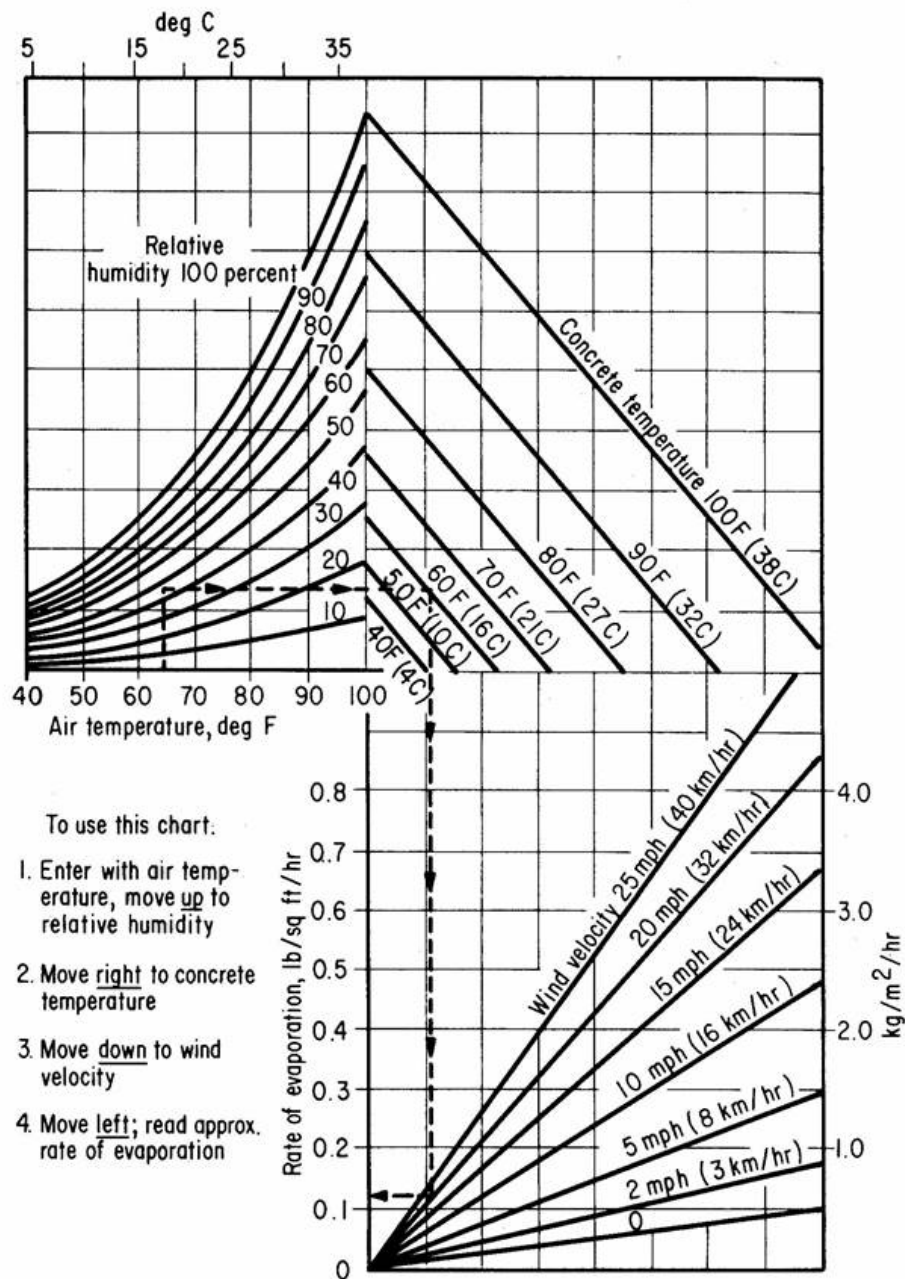
The evaporation rate of the exposed concrete surface shall not exceed 0.15 psf per hour. The deck surface evaporation rate shall be determined in accordance with Figure 901.66-1, obtained from ACI 305R-10.

The contractor shall determine the evaporation rate by measuring the ambient air temperature, relative humidity of the air at the construction site and concrete temperature prior to the placement of concrete and every hour thereafter until the end of the concrete placement, consolidation and finishing operation. Concrete temperature will be taken from the same sample used for slump and air content tests. To document the readings, Form 901.66 Bridge Deck Placement Environment will be provided by the Engineer and shall be filled out by the Contractor and returned to the Engineer.

The Contractor must provide suitable equipment and take appropriate actions as approved by the Engineer to maintain limit the evaporation rate to 0.15 psf per hour or less including one or more of the following actions:

1. Misting the surface of the concrete with pressurized equipment attached to the finishing machine until the curing cover is applied. The water mist shall be distributed at a rate of at least 0.10 gallons/square foot/hour. For example, on a deck that is 30 feet wide, the system must be able to apply at least 3.0 gallons of water per linear foot per hour. The nozzles must produce an atomized fog mist that will maintain a sheen of moisture on the concrete surface without ponding. The atomized water droplets shall have an average droplet diameter of 0.003 inches or less. The area of coverage from each nozzle shall overlap all adjacent coverage areas by at least 12 inches. Water that drips from the nozzles shall not be allowed to fall onto the concrete that is being cured.
2. Construct windscreens or enclosures to effectively reduce the wind velocity throughout the area of placement. If the use of windscreens is required, the windscreens shall consist of canvas barriers of suitable height erected on the windward side of the concrete placement.
3. Reduce the temperature of the concrete.
4. Reschedule the placement until such time as the environmental conditions are acceptable, such as at night or during early morning hours.

Figure 901.66-1: Deck Surface Evaporation Rate



D. Consolidation.

The concrete shall be consolidated by means of approved high frequency internal vibrators (9000 – 12,500 vibrations per minute in concrete) that shall be applied in a manner to ensure the consolidation of the concrete throughout the full depth of the deck in advance of the finishing machine. The Contractor shall use rubber vibrator heads or take other approved preventive measures to ensure that the vibrators will not damage the epoxy coated reinforcement. The Contractor shall have approved vibrators in service for each placement operation in accordance with the following schedule and a minimum of two backup vibrators in case of equipment failure,

Table 901.66-1: Minimum Number of Internal Concrete Vibrators Required

Concrete Placement Rate	Number of Vibrators Required
Between 35 and 60 cubic yards per hour	3
Greater than 60 cubic yards per hour	4

These vibrators shall be in operation in addition to the surface vibratory action from the vibrating pan(s) of the finishing machine. Consolidation by the vibrators shall leave the concrete free from voids and insure a dense surface texture, but the vibration of the concrete shall not be continued so long as to cause segregation or bleeding. A small uniform quantity of concrete shall be maintained ahead of the screed on each pass. At no time shall the quantity of concrete carried ahead of the screed be so great as to cause slipping or lifting.

SUBSECTION 965: MEMBRANE WATERPROOFING FOR NEW BRIDGE DECKS

SUBSECTION 965 Membrane Waterproofing for New Bridge Decks.

(page II.552) Add this new section.

SUBSECTION 965: MEMBRANE WATERPROOFING FOR NEW BRIDGE DECKS

DESCRIPTION

965.20: General

Membrane waterproofing systems are defined as a thin impermeable membrane that is used to protect the concrete deck from penetration of moisture and deicing chemicals.

The work to be performed shall consist of the furnishing and application of an approved membrane system and all concrete surface preparation work necessary to install the membrane system. The membrane waterproofing system applied to the surface of the bridge deck as indicated on the plans shall consist of the primer, spray applied membrane (either methyl methacrylate, polyurea, or polyurethane methyl methacrylate), aggregate keycoat, and polymer modified tack coat.

MATERIALS

965.30: General

Materials shall meet the requirements specified in the following Subsections of Division III, Materials:

Spray Applied Waterproofing Membrane.....M9.08.1

CONSTRUCTION METHODS

965.40: Submittals

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

- Initial submission (at least 30 days prior to application):
 - The membrane system to be installed.
 - The manufacturer's installation instructions for the applicable system
 - Safety data sheets (SDS) for all components
 - Cleaning solvents approved by the membrane manufacturer
- At the pre-application meeting (at least 14 days prior to application):
 - Manufacturer's written approval of the Applicator's qualifications.
 - List of personnel performing the installation, inspection, and testing.
 - Installation procedure including storage and protection instructions as well as handling and mixing instructions.
 - List of application equipment to be used.

- Manufacturer's written approval of the proposed polymer modified tack coat and the application rate that it shall be applied at.
 - Certificate of Compliance certifying that the aggregate for the keycoat meets the required hardness.
3. A minimum of 48 hours prior to installation a certificate of analysis for the proposed polymer modified tack coat shall be submitted by the Supplier of the tack coat to the Engineer for approval.
 4. Upon completion of installation:
 - All QC installation test results for the tests specified in the materials section, including the name, address, and contact person of the laboratory that performed the tests and the date of the tests.
 - A Certificate of Compliance, from the membrane waterproofing system manufacturer, certifying that the membrane waterproofing system materials meet the requirements of the manufacturer and the contract specifications.

965.41: Preconstruction

Membrane waterproofing shall be installed in accordance with the manufacturer's instructions. The handling, mixing, and addition of membrane components shall be performed in a safe manner to achieve the desired results in accordance with the manufacturer's recommendations. Care shall be taken to prevent adjacent areas from overspray or other contamination.

965.42: Applicator Qualifications

The Contractor applying the waterproofing system shall be certified by the membrane waterproofing system manufacturer and have at least 2 years of experience in membrane installation. The Engineer shall receive the manufacturer's written approval of the contractor's qualifications at least 30 days prior to the application of any system component. This approval shall apply only to the named individuals performing the application.

965.43: Material Delivery and Storage

All components of the membrane system shall be delivered to the site in the manufacturer's original packaging, clearly identified with the products type and batch number. The storage area for all components shall be cool, dry, out of direct sunlight, and comply with relevant health and safety regulations. Copies of safety data sheets for all components shall be given to the Engineer and kept on site at the Contractor's field office.

965.44: Pre-Application Meeting

A minimum of 14 days before the anticipated start of membrane application, the Contractor shall schedule and conduct a pre-application meeting at the site to review the approved submittals, and other pertinent matters related to the application including the schedule for coordination between trades. At a minimum, the Contractor, the subcontractor performing the application and the Engineer shall be present at the meeting.

965.45: Mockup to Validate Bond Strength

For those projects where the concrete will be aged less than 28 days the manufacturer shall concur that the system is acceptable for use with the shortened aging period and a mockup shall be required. The intent is to validate the bond strength using the membrane waterproofing manufacture's primer and membrane.

In order to emulate the actual placement conditions, the mockup shall take place as close as possible to the intended date of the waterproofing application but be a minimum of 7 days before concrete placement. The mockup activities shall be representative of what will take place during the specified final bridge placement. It shall include the placement and surface preparation of the concrete and installation of membrane waterproofing system.

Inspection and testing shall be in accordance with Tables 965.63-1 and 965.64-1. The results of moisture and adhesion testing performed on a mockup of the bridge deck and closure pours shall meet these specifications. The mockup shall simulate the actual job conditions in all respects including air temperature, transit equipment, travel conditions, admixtures, forming, placement equipment, and personnel. If the mockup is unable to validate that the waterproofing membrane meets the project requirements, then the Engineer may require the Contractor to conduct additional mockups.

Removal of the mockup after its completion shall be the responsibility of the Contractor. In addition to the requirements contained herein, all weather and concrete temperature requirements contained in Section 901 shall be satisfied.

Acceptance of the mockup shall be the responsibility of the Engineer.

965.46: Application

The installation procedure shall consist of preparation of the concrete surface and application of primer, membrane, aggregate keycoat, and polymer modified tack coat. Special attention shall be paid to the bridge deck surface preparation prior to the membrane waterproofing system application. The membrane system shall be installed in accordance with the manufacturer's requirements. The Contractor shall be responsible for the field testing including, but not limited to, adhesion bond testing, deck moisture content measurement, and all other required documentation and reporting.

The membrane waterproofing system shall not be applied in either wet, damp, or foggy weather, or when the ambient temperature is 40°F or below or is forecast to fall below 40°F during the application period. The temperature of the concrete deck surface shall also exceed the dew point by at least 5°F.

The membrane waterproofing shall not be placed until the Contractor is ready to follow within 24 hours with the first layer of hot mix asphalt pavement. A longer period will be allowed only with prior written approval from the Engineer.

Where the areas to be waterproofed are bound by a vertical surface including, but not limited to, a curb or a wall, the membrane waterproofing system shall be continued up the vertical as necessary. A neat finish with well-defined boundaries and straight edges shall be provided.

A. Concrete Surface Preparation

Concrete surfaces which are to be waterproofed shall be screeded to the true cross section and sounded. All spalls and depressions shall be repaired prior to the application of the primer. Depressions shall be filled to a smooth flush surface with 1:2 mortar (1-part cement to two parts sand) or an approved rapid setting patching mortar that is compatible with the membrane waterproofing system. Other surfaces shall be trimmed free of rough spots, projections, or other defects which might cause puncture of the membrane so that the surface profile of the prepared concrete surface shall not exceed a ¼ inch amplitude, peak to valley.

The use of resin or wax-based deck curing membranes are not acceptable. Unless a mockup is completed in accordance with 965.45, the concrete shall be aged a minimum of 28 days, including curing time, before application of the membrane waterproofing system.

Immediately prior to the application of the primer, the concrete to which the membrane is to be applied shall be cleaned of all existing bond inhibiting materials in accordance with ASTM D4259 or as required by the manufacturer. Dust or loose particles shall be removed using clean, dry, oil-free compressed air or industrial vacuums. The surface preparation shall produce a clean dry surface and ensure that the concrete surface is free of asphaltic product, surface laitance, oil staining, soiling, and dust.

Any exposed steel components to receive membrane waterproofing shall be blast cleaned in accordance with the Society for Protective Coatings (SSPC) SSPC-SP6 or as required by the manufacturer and coated with the membrane waterproofing system within the same work shift.

B. Applying Primer

The primer shall only be applied when the temperature of the concrete deck surface exceeds the dew point by at least 5°F and when the concrete deck surface has a moisture content of 5% or less, as confirmed by a portable electronic surface moisture meter supplied by the Contractor.

The primer shall be applied in a manner to ensure full coverage and shall consist of one coat with an overall coverage rate of 125-175 ft²/gallon unless otherwise recommended in the manufacturer's written instructions. All components shall be measured and mixed in accordance with the manufacturer's recommendations. The primer shall be spray applied using a single or multiple component spray system approved for use by the manufacturer. If required by site conditions, brush or roller application shall be allowed. The primer shall be allowed to cure tack-free for a minimum of 30 minutes or as required by the manufacturer's instructions, whichever time is greater, prior to application of the first lift of waterproofing membrane.

A second coat of primer shall be required if the first coat is absorbed by the concrete. The membrane shall be applied within the primer re-coat drying time allowed by the manufacturer but in no case shall it exceed 24 hours. Beyond this period, the surface shall be prepared again and re-primed following the manufacturer's recommendations prior to membrane application.

C. Applying Membrane

The waterproofing membrane shall be applied following the approved mixing and application procedure. The membrane shall be spray applied, with the mixing of the two components taking place at the nozzle and shall be applied to the primed deck in accordance with the manufacturer's instructions. The spray equipment shall be controlled so that the quantities applied may be monitored and shall allow for coverage rates to be checked.

Following the application of the membrane waterproofing system, the cured surface shall be visually inspected. If any defects or pinholes are found, an appropriate quantity of membrane material shall be mixed and repaired in accordance with Subsection 965.46 Part D. In all cases, the thickness of the repair shall be sufficient to bring the area up to the specified thickness. The thickness of the repair patch, measured over peaks, shall be a minimum of 80 mils or the thickness used to pass the ASTM C1305 Crack Bridging Test, whichever is greater.

For multi-stage construction, the subsequent stage membrane application shall overlap the existing cured membrane from the previous stage to form a continuous layer with a 6-inch overlap onto the existing membrane. The existing membrane shall be cleaned of all contamination including tack coat material or dirt to an edge distance of at least 6 inches and wiped with a solvent as approved by the membrane waterproofing manufacturer.

D. Repairs

If an area of membrane requires repair or if the membrane becomes damaged, a patch repair shall be carried out to restore the integrity of the membrane waterproofing system. The damaged area shall be cut back to sound materials and wiped with a solvent up to a width of at least 6 inches beyond the periphery of the damaged area, removing contaminants. The concrete shall be primed as necessary followed by the application of the membrane. A continuous layer shall be obtained over the concrete with a 6-inch overlap onto the existing membrane. The solvent shall be as approved by the membrane waterproofing manufacturer. Repairs shall comply with the manufacturer's guidelines for any over-coating times.

Where the membrane is to be joined to existing cured material and at joints, the new application shall overlap the existing membrane/joint by at least 4 inches. The existing membrane/joint shall be cleaned of all contamination including tack coat material or dirt to an edge distance of at least 6 inches and wiped with a solvent as approved by the membrane waterproofing manufacturer.

If pin holes or holidays are observed in the membrane surface they shall be repaired in accordance with the manufacturer's instructions and the approved Contractor Quality Control Plan (QC Plan).

In all cases, the thickness of the repair shall be sufficient to bring the area up to the specified thickness. The thickness of the repair patch, measured over peaks, shall be a minimum of 80 mils or the thickness used to pass the ASTM C1305 Crack Bridging Test, whichever is greater.

E. Applying Aggregate for Keycoat

Following the membrane application, an additional layer of membrane or resin, compatible with the membrane, shall be spray applied to a thickness of 30 to 40 mils into which an aggregate approved by the membrane manufacturer shall be broadcast ensuring a minimum coverage of 95%. The application rate shall be designated by the manufacturer. Loose aggregate shall be removed with brooms or oil/moisture-free compressed air before applying the tack coat.

For multi-stage construction, the aggregate keycoat of the previous stage shall be applied to a limit of 6-inches from the stage construction joint to allow the subsequent stage membrane material to bond directly to the existing membrane. The application of the aggregate keycoat for the subsequent stage shall cover the 6-inch overlap.

F. Applying Tack Coat

The polymer modified tack coat shall be applied in accordance with the membrane manufacturer's recommendations after a minimum of three hours from initial membrane application. The tack coat shall be allowed to cool for a minimum of 1 hour prior to HMA paving. The tack coat application rate shall be in accordance with the manufacturer's recommendation. The application rate of the tack coat shall be set at a rate that achieves the specified residual rate and coverage. Tack coat shall be applied to cover a minimum of 95% of the membrane surface. The tack coat application shall be monitored by Quality Control personnel in accordance with the approved QC Plan.

G. HMA Pavement Over Membrane

Placement of the HMA surface shall be in accordance with Section 450 and the contract specifications. During paving, a light soap spray should be applied to the paving equipment wheels to prevent tack coat pick-up.

965.47: Protection of Exposed Surfaces

The Contractor shall exercise care in the application of the waterproofing membrane system to prevent surfaces not receiving treatment from being spattered or marred, such as the face of curbs, copings, finished surfaces, substructure exposed surfaces, and outside faces of the bridge. Any material that spatters on these surfaces shall be removed and the surfaces cleaned to the satisfaction of the Engineer.

CONTRACTOR QUALITY CONTROL

965.60: General

The Contractor shall provide a Quality Control System (QC System) and, when required, a QC Plan, adequate to ensure that all materials and workmanship meet the required quality levels for each specified Quality Characteristic. The Contractor shall provide qualified QC personnel and QC laboratory facilities and perform Quality Control inspection, sampling, testing, data analysis, corrective action (when necessary), and documentation as outlined further below.

965.61: Contractor Quality Control Plan

The Contractor shall provide and maintain a QC Plan which should sufficiently document the QC processes of all Contractor parties (i.e. Prime Contractor, Subcontractors, Producers) performing work required under this specification.

A. QC Plan Submittal Requirements

At the pre-construction meeting, the Contractor shall be prepared to discuss the QC Plan. Information to be discussed shall include the proposed QC Plan submittal date, QC organization, and sources of materials. The Contractor shall submit the QC Plan to the Engineer for approval not less than 30 days prior to the start of any work activities related to membrane waterproofing installation (including preparation of underlying surface) addressed in Subsections 965.40 thru 965.47. The Contractor shall not start work on the subject work items without an approved QC Plan.

B. QC Plan Format and Contents

The QC Plan shall be structured to follow the format and section headings outlined in the MassDOT Model QC Plan. The pages of the QC Plan shall be sequentially numbered. The QC Plan shall address, in sufficient detail, the specific information requested under each section and subsection contained in the MassDOT Model QC Plan.

C. QC Plan Approval and Modifications

Approval of the QC Plan will be based on the inclusion of the required information. Revisions to the QC Plan may be required prior to approval for any part of the QC Plan that is determined by the Department to be insufficient. Approval of the QC Plan does not imply any warranty by the Engineer that the QC Plan will result in completed work that complies with the specifications. It remains the responsibility of the Contractor to demonstrate such compliance. The Contractor may modify the QC Plan as work progresses when circumstances necessitate changes in Quality Control personnel, laboratories, or procedures. In such case, the Contractor shall submit an amended QC Plan to the Department for approval a minimum of three calendar days prior to the proposed changes being implemented.

965.62: Quality Control Personnel Requirements

The Contractor's Quality Control organization shall, at a minimum, consist of the personnel qualified by the manufacturer to perform the required inspection and testing. Every effort should be made to maintain consistency in the QC organization; however, substitution of qualified personnel shall be allowed. When circumstances necessitate substitution of QC personnel not originally listed in the approved QC Plan, the Contractor shall submit an amended QC Plan for approval in accordance with Subsection 965.61 Part C.

965.63: 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 (e.g. Skilled Laborers, Foremen, and Superintendents). However, the Contractor's QC personnel shall have overall responsibility for QC inspection. The Contractor shall not rely on the results of the Engineer's Acceptance inspection for QC purposes. The Engineer shall be provided the opportunity to monitor and witness all QC inspection.

QC inspection activities must address the following four primary components:

- a) Equipment
- b) Materials
- c) Environmental Conditions
- d) Workmanship

The minimum frequency of QC inspection activity shall be in accordance with the requirements below and as outlined in the approved QC Plan. The Contractor shall document the results and findings of QC inspection.

The quality of each waterproofing membrane surface will be inspected and evaluated on the basis of Lots and Sublots. A Lot is defined as an isolated quantity of work which is assumed to be produced by the same controlled process. A Lot shall constitute no greater than the entire waterproofing membrane surface area on the bridge deck completed within the same construction season using the same placement process. Each Lot shall be divided into Sublots of equal sizes unless specified otherwise below.

All inspection reports shall be submitted to the Engineer within 72 hours of the test completion.

A. QC Inspection for Preparation of Underlying Surface

The Contractor's personnel will perform QC inspection during preparation of the underlying surface in accordance with the requirements of Subsection 965.46 Part A. The minimum items to be inspected shall be as outlined in Table 965.63-1. The Contractor shall identify in the QC Plan the specific inspection activities necessary to ensure the quality of the work, including any additional inspection activities not specifically listed in the table.

B. QC Inspection for Placement of Waterproofing Membrane

The Contractor's QC personnel will perform QC inspection at the site of waterproofing membrane field placement to ensure that the production and placement processes are providing work conforming to the contract and manufacturer requirements. The minimum items to be inspected for each waterproofing membrane Lot shall be in accordance with the requirements of Subsection 965.43 thru Subsection 965.47 and as outlined in Table 965.63-1. The Contractor shall identify in the QC Plan the specific inspection activities necessary to ensure the quality of the work, including any additional inspection activities not specifically listed in the table. Inspection shall include:

- a) Pin Hole/Holidays: The surface of the membrane shall be inspected for pin holes and/or holidays. All pin hole/holidays shall be located, marked for repair, documented, and repaired in accordance with a repair procedure developed by the manufacturer and approved by the Engineer.
- b) Coverage Rates: Rates for all layers shall be monitored by checking quantity of material used against the area covered.
- c) Visual inspections shall be conducted throughout the application process. The Contractor shall take progress photos for incorporation with the final review report to the Engineer.

Table 965.63-1 - Minimum QC Inspection of Waterproofing Membrane Operations

Inspection Component	Inspection Attribute	Minimum Inspection Frequency	Point of Inspection	Inspection Method
Equipment	As specified in QC Plan	Per QC Plan	Per QC Plan	Per QC Plan
Materials	Primer (Correct Type)	Per QC Plan	Per QC Plan	Check Manufacturer COC
	Membrane (Correct Type)	Per QC Plan	Per QC Plan	Check Manufacturer COC
	Aggregate (Correct Type)	Per QC Plan	Per QC Plan	Check Manufacturer COC
	Tack Coat (Correct Type)	Per QC Plan	Per QC Plan	Check Manufacturer COC
Environmental Conditions	Temperature of Air & Underlying Surface	1 per Day	At Project Site	Check Measurement
	Underlying Surface (Soundness)	Per QC Plan	Underlying Surface	Visual Check
	Surface (Standing Moisture)	Per QC Plan	Underlying Surface & Membrane Surface	Visual Check
	Surface (Cleanliness)	Per QC Plan	Underlying Surface & Membrane Surface	Visual Check
Workmanship	Pin Hole/Holidays	Per QC Plan	Membrane Surface	Visual Check
	Membrane Coverage Rate	Per QC Plan	From Distributor	Check Measurement
	Aggregate Coverage Rate	Per QC Plan	Membrane Surface	Visual Check
	Tack Coat Application Rate	Per QC Plan	From Distributor	Check Measurement

965.64: Quality Control Sampling and Testing Requirements

The Contractor's QC personnel will perform QC sampling and testing at the site of membrane waterproofing placement to ensure that the production and placement processes are providing work conforming to the contract and manufacturer's requirements. The Engineer will not sample or test for Quality Control or assist in controlling the Contractor's operations. All QC sampling and testing shall be in accordance with the current AASHTO, ASTM, NETTCP, or Department procedures specified in Table 965.64-1. The Contractor shall furnish approved containers for all material samples. The Engineer shall be provided the opportunity to monitor and witness all QC sampling and testing.

The following testing shall be conducted and recorded on a test report form to be submitted to the Engineer. All reports shall be submitted to the Engineer within 72 hours of the test completion.

- a) Deck moisture: The concrete deck's surface moisture content shall be measured to determine if it is suitable to allow for installation to proceed.
- b) Primer Adhesion: Random tests for adequate tensile bond strength shall be conducted in accordance with ASTM D7234 using the membrane Manufacturer's primer. Minimum bond strength of 100 psi and failure in the concrete will be required for acceptance. Testing shall be at a frequency of 1 test per 5,000 square feet with a minimum of 3 tests per day. Areas smaller than 5,000 square feet shall receive a minimum of 3 tests.
- c) Film Thickness:
 - Wet film thickness shall be checked every 300 square feet in accordance with ASTM D4414 using a gauge pin or standard comb type thickness gauge or a magnetic gauge. Film thickness checks shall be carried throughout the application process.
 - Dry Film Thickness: If the membrane waterproofing system cures too quickly to perform wet film thickness testing, dry film thickness shall be checked every 300 square feet in accordance with ASTM D6132 using magnetic or ultrasonic gauges or using a destructive method. If a destructive method is used, areas shall be repaired in accordance with Subsection 965.46 Part C.
- d) Membrane Adhesion: Random tests for adequate tensile bond strength shall be conducted in accordance with ASTM D7234 using the membrane Manufacturer's primer and membrane. The portion of the membrane to be tested shall be separated from the rest of the membrane surface prior to performing the test so only that portion under the dolly receives the tensile force. A minimum bond strength of 100 psi and failure in the concrete will be required for acceptance. Testing shall be at a frequency of 1 test per 5,000 square feet with a minimum of 3 tests per day. Areas smaller than 5,000 square feet shall receive a minimum of 3 tests.

The Contractor shall take a representative sample of the membrane from that day's installation. The samples shall consist of 2 10-inch by 10-inch square samples of the membrane with smooth surfaces. The primer and aggregate shall not be incorporated into the sample. The sample shall be sprayed separate from the bridge deck on a non-adhesive surface using the same application techniques used for the deck. These samples shall be peeled off the non-adhesive surface and be provided to the Engineer to be tested by the Department.

Table 965.64-1: Minimum Quality Control Sampling & Testing of Waterproofing Membrane Lots

Quality Characteristic	Test Method(s)	Sublot Size	Minimum Test Frequency	Point of Sampling	Engineering Limits
Deck Concrete Moisture	Manufacturer's Recommendation	5,000 ft ²	1 per Sublot ⁽¹⁾	Deck Concrete Surface	≤ 5%
Primer Adhesion to Concrete	ASTM D7234	5,000 ft ²	1 per Sublot ⁽¹⁾	Primed Concrete Surface	≥ 100 psi minimum and failure in concrete
Film Thickness	Wet: ASTM D4414 Dry: ASTM D6132 or other approved method	300 ft ²	1 per Sublot ⁽¹⁾	Membrane Surface	≥ 80 mils minimum measured over peaks or ≥ Thickness used to pass ASTM C1305 (Whichever thickness is greater)
Membrane Adhesion to Concrete	ASTM D7234	5,000 ft ²	1 per Sublot ⁽¹⁾	Membrane Surface	≥ 100 psi minimum and failure in concrete
⁽¹⁾ In the event that the total daily production is less than three Sublots, a minimum of three random QC samples shall be obtained for the day's production.					

DEPARTMENT ACCEPTANCE

965.70: General

The Department is responsible for performing all Acceptance activities and making the final Acceptance determination for each membrane waterproofing surface. The Department's Acceptance system will include monitoring the Contractor's QC activity and performing Acceptance inspection and testing in order to determine the quality and corresponding payment for each Lot.

965.71: Acceptance Inspection

The Engineer will perform Acceptance inspection of all work items addressed under Section 965 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 965.71-1 – Department Acceptance Inspection of Waterproofing Membrane Operations

Inspection Component	Inspection Attribute	Minimum Inspection Frequency	Point of Inspection	Inspection Method
Materials	Primer (Correct Type)	1 Per Day	At Placement Site	Check Manufacturer COC
	Membrane (Correct Type)	1 Per Day	At Placement Site	Check Manufacturer COC
	Aggregate (Correct Type)	1 Per Day	At Placement Site	Check Manufacturer COC
	Tack Coat (Correct Type)	1 Per Day	At Placement Site	Check Manufacturer COC
Workmanship	Pin Hole/Holidays	25% of Sublots	Membrane Surface	Visual Check
	Membrane Coverage Rate	25% of Sublots	From Distributor	Check Measurement
	Aggregate Coverage Rate	25% of Sublots	Membrane Surface	Visual Check
	Tack Coat Application Rate	25% of Sublots	From Distributor	Check Measurement

965.72: Acceptance Sampling and Testing Requirements

The 2 10-inch by 10-inch samples fabricated by the Contractor during installation shall be submitted to the Department for testing.

Table 965.72-1: Department Acceptance Sampling and Testing of Waterproofing Membrane Lots

Quality Characteristic	Test Method(s)	Engineering Limits
Minimum Thickness (Membrane only)	ASTM D6132 or other approved method	≥ 80 mils minimum measured over peaks or \geq thickness used to pass ASTM C1305 (Whichever thickness is greater)
Percent Elongation at Break	ASTM D638	$\geq 130\%$
Tensile Strength	ASTM D638 Type IV @ 2 in/min	$> 1,100$ psi
Shore Hardness	ASTM D2240 ⁽¹⁾	≥ 50 Type 00

⁽¹⁾ ASTM D2240 shall be modified in accordance with ASTM C836 Section 6.5.

965.73: 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 periodically evaluate all Acceptance inspection information for the prepared underlying surface and 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 965.40 thru 965.47.

When the Acceptance information identifies deficiencies in either material quality or product workmanship for any underlying surface location or waterproofing membrane Sublot(s), the location or Sublot(s) will be isolated and further evaluated by the Engineer through additional Acceptance inspection (or sampling and testing, if relevant or possible). 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.

965.74: Lot Acceptance Determination Based on Testing Data

Evaluation of Testing Data

Prior to final Acceptance of each Lot produced and placed; the Engineer will periodically evaluate all available Acceptance testing data for the Lot.

Conformance with Engineering Limits

The Engineer will evaluate all Acceptance testing data and Contractor QC testing data for each Lot to determine conformance with the Engineering Limits in Tables 965.63-1 and 965.72-1. Each Sublot test value for the Acceptance Quality Characteristics identified in the tables shall be within the Engineering Limits.

If a Sublot test result is outside of the Engineering Limits, the Contractor and Engineer will further assess the Sublot quality to determine whether the material in the Sublot can remain in place. The Engineer will determine the disposition of the Sublot in accordance with Division I, Subsection 5.03, Conformity with Plans and Specifications.

If the Engineer's assessment determines that the material quality is not sufficient to permit the Sublot to remain in place the Sublot shall be removed and replaced. When a nonconforming Sublot is corrected or replaced, the Engineer will perform Acceptance testing of the Sublot and evaluate the test results for conformance with the Engineering Limits. Once the above requirements have been met, the Engineer will accept all completed Sublots.

965.75: Final Lot Acceptance Determination

For each Lot produced and placed, the Engineer will evaluate all Acceptance inspection and testing data for the Lot after all Sublots are complete in place. The final review and visual inspection shall be conducted jointly by the Contractor and Engineer. Irregularities or other items that do not meet the requirements of the specifications and plans shall be addressed/repared 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 and Contractor QC data for the Lot. The Engineer will accept the Lot if the Engineer's evaluation of all inspection and testing data for the Lot is in conformance with this specification and the contract documents.

COMPENSATION

965.90: Method of Measurement

Membrane Waterproofing for Bridge Decks will be measured by the square foot of the membrane system complete in place with no allowance for overlapping or for edges turned up or carried into recesses for seals, except that the area of the full membrane turned down in back of the backwalls and extended up the face of the curb or under and in back of median curbs shall be included for payment.

965.91: Basis of Payment

Payment under this Item shall be made at the unit bid price per square foot, which includes the primer, spray applied membrane, aggregate for keycoat, polymer modified tack coat, and all labor, materials, equipment, safety devices, tools, inspections and incidentals necessary to complete all work specified under this Item.

965.92: Payment Items

965. Membrane Waterproofing for Bridge Decks Square Foot

SUBSECTION 966: MEMBRANE WATERPROOFING FOR BRIDGE DECK REPAIRS**SUBSECTION 966 Membrane Waterproofing for Bridge Deck Repairs.**

(page II.552) Add this new section.

SUBSECTION 966: MEMBRANE WATERPROOFING FOR BRIDGE DECK REPAIRS**DESCRIPTION****966.20: General**

Membrane waterproofing applied to the repaired deck surface as indicated on the plan and elsewhere as directed shall consist of one of the following systems:

- Sheet membrane - either reinforced rubberized asphalt or reinforced tar and resin.
- Hot applied rubberized asphalt membrane. This system shall not be used on grades in excess of 3 percent.

MATERIALS**966.30: General**

Materials shall meet the requirements specified in the following Subsections of Division III, Materials:

Asphalt Emulsions.....	M3.03.1
Sheet Membrane.....	M9.08.2
Hot Applied Rubberized Asphalt Membrane	M9.08.3
Primer	M9.09.1

CONSTRUCTION METHODS**966.40: Application****A. Preparation of Surface**

No waterproofing shall be done in wet, damp or foggy weather, nor when the ambient temperature is 40°F or below, without permission of the Engineer.

The membrane waterproofing on bridge deck repairs shall not be placed unless the Contractor is ready to follow within 24 hours with the first layer of hot mix asphalt pavement; a longer period of time will be allowed only with the approval of the Engineer.

Immediately prior to the membrane application, the concrete surface shall be thoroughly swept and blown clean with an air compressor to remove any loose debris. If the concrete surface is damp it shall be dried by use of a propane gas torch or similar equipment.

B. Applying Primer

The primer shall be applied to all surfaces at a rate of 0.015 gallon per square yard. The primer shall be thoroughly mixed and continuously agitated during application. It shall be applied by spray or squeegee. It shall thoroughly dry before application of the rubberized asphalt membrane. Should the membrane not be placed over the primed surface within 8 hours the surface shall be re-primed.

C. Applying Membrane**(1) Sheet Membranes**

This system shall consist of the application of preformed reinforced rubberized asphalt membrane. Composition and dimensional requirements shall be as stipulated by the manufacturer of the sheet membrane.

Membrane Application

Membrane application shall be in accordance with the manufacturer's instructions. The preformed membrane sheets shall be applied to the primed surfaces either by hand or by mechanical applicators.

The membrane sheet shall be placed in such a manner that a shingling effect is achieved in the direction that water will drain. After being laid, the membrane sheets shall be rolled with hand rollers or other apparatus as necessary to develop a firm and uniform bond with the primed concrete surface. Wrinkles and air bubbles shall be eliminated to the extent possible.

A mastic, approved by the Sheet Membrane manufacturer, shall be applied as a bead along the exposed edge of the membrane sheet that extends up the barrier railing or curb face and that terminates in the high-side gutter after the sheets have been installed.

Any tears, cuts, or narrow overlaps shall be patched, using a satisfactory adhesive and by placing sections of membrane sheet over the defective area in such a manner that the patch extends at least 6 inches beyond the defect.

(2) Hot Applied Rubberized Asphalt Membrane**Membrane Application**

Melting of the rubberized asphalt membrane shall be in accordance with the manufacturer's instructions. The kettle shall be equipped with a suitable agitator and temperature gauges for the kettle.

Sufficient lead time shall be allowed for heating of the rubberized asphalt so that it will be in a fluid state at the time scheduled for application. Caution should be observed that the melting temperature does not exceed the manufacturer's recommendation. When fluid, the material shall be drawn off in suitable containers and poured onto the primed and dried deck surface.

It shall be evenly spread with a special spray nozzle or silicone squeegees at a uniform rate to yield a coating at a minimum thickness of 1/8 inch and an average of 3/16 inch. All horizontal surfaces shall be completely covered and vertical surfaces (curbing, edging, etc.) shall be covered up to 4 inches above the deck surface.

Any defects shall be repaired in accordance with the manufacturer's recommendations prior to HMA pavement overlayment.

Immediately following the application of the hot applied rubberized asphalt membrane and before it cools, the protective covering shall be laid parallel to the roadway centerline covering the entire area of membrane waterproofing.

D. Repairs

If an area of membrane requires repair or if the membrane becomes damaged, a patch repair shall be carried out to restore the integrity of the membrane waterproofing system. The damaged area shall be cut back to sound materials to a width of at least 6 inches beyond the periphery of the damaged area, removing contaminants. The concrete shall be primed as necessary followed by the application of the membrane. A continuous layer shall be obtained over the concrete with a 6-inch overlap onto the existing membrane. The solvent shall be as approved by the membrane waterproofing manufacturer. Repairs shall comply with the manufacturer's guidelines.

Where the membrane is to be joined to existing cured material and at joints, the new application shall overlap the existing membrane/joint by at least 4 inches. The existing membrane/joint shall be cleaned of all contamination including tack coat material or dirt to an edge distance of at least 6 inches.

If pin holes or holidays are observed in the membrane surface they shall be repaired in accordance with the manufacturer's instructions.

E. Applying Tack Coat

Tack coat, meeting Subsection 966.30, shall be applied in accordance with the membrane manufacturer's recommendations after a minimum of three hours from initial membrane application. The tack coat application rate shall be in accordance with the manufacturer's recommendation. The application rate of the tack coat shall be set at a rate that achieves the specified residual rate and coverage.

F. HMA Pavement Over Membrane

Placement of the HMA surface shall be in accordance with Section 450 and the contract specifications. To eliminate any possible damage to the membrane and in accordance with Subsection 450.50, the HMA overlayment shall be applied as soon as possible. Caution must be observed to assure that the paver does not cause damage to the membrane. During paving, a light soap spray should be applied to the paving equipment wheels to prevent tack coat pick-up.

966.41: Protection of Exposed Surfaces

The Contractor shall exercise care in the application of the waterproofing membrane system to prevent surfaces not receiving treatment from being spattered or marred, such as the face of curbs, copings, finished surfaces, substructure exposed surfaces, and outside faces of the bridge. Any material that spatters on these surfaces shall be removed and the surfaces cleaned to the satisfaction of the Engineer.

CONTRACTOR QUALITY CONTROL

966.60: General

The Contractor shall provide Quality Control (QC) activities to ensure that their operations will provide waterproofing that conforms to the specified material and workmanship requirements.

966.61: 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 (e.g. Skilled Laborers, Foremen, and Superintendents). The Contractor shall not rely on the results of the Engineer's Acceptance inspection for QC purposes. The Engineer shall be provided the opportunity to monitor and witness all QC inspection.

QC inspection activities must address the following four primary components:

- a) Equipment.
- b) Materials.
- c) Environmental Conditions.
- d) Workmanship.

The minimum frequency of QC inspection activity shall be in accordance with the requirements below. The Contractor shall document the results and findings of QC inspection.

A. QC Inspection for Preparation of Underlying Surface

The Contractor's personnel will perform QC inspection during preparation of the underlying surface in accordance with the requirements of Subsection 966.40 Part A. The minimum items to be inspected shall be as outlined in Table 966.61-1.

B. QC Inspection for Placement of Waterproofing Membrane

The Contractor will perform QC inspection at the site of waterproofing membrane field placement to ensure that the production and placement processes are providing work conforming to the contract and manufacturer requirements. The minimum items to be inspected for each waterproofing membrane shall be in accordance with the requirements of Subsection 966.40 Parts C thru F and as outlined in Table 966.61-1. Inspection shall include:

- a) Pin Hole/Holidays: The surface of the membrane shall be inspected for pin holes and/or holidays. All pin hole/holidays shall be located, marked for repair, documented, and repaired in accordance with a repair procedure approved by the manufacturer.
- b) Visual inspections shall be conducted throughout the application process. The Contractor shall take progress photos for incorporation with the final review report to the Engineer.

Table 966.61-1 - Minimum QC Inspection of Waterproofing Membrane Operations

Inspection Component	Inspection Attribute	Minimum Inspection Frequency	Point of Inspection	Inspection Method
Equipment	As specified by Contractor	As specified by Contractor	As specified by Contractor	As specified by Contractor
Materials	Primer (Correct Type)	1 per Day	As specified by Contractor	Check Manufacturer COC
	Membrane (Correct Type)	1 per Day	As specified by Contractor	Check Manufacturer COC
	Tack Coat (Correct Type)	1 per Day	Per QC Plan	Check Manufacturer COC
Environmental Conditions	Temperature of Air & Underlying Surface	1 per Day	At Project Site	Check Measurement
	Underlying Surface (Soundness)	Entire Surface	Underlying Surface	Visual Check
	Surface (Standing Moisture)	Entire Surface	Underlying Surface & Membrane Surface	Visual Check
	Surface (Cleanliness)	Entire Surface	Underlying Surface & Membrane Surface	Visual Check
Workmanship	Pin Hole/Holidays	Entire Surface	Membrane Surface	Visual Check
	Membrane Coverage Rates	Entire Surface	From Distributor	Visual Check
	Tack Coat Application Rate	1 per Day	From Distributor	Check Measurement

DEPARTMENT ACCEPTANCE**966.70: General**

The Department is responsible for performing all Acceptance activities and making the final Acceptance determination for each membrane waterproofing surface. The Department's Acceptance system will include monitoring the Contractor's QC activity and performing Acceptance inspection in order to determine the quality and corresponding payment.

966.71: Acceptance Inspection

The Engineer will perform Acceptance inspection of all work items addressed under Section 966 to ensure that materials and completed work are in conformance with the contract requirements. Acceptance inspection is intended to visually assess the quality of the materials and work 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 965.71-1 – Department Acceptance Inspection of Waterproofing Membrane Operations

Inspection Component	Inspection Attribute	Minimum Inspection Frequency	Point of Inspection	Inspection Method
Materials	Primer (Correct Type)	1 Per Day	At Placement Site	Check Manufacturer COC
	Membrane (Correct Type)	1 Per Day	At Placement Site	Check Manufacturer COC
	Tack Coat (Correct Type)	1 Per Day	At Placement Site	Check Manufacturer COC
Workmanship	Pin Hole/Holidays	Entire Surface	Membrane Surface	Visual Check
	Membrane Coverage Rates	Entire Surface	At Placement Site	Visual Check
	Tack Coat Application Rate	1 per day	At Placement Site	Check Measurement

966.72: Acceptance Determination

The Engineer's Acceptance inspection results will be used in the final Acceptance determination. Prior to final Acceptance, the Engineer will periodically evaluate all Acceptance inspection information for the prepared underlying surface and the waterproofing membrane. The materials and product workmanship for the completed work will be evaluated for conformance with the plans and the requirements specified in Subsections 966.40 and 966.41.

When the Acceptance information identifies deficiencies in either material quality or product workmanship for any underlying surface location or waterproofing membrane, 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.

The final review and visual inspection shall be conducted jointly by the Contractor and Engineer. Irregularities or other items that do not meet the requirements of the specifications and plans shall be addressed/repared at this time, at no additional cost to the Department.

After the work is complete, including any corrective action, the Engineer will perform a final evaluation of all Acceptance data and Contractor QC data. The Engineer will accept the work if the Engineer's evaluation of all inspection data is in conformance with this specification and the contract documents.

COMPENSATION

966.90: Method of Measurement

Membrane waterproofing for bridge deck repairs will be measured by the square foot of surface covered with no allowance for overlapping or for edges turned up or carried into recesses for seals, except that the area of the full membrane turned down in back of the backwalls and extended under and in back of curb or edging will be included for payment.

966.91: Basis of Payment

The membrane waterproofing will be paid for at the contract unit price per square foot under the item for Membrane Waterproofing for Bridge Deck Repairs, complete in place. Tack coat shall be paid under item 452. Tack Coat.

966.92: Payment Items

966.	Membrane Waterproofing for Bridge Deck Repairs	Square Foot
------	--	-------------

SUBSECTION 970: BITUMINOUS DAMP-PROOFING**SUBSECTION 970 Bituminous Damp-Proofing.**

(page II.552) Replace this subsection with the following.

SECTION 970: DAMP-PROOFING**DESCRIPTION****970.20: General**

Damp-proofing to be applied as shown on the plans shall consist of a primer and damp-proofing material. If material other than that specified herein is permitted to be used, the method of application shall conform to the published specifications of the manufacturer.

MATERIALS**970.30: General**

Materials shall meet the requirements specified in the following Subsections of Division III, Materials:

Primer	M9.09.1
Damp-proofing.....	M9.09.2

CONSTRUCTION METHODS**970.40: General**

Concrete surfaces shall be allowed to dry for a period of at least 5 days after the removal of forms before damp-proofing is applied.

Surfaces to be damp-proofed shall be made reasonably smooth and free from all projections and holes. All holes in concrete surfaces shall be satisfactorily filled with 1-part cement to 2 parts sand mortar before damp-proofing is applied. Concrete surfaces shall be properly cured before being damp-proofed. Surfaces shall be dry and immediately before the application of the damp-proofing shall be thoroughly cleaned of dust and all loose material. Damp-proofing shall not be done during wet, damp, or foggy weather, or when the ambient temperature is 40°F or below or is forecast to fall below 40°F during the application period. The temperature of the concrete surface shall also exceed the dew point by at least 5°F.

One coat of primer shall be uniformly applied to the surface in accordance with the manufacturer's recommendation. The material for damp-proofing shall be mopped or sprayed on the designated surfaces in two coats. Application methods, rates, temperature constraints shall be as recommended by the manufacturer.

The initial coat of damp-proofing shall be allowed to dry thoroughly before a second coat is applied. The final coat shall be thoroughly dry before any fill is placed against it.

CONTRACTOR QUALITY CONTROL**970.60: General**

The Contractor shall provide Quality Control (QC) activities to ensure that their operations will provide damp-proofing that conforms to the specified material and workmanship requirements.

970.61: Damp-proofing Materials and Workmanship

The Contractor shall verify that they are using the correct damp-proofing materials as specified under Subsection 970.30. All damp-proofing operations shall exhibit satisfactory workmanship including ensuring a dry, smooth, and clean concrete surface which is cured properly, as well as, correct application of the primer and damp-proofing.

DEPARTMENT ACCEPTANCE**970.70: General**

The Department shall verify that the Contractor is correctly performing the work and QC activities.

970.71: Damp-proofing Materials and Workmanship

The Engineer will verify that the damp-proofing materials and workmanship conform with Subsection 970.61.

COMPENSATION**970.80: Method of Measurement**

Damp-proofing will be measured by the actual area of surface covered in square foot.

970.81: Basis of Payment.

Damp-proofing will be paid for at the contract unit price per square foot of surface and shall include the primer and all materials, equipment and labor to install the damp-proofing complete in place.

970.82: Payment Items.

970.	Damp-Proofing	Square Foot
------	---------------	-------------

**DIVISION III
MATERIALS SPECIFICATIONS****SECTION M1: SOILS AND BORROW MATERIALS****SECTION M1 Soils and Borrow Materials.**

(page III.2) Replace the words "AASHTO T 11 and T 27" with "AASHTO T 311" where encountered in M1.02.0, M1.03.0, M1.04.1, M1.09.0 and M1.10.0.

SECTION M2: AGGREGATES AND RELATED MATERIALS**Subsection M2.01.0 Crushed Stone.**

(page III.10) In table M2.01.0-1 under the column for M2.01.6 3/8 Inch Crushed Stone change the percent passing the No.4 sieve from 20-20 to 20-50.

Subection M2.01.7 Dense Graded Crushed Stone for Sub-base

(page III.11) Replace the second paragraph from the bottom of this subsection with the following:

Testing shall be in accordance with AASHTO T 311.

SECTION M3: ASPHALTIC MATERIALS

SECTION M3: ASPHALTIC MATERIALS

(page III.15) Replace this subsection with the following;

M3.00.0 General.

Asphaltic materials (also referred to as bituminous materials) include liquid asphalts as well as Hot Mix Asphalt (HMA) mixtures and other related materials. All asphaltic materials shall conform to the requirements of the specifications as designated hereinafter.

Unless otherwise stipulated, the sampling of liquid asphalt materials shall be in accordance with AASHTO R 66.

The following procedure shall be followed in obtaining liquid asphalt samples from pressure distributors or tankers used for the transport of liquid asphalt materials:

1. Distributors and tankers shall be equipped with approved sampling valves. The sampling valves on tankers shall be installed in the rear bulkhead approximately 1/3 of the height from the bottom. The sampling valves on pressure distributors may be located in the side of the tank somewhere in the middle third of the tank depth.
2. At least 1 gallon of material shall be drained off through the sampling valve and discarded before the sample is obtained.
3. Sample containers shall be new, clean and sealed with a tight-fitting cap. Washing of sample containers with solvents or water will not be permitted.

M3.01.0 Performance Graded Asphalt Binder.

Performance Graded Asphalt Binder (PGAB) delivered to a project or to an HMA plant must be accompanied by a Bill of Lading (BOL) signed by the asphalt binder Supplier's authorized representative in accordance with AASHTO R 26. Shipments of material not accompanied by a BOL will not be accepted for use in the work.

The PGAB Supplier and the Contractor shall perform random Quality Control (QC) sampling and testing of PGAB as specified in Subsection 450.65F(1). The Contractor shall furnish, to the Engineer, the PGAB Supplier's BOL for each truckload of asphalt binder shipped to the project or HMA plant. The Contractor shall also submit to the Engineer the Supplier's Certificate of Compliance (COC) along with copies of the Certificate of Analysis (COA) showing the certified AASHTO M 320 test results for each Supplier Lot of PGAB. The COA shall meet the requirements of AASHTO R 26. The Contractor shall maintain a copy of the COA for each Lot of PGAB used, with a copy attached to each sample obtained for testing.

The Contractor shall assist the Engineer in obtaining random Department Acceptance samples of PGAB from the HMA plant in accordance with AASHTO R 66 and as specified in Subsection 450.74C. Each sample shall be labeled with the PGAB grade, Supplier source and Lot number, sampling location, quantity represented, project name, plant, date, and the sampling inspector. When the PGAB is used for HMA production under Section 450 the sample shall be obtained from an in-line sample valve located between the asphalt tanks and mixing chamber at a sampling location downstream of all additive injection ports.

The Engineer will test the Department Acceptance samples for verification of the PGAB grade. The material shall conform to the specification requirements for the applicable performance grade as specified herein. Material not conforming to specification requirements shall be subject to corrective action, production suspension, rejection, or removal as determined by the Engineer.

The blending of binder of different grades or binder from different Suppliers at the HMA plants is strictly prohibited without the Engineer's approval. Contractors may switch to another approved source of binder, upon written notification to the Engineer, and by certifying that the tank to be utilized has been drained to an un-pumpable condition. The binder tanks at the HMA production facility shall be managed in a manner which prevents contamination.

Contractors who modify, blend PG binders, or add additives to the PGAB at the HMA production facility will be reclassified as a Supplier and shall be required to certify the binder in accordance with AASHTO R 26.

A copy of the COA for each Lot shall be provided in accordance with AASHTO R 26. The data reported shall meet the requirements of the specific binder specification:

1. For AASHTO M 320 – Table 1
2. For AASHTO M 332 – Table 1
3. For Crumb Rubber Modified Asphalt ASTM D6114-09 – Table 1

M3.01.1 Standard Asphalt Binder Grade.

The asphalt binder for HMA mixtures shall be a PGAB which meets the specification requirements of AASHTO Standard M 320. PGAB shall be provided by an Approved Supplier in accordance with AASHTO R 26. Approved Suppliers shall be listed on the MassDOT Qualified Construction Materials List (QCML).

Unless indicated otherwise on the Plans or in the Special Provisions, the standard PGAB Grade of **PG64-28** shall be used.

M3.01.2 Modified Asphalt Binder Grades.

When specified by the contract documents, the PGAB shall be modified in accordance with the following:

A. Polymer Modified Asphalt Binder

The polymer modified asphalt binder shall be a PGAB which meets the specification requirements of AASHTO M 332, however “E” grades will not be subject to the J_{ndiff} difference requirement. PGAB shall be provided by an approved Supplier in accordance with the AASHTO R 26. The modified PGAB Grade of **PG64E-28** shall be used.

B. Crumb Rubber Modified Asphalt Binder

The modified binder shall be in accordance with ASTM D6114-09, Type II. Virgin PGAB for the crumb rubber modified asphalt shall be a PG 58-28 or PG 64-28 provided by an approved Supplier in accordance with the AASHTO R 26. The grade selected shall be based on laboratory testing by the asphalt rubber Manufacturer.

The granulated rubber shall be vulcanized rubber product from the ambient temperature processing of scrap, pneumatic tires. The granulated rubber shall meet the gradation found in Table M3.1.

Table M3.1 – Crumb Rubber Gradation

Sieve Size	Percent by Weight Passing
#10	100
#16	90 – 100
#30	25 – 75
#80	0 – 20

The use of crumb rubber of multiple types from multiple sources is acceptable provided that the overall blend of crumb rubber meets the gradation requirements. The length of the individual rubber particles shall not exceed 1/8”. The rubber shall be certified by the crumb rubber Manufacturer.

The percent of crumb rubber shall be a minimum of 15% by weight of binder. The temperature of the asphalt shall be between 350°F and 400°F at the time of addition of the granulated crumb rubber. The asphalt and crumb rubber shall be combined and mixed together in a blender unit and reacted in the distributor for a period of time as required by design. The temperature of the asphalt rubber mixture shall be above 325°F during the reaction for a period of one hour.

M3.01.3 Asphalt Binder Grade for Recycled Asphalt Materials.

For any HMA mixture containing recycled asphalt materials, a binder that is softer than the standard asphalt binder shall be utilized in the mixture to account for the amount and stiffness of the recycled binder in accordance with Table M3.2.

If greater than 25% Reclaimed Asphalt Pavement (RAP) or any quantity of Recycled Asphalt Shingles (RAS) are used in an asphalt mixture, the virgin PGAB grade when blended with the RAP binder shall meet the binder grade specified by the project. The resulting final PGAB grade shall be in accordance with Table M3.2. Only PGABs meeting the requirements of AASHTO M 320 or M 323 will be used.

The type and amount of virgin asphalt binder to be used in the HMA mixture shall be included as part of the Laboratory Trial Mix Formula (LTMF). The Contractor shall submit certified test results from an AASHTO accredited laboratory showing the testing of the individual binders and the blending.

Table M3.2 – PGAB Grades for HMA Containing RAP/RAS

Amount of RAP in Mixture	Virgin PGAB Grade	Resulting PGAB Grade
≤ 25% RAP by Weight of Mixture	Project Specified Grade	Project Specified Grade
> 25% to 40% RAP by Weight of Mixture	Follow AASHTO M 323 Appendix X1	
≤ 5% RAS by Weight of Mixture	Follow AASHTO PP 78	

M3.01.4 Warm Mix Asphalt Additive.

All HMA shall be modified using a warm mix asphalt (WMA) additive. The WMA additive shall be evaluated by AASHTO's National Transportation Product Evaluation Program (NTPEP) and be listed on the MassDOT QCML. No WMA foaming technology which requires the mechanical injection of steam or water into the liquid asphalt will be permitted.

For HMA placed on bridge decks, the WMA additive shall not be used to lower the mixing and compaction temperatures. The mixing and compaction temperatures specified for the binder prior to addition of the WMA additive shall be used.

The WMA additive must be compatible with polyphosphoric acid modified binders, polymer modified binders, and anti-stripping agents. The WMA additive shall be introduced in accordance with the Manufacturer's dosing rates and approved blending methods.

The HMA mixture design shall incorporate the requirements of AASHTO R35 Appendix X2: Special Mixture Design Considerations and Practices for Warm Mix Asphalt (WMA). Laboratory mixing and compaction temperatures shall be reduced per the WMA Manufacturer's recommendations, however, the optimum laboratory compaction temperature for unmodified asphalt binders shall be less than 260°F. Target laboratory mixing and compaction temperatures shall be submitted to the Research & Materials Section (RMS) for review prior to performing a mix design.

When the asphalt binder is modified with the WMA additive at the HMA plant, all WMA additive equipment shall be fully automated and integrated into the plant controls and shall record actual dosage rates on the plant printouts. The Contractor's Quality System Manual shall provide mixture production and placement alterations due to the WMA additive and shall incorporate the modification of asphalt binders when the WMA additive is blended with the asphalt binder at the plant. This plan shall specifically address WMA metering requirements, tolerances and other Quality Control measures.

M3.01.5 Asphalt Anti-Stripping Additive.

An anti-stripping additive may be required in an HMA mixture to increase the resistance of the asphalt binder coating to stripping in the presence of water. An anti-stripping additive may be a liquid anti-strip or hydrated lime.

The Engineer may verify the effectiveness of the anti-strip used in an HMA mixture. When added at the dosage rate recommended by the Manufacturer to an HMA mixture showing moisture susceptibility, the anti-strip shall cause an improvement to the mixture's moisture susceptibility. This shall be determined by testing specimens with and without the liquid anti-strip additive in accordance with AASHTO T 324. If the antistrip does not show an improvement in the moisture susceptibility the additive will not be permitted for use.

The Manufacturer shall certify that the material is in accordance with this specification. The Manufacturer shall submit a COC for each Lot in accordance with Division 1 Section 6.0. The COC shall also include the:

1. Brand name and designation.
2. Composition or description of the anti-strip additive.
3. Manner in which the material will be identified on the containers.

A. Hydrated Lime

The hydrated lime for HMA shall conform to the requirements of AASHTO M 303.

B. Liquid Anti-Strip

The anti-strip Manufacturer shall submit product documentation, including the recommended dosage rate, to RMS for approval. Approved anti-strip additives shall be listed on the MassDOT QCML.

Anti-stripping additives shall be an organic chemical compound free from inorganic mineral salts or inorganic mineral soaps. The anti-strip additive shall be chemically inert to asphalt binder and shall not appreciably alter the specified characteristics of the asphalt binder. When blended with asphalt binder, it shall be stable and withstand storage at a temperature of 400°F for extended periods without loss of effectiveness.

M3.01.6 Asphalt Release Agents.

Approved asphalt release agents will be listed on the MassDOT QCML. The asphalt release agent shall not be detrimental to the HMA and shall not dissolve asphalt binder when applied to the truck bed. Dilution by diesel or other petroleum products will not be permitted.

Asphalt release agents shall be evaluated by AASHTO's National Transportation Product Evaluation Program (NTPEP). Release agents shall meet the following minimum requirements:

1. 7-Day Stripping Test
 - a. No stripping or discoloration when used in full strength and diluted forms.
2. Mixture Slide Test
 - a. 10.0 grams retained, maximum.
3. Asphalt Performance Test
 - a. Able to pull the cooled binder from the metal plate without adherence, a minimum of three pours.
4. Flash Point, ASTM D93
 - a. Have a flash point greater than 400°F on the undiluted product and contain no flammable materials, solvents, or petroleum elements.

The Manufacturer shall submit a Certificate of Compliance (COC) for each Lot of asphalt release agent in accordance with Division 1 Section 6.0. The COC shall also include the:

1. Brand name and designation.
2. Composition or description of the release agent.
3. Manner in which the material will be identified on the containers.

The Manufacturer shall certify that the material is in accordance with this specification. In addition, the Manufacturer shall furnish information for any dilution requirements, including the minimum dilution rate and special application requirements.

M3.02.0 Cutback Asphalts.

These materials shall be blends of asphalt cements and suitable solvents. They shall be homogeneous, free from water and conform to the requirements of AASHTO M 81 for the rapid curing type and AASHTO M 82 for the medium curing type.

M3.03.0 Asphalt Emulsions.**M3.03.1 Anionic Emulsified Asphalt.**

These materials shall conform to the requirements of AASHTO M 140. Anionic emulsion used for tack coat shall be grade **RS-1h**.

When supplied in 5-gallon buckets the anionic emulsion used for tack coat shall be grade **RS-1**.

M3.03.2 Cationic Emulsified Asphalt.

This material shall conform to the requirements of AASHTO M 208. Cationic asphalt emulsion used for tack coat shall be grade **CRS-1h**.

When supplied in 5-gallon buckets the cationic emulsion used for tack coat shall be grade **CRS-1**.

M3.03.3 Polymer Modified Emulsified Asphalt.

This material shall conform to the requirements of AASHTO M 316. Polymer modified asphalt emulsion used for tack coat shall be grade **CRS-1P**.

M3.05.0 Hot Poured Joint Sealer.

This sealer shall meet the requirements of ASTM D6690 Type II. Products shall be evaluated by the National Transportation Product Evaluation Program (NTPEP) as an HMA Crack Sealer (CS) and be listed on the MassDOT QCML.

M3.05.1 Asphalt-Fiber Joint and Crack Sealer.

This material shall consist of a blend of asphalt cement (PG64-28) and polyester fibers. The asphalt-fiber blend shall consist of 6% fiber by weight of asphalt binder.

M3.05.2 Preformed Bituminous Joint Filler for Concrete.

This material shall be a non-extruding and resilient bituminous type preformed expansion joint filler. It shall conform to the requirements of AASHTO M 213.

M3.05.3 Hot Applied Asphalt Crack Sealer.

This specification covers a hot applied crack sealer suitable for use in cement concrete and hot mix asphalt pavement. This sealer shall meet the requirements of ASTM D6690 Type II. Products shall be evaluated by the National Transportation Product Evaluation Program (NTPEP) as an HMA Crack Sealer (CS) and be listed on the MassDOT QCML.

M3.11.0 Hot Mix Asphalt.**M3.11.1 General.**

All Hot Mix Asphalt (HMA) mixtures shall meet the requirements of the Superpave volumetric mix design system as well as the following. Asphalt mixtures shall be composed of the following:

1. Mineral aggregate.
2. Mineral filler (if required).
3. Performance Graded Asphalt Binder (PGAB).

The use of recycled materials shall be at the Contractor's option in accordance with these specifications. And as permitted, recycled materials shall be limited to:

1. Recycled Asphalt Pavement (RAP).
2. Recycled Asphalt Shingles (RAS).
3. Processed Glass Aggregate (PGA).

Each HMA pavement course placed shall be compromised of one of the mixture types listed in Table 450.1HMA Pavement Courses & Mixture Types.

M3.11.2 Aggregate for Hot Mix Asphalt.**A. Coarse Aggregate**

The coarse mineral aggregate shall be clean, hard, durable, crushed rock consisting of the angular fragments obtained by breaking and crushing shattered natural rock, reasonably free from thin and/or elongated pieces, free from dirt or other objectionable materials. It shall be surface dry and shall have a moisture content of not more than ½ percent after drying. Aggregates from multiple sources of supply shall not be mixed or stored in the same stockpile.

B. Fine Aggregate

The fine aggregate shall consist of one of the following:

1. 100% Natural Sand.
2. 100% Stone Sand.
3. A blend of sand and stone screenings, the proportions of which shall be approved by the Engineer.
4. A blend of natural sand and stone sand.

Natural sand shall consist of inert, hard, durable grains of quartz or other hard, durable rock, free from topsoil or clay, surface coatings, organic matter or other deleterious materials.

Stone sand shall be a processed material prepared from stone screenings to produce a consistently graded material conforming to specification requirements.

Stone screenings shall be the product of a secondary crusher and shall be free from dirt, clay, organic matter, excess fines or other deleterious material.

C. Consensus Properties

Aggregates utilized in HMA mixtures, including RAP if used in the mixture, shall be tested for conformance with the Consensus Property requirements outlined in AASHTO M 323 Sections 6.2 to 6.6 and Table M3.5 below.

D. Source Properties

The coarse aggregate utilized in asphalt mixtures shall be clean, crushed rock consisting of the angular fragments obtained by breaking and crushing shattered natural rock. It shall be free from dirt or other objectionable materials. The coarse aggregate, including RAP if used in the mixture, shall be tested for conformance with the requirements indicated in Table M3.6. The specific gravity of each aggregate component shall be determined as specified in Table M3.7 below.

To determine the bulk specific gravity of RAP aggregate, the method outlined in FHWA Publication Number FHWA-HRT-11-021 "Reclaimed Asphalt Pavement in Asphalt Mixtures: State of the Practice" shall be used. The following excerpt is the method to be followed:

If the source of RAP is known and original construction records are available, the bulk specific gravity (BSG) value of the virgin aggregate from the construction records may be used as the BSG value of the RAP aggregate. However, if original construction records are not available, the recommended procedure for estimating BSG of the RAP aggregate is a simple three-step process as follows:

Determine the maximum theoretical specific gravity of the RAP mixture, G_{mm}^{RAP} , according to AASHTO T 209.

Calculate the effective specific gravity of the RAP aggregate, G_{se}^{RAP} , using G_{mm}^{RAP} , the asphalt content of the RAP mixture (P_b) and an assumed asphalt specific gravity (G_b) as follows:

$$G_{se}^{RAP} = \frac{100 - P_b}{\frac{100}{G_{mm}^{RAP}} - \frac{P_b}{G_b}}$$

Where $G_b = 1.030$.

The asphalt absorption, P_{ba} , shall be assumed to be 0.5%. Use this value to estimate the BSG of the RAP aggregate, G_{sb}^{RAP} , from the calculated G_{se}^{RAP} .

$$G_{sb}^{RAP} = G_{se}^{RAP} / \left(\frac{P_{ba} \times G_{se}^{RAP}}{100G_b} + 1 \right)$$

E. Recycled Asphalt Pavement

Reclaimed Asphalt Pavement (RAP) shall meet the requirements of Subsection M3.11.2C and D as well as the following. RAP shall consist of the material obtained from state highways or streets by crushing or milling existing HMA pavements. This material shall be transported to the HMA production facility yard and processed through an appropriate crusher so that the resulting material will contain no particles larger than the maximum aggregate size of the HMA mixture in which it will be used.

The RAP shall be stockpiled on a free draining base and kept separate from the other aggregates. RAP stockpiles shall be covered in a manner that prevents the intrusion of water but also allows the flow of air. The RAP stockpiles shall have a reasonably uniform gradation from fine to coarse and shall not be contaminated by foreign materials. The RAP used in the HMA mix production shall have a moisture content such that the final HMA contains no more than 0.5% moisture.

The use of RAP will be permitted at the option of the Contractor and provided that the end product is in conformance with the approved Job Mix Formula (JMF). The proportion of RAP to virgin aggregate shall be in accordance with Table M3.4 and Subsection M3.01.3.

Table M3.4 – Maximum Allowed RAP Content by Mix Type

Mix Type	Maximum Amount of RAP Allowed (%)	Maximum Amount of RAS Allowed (%) ⁽¹⁾
Friction Course (OGFC)	0	0
Friction Course (ARGG)	10	0
Surface Course	15	0
Leveling Course		5
Bridge Surface Course		0
Bridge Protective Course		0
Intermediate Course		5
Base Course	40	5

(1) When RAS is used in HMA mixtures containing RAP or other recycled materials, the RAS will be considered as part of the overall allowable weight of recycled materials in the mixture.

F. Recycled Asphalt Shingles

Recycled Asphalt Shingles (RAS) shall consist of only the by-product materials obtained from the roofing shingle manufacturing process. Post-consumer shingle waste and re-roofing shingle scrap will not be allowed. The Contractor or the plant shall provide certification from the roofing shingle manufacturer that RAS material provided is a by-product of the shingle manufacturing process. This material shall be transported to the HMA production facility yard and processed through an appropriate crusher so that the resulting material will contain no particles larger than ½ inch. The material shall be stockpiled on a free draining base and kept separate from the other aggregates. The material contained in the processed stockpile shall not be contaminated by foreign materials. RAS stockpiles shall be covered in a manner that prevents the intrusion of water but also allows the flow of air.

RAS may be used in HMA leveling courses, HMA intermediate courses, and HMA base courses at a maximum rate of 5% by weight. When RAS is used in HMA mixtures containing RAP or other recycled materials, the RAS will be considered as part of the overall allowable weight of recycled materials in the mixture.

G. Processed Glass Aggregate

The use of Processed Glass Aggregate (PGA) meeting the requirements of Subsection M2.01.8 may be added at a maximum addition rate of 10% by weight. This addition will only be allowed in base and intermediate mixtures. PGA in mixes containing RAP will be considered as part of the overall allowable mass of RAP in the mix. If PGA is used in the mix, a separate aggregate bin shall be used and the use of lime as an anti-stripping agent shall be required.

Table M3.5 – Aggregate Consensus Property Requirements

Traffic Level	Design ESALs (Millions) ⁽¹⁾	Fractured Faces, Coarse Aggregate, ⁽²⁾ % Minimum		Uncompacted Void Content of Fine Aggregate, % Minimum		Sand Equivalent, % Minimum	Flat and Elongated, ⁽²⁾ % Maximum
		All Courses (except Base Course)	Base Course	All Courses (except Base Course)	Base Course		
1	< 0.3	55/--	--/--	-- ⁽⁴⁾	--	40	--
2	0.3 to < 10	85/80 ⁽³⁾	60/--	45	40	45	10
3	≥ 10	95/90	80/75	45	40	45	10

(1) The anticipated project traffic level expected on the design lane over a 20-year period. Regardless of the actual design life of the roadway, determine the design ESALs for 20 years.

(2) This criterion does not apply to 4.75 mm nominal maximum size mixtures.

(3) 85/80 denotes that 85 percent of the coarse aggregate has one fractured face and 80 percent has two or more fractured faces.

(4) For 4.75 mm nominal maximum size mixtures designed for traffic levels below 0.3 million ESALs, the minimum Uncompacted Void Content is 40.

Table M3.6 – Aggregate Source Property Requirements

Source Property Test	Test Method	Limit
Toughness	AASHTO T 96	< 30 %
Soundness	AASHTO T 104	< 10 %
Deleterious Materials	AASHTO T 112	< 0.5 %

Table M3.7 – Aggregate Specific Gravity Test Method

Aggregate Type	Test Method
Coarse	AASHTO T 85
Fine	AASHTO T 84 or ASTM D7370
Mineral Filler	AASHTO T 100
RAP	From FHWA-HRT-11-021

M3.11.3 Performance Graded Asphalt Binder.

The PGAB utilized in the HMA mixture shall be specified by the Contract and shall comply with the requirements of Subsection M3.01.0.

M3.11.4 Hot Mix Asphalt Mixture Design.

The Contractor shall be responsible for development of all HMA mixture designs. All HMA surface courses, intermediate courses, base courses, leveling courses, bridge surface courses, and bridge protective courses shall be supported by volumetric mixture designs using the Superpave mixture design system. All Superpave HMA designs shall be developed in accordance with the following AASHTO standards, as modified herein:

1. AASHTO M 323
2. AASHTO R 35
3. AASHTO T 312

Open Graded Friction Course (OGFC) and Asphalt Rubber Gap Graded (ARGG) mixtures shall be designed in accordance with Subsections M3.11.4G and M3.11.4H, respectively.

A. Development of Laboratory Trial Mix Formula

The Contractor shall develop and submit a Laboratory Trial Mix Formula (LTMF) for each HMA mixture type, which is to be proposed as a Job Mix Formula (JMF), a minimum of sixty (60) days prior to HMA production. Each LTMF shall be submitted with supporting documentation and adequate amount of blended aggregate material and PGAB in order to verify the LTMF.

Once verified by the Department, the LTMF may become the Job Mix Formula (JMF) for a project. Two or more JMFs per HMA type may be approved for a particular plant, however, only mixture conforming to one JMF is permitted to be produced and placed on any given day.

B. Estimated Design Traffic

The estimated traffic level to be used for HMA mix designs shall be specified by the contract. The traffic level shall be expressed in Equivalent Single Axle Loads (ESALs) for the design travel lane over a 20-year period in million 18-kip ESALs.

C. Specific Gravity Requirements

The individual aggregate, mineral filler, and PGAB specific gravities shall be included with the LTMF. The Contractor shall provide samples of each aggregate material a minimum of sixty (60) days prior to production for each LTMF to the Department for verification specific gravity of each stockpile.

D. Superpave Aggregate Gradation Requirements

The combined aggregate blend for each Superpave HMA mixture shall conform to the Gradation Control Point requirements specified in Table M3.8. The results of the selected optimum design aggregate structure shall be plotted on a 0.45 power chart and included with the LTMF.

The combined aggregate gradation shall be classified as coarse-graded when it passes below the Primary Control Sieve (PCS) control point as defined in Table M3.9. All other gradations shall be classified as fine graded.

When a Superpave Surface Course - 19.0 (SSC - 19.0) is specified in the contract, the LTMF aggregate gradation shall provide a fine-graded HMA mixture as defined in Table M3.9.

E. Gyratory Compaction Criteria

Each asphalt mixture shall be designed and controlled during production using an approved gyratory compactor which meets the requirements of AASHTO T 312. Compaction shall be in accordance with the requirements of AASHTO T 312. The density of each HMA mixture shall be evaluated at the initial number of gyrations (N_{initial}), the design number of gyrations (N_{design}), and the maximum number of gyrations (N_{max}). The gyratory-compacted specimens for each LTMF shall meet the density requirements specified in Table M3.10 below.

F. Superpave Volumetric Design Requirements.

Each Superpave HMA mixture shall be designed in accordance with the volumetric mixture design specifications contained in AASHTO M 323 and procedures contained in AASHTO R 35, as modified herein. Each HMA mixture LTMF shall be tested for conformance with the following volumetric properties:

1. Air Voids at N_{design} (V_a).
2. Voids in the Mineral Aggregate at N_{design} (VMA).
3. Voids Filled with Asphalt at N_{design} (VFA).
4. Fines to Effective Asphalt Ratio ($P_{0.075} / P_{be}$).

The volumetric property test results shall be submitted with the LTMF for each Superpave HMA mixture. The required minimum or maximum criteria for each of the volumetric property tests are specified in Tables M3.10, M3.11, and M3.12.

Table M3.8 – Superpave Aggregate Gradation Control Points

Sieve	Nominal Maximum Aggregate Size – Control Points (% Passing)											
	#4 (4.75 mm)		3/8" (9.5 mm)		1/2" (12.5 mm)		3/4" (19.0 mm)		1" (25.0 mm)		1 1/2" (37.5 mm)	
Inches	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2											100	
1 1/2									100		90	100
1							100		90	100		90
3/4					100		90	100		90		
1/2	100		100		90	100		90				
3/8	95	100	90	100		90						
#4	90	100		90								
#8			32	67	28	58	23	49	19	45	15	41
#16	30	55										
#30												
#50												
#100												
#200	6	13	2	10	2	10	2	8	1	7	0	6

Table M3.9 – Gradation Classification

PCS Control Point for Mixture Nominal Maximum Aggregate Size (% Passing)					
Nominal maximum aggregate size	3/8" (9.5 mm)	1/2" (12.5 mm)	3/4" (19.0 mm)	1" (25.0 mm)	1 1/2" (37.5 mm)
Primary control sieve	#8 (2.36 mm)	#8 (2.36 mm)	#4 (4.75 mm)	#4 (4.75 mm)	3/8" (9.5 mm)
PCS control point, % passing	47	39	47	40	47

Table M3.10 – Superpave Asphalt Mixture Design Laboratory Compaction Requirements

Traffic Level	Design ESALs	Number of Gyration			Percent Density of G _{mm} from Asphalt Mixture Gyratory Specimen		
	(millions)	N _{ini}	N _{des}	N _{max}	N _{ini}	N _{des}	N _{max}
1	< 0.3	6	50	75	≤ 91.5	96.0	≤ 98.0
2	0.3 to < 10	7	75	115	≤ 90.5	96.0	≤ 98.0
3	≥ 10	8	100	160	≤ 89.0	96.0	≤ 98.0

Table M3.11 – Superpave Volumetric Requirements

	Nominal Maximum Aggregate Size					
	#4 (4.75 mm)	3/8" (9.5 mm)	1/2" (12.5 mm)	3/4" (19.0 mm)	1" (25.0 mm)	1 ½" (37.5 mm)
P _b	LTMF Value					
G _{mb}						
G _{mm}						
V _a	4.0					
VMA	≥ 17.0	≥ 16.0	≥ 15.0	≥ 14.0	≥ 13.0	≥ 12.0
VFA	Table M3.12					
Dust/P _{be} ⁽¹⁾	0.9 - 2.0	0.6 - 1.2	0.6 - 1.2	0.6 - 1.2	0.6 - 1.2	0.6 - 1.2
Mixture Temp	Unmodified PGAB ≤ 325°F Modified PGAB ≤ 350°F					
(1) If the aggregate gradation passes beneath the PCS Control Point specified in M 323 Table 5, the dust-to-binder ratio range may be increased from 0.6-1.2 to 0.8-1.6 at the Engineer's discretion.						
(2) Laboratory mixing and compaction temperatures shall be based on the PGAB Certificate of Analysis. When additives such as WMA, polymers, and rubber are introduced the mixing and compaction temperatures may be modified from the PGAB COA. Temperature modifications shall be recommended by the binder Supplier and approved at the Engineer's discretion.						

Table M3.12 – Superpave Asphalt Mixture VFA Requirements

Traffic Level	Design ESALs (Millions)	Voids Filled with Asphalt (VFA) Based on Nominal Maximum Aggregate Size					
		#4 (4.75 mm)	3/8" (9.5 mm)	1/2" (12.5 mm)	3/4" (19.0 mm)	1" (25.0 mm)	1 1/2" (37.5 mm)
1	< 0.3	70 - 80	70 - 80	70 - 80	70 - 80	67 - 80	64 - 80
2	0.3 to < 10	65 - 78	65 - 78	65 - 78	65 - 78	65 - 78	64 - 78
3	≥ 10	75 - 78	73 - 76	65 - 75	65 - 75	65 - 75	64 - 75

G. Open Graded Friction Course Design Requirements

Each OGFC asphalt mixture shall be designed in accordance AASHTO PP 77, as modified herein. The combined aggregate gradation shall conform to Table M3.13 and the mixture shall conform to Table M3.14.

1. OGFC-P will utilize asphalt binder meeting the requirements of Subsection M3.01.2A.
2. OGFC-AR will utilize asphalt binder meeting the requirements of Subsection M3.01.2B.

Table M3.13 – OGFC Aggregate Gradation Control Points

Sieve	Nominal Maximum Aggregate Size Control Points (% Passing)	
	3/8" (9.5 mm)	
Inches	Min	Max
1	-	-
3/4	-	-
1/2	100	-
3/8	85	100
#4	20	40
#8	5	15
#200	0	4

Table M3.14 – OGFC Mixture Requirements

Property	Requirement
N _{des} , gyrations	50
P _b , % (Polymer)	≥ 6.5
P _b , % (Asphalt Rubber)	≥ 7.5
V _a , %	18 – 22
VCA _{mix} , %	< VCA _{DRC}
Draindown, % ⁽¹⁾	≤ 0.3
Abrasion Loss, % ⁽²⁾	≤ 15
Moisture Susceptibility, % ⁽³⁾	≥ 70
Permeability, in/sec ⁽⁴⁾	≥ 0.0178
(1) Draindown shall be tested in accordance with AASHTO T 305 at the production temperature. (2) Abrasion loss shall be tested in accordance with AASHTO TP 108. (3) Moisture susceptibility shall be tested in accordance with AASHTO T 283. (4) Permeability shall be performed in accordance with the procedure outlined by RMS.	

H. ARGG Design Requirements

Each Asphalt Rubber Gap Graded (ARGG) asphalt mixture shall be designed in accordance with the AASHTO M 323 and procedures contained in AASHTO R 35, as modified herein. The combined aggregate gradation shall conform to Table M3.15 and the mixture shall conform to Table M3.16.

ARGG will utilize asphalt binder meeting the requirements of Subsection M3.01.2B.

Table M3.15 – ARGG Aggregate Gradation Control Points

Sieve	Nominal Maximum Aggregate Size Control Points (% Passing)	
	½" (12.5 mm)	
Inches	Min	Max
1	-	-
¾	100	-
½	90	100
⅜	83	87
#4	28	42
#8	14	22
#200	0	6

Table M3.16 – ARGG Mixture Requirements

Property	Requirement
N _{des} , gyrations	100
P _b , %	≥ 7.6
V _a , %	3 – 6
VMA, %	18 – 23
Draindown, % ⁽¹⁾	≤ 0.3
(1) Draindown shall be tested in accordance with AASHTO T 305 at the production temperature.	

M3.11.5 Verification of Laboratory Trial Mix Formula.

The Contractor shall submit an LTMF in accordance with Subsection M3.11.4. The Engineer will perform laboratory verification of each LTMF.

If the Engineer is unable to verify the Contractor's LTMF in accordance with the applicable LTMF Verification Limits in Table M3.17, Table M3.18, or Table M3.19, then the Engineer will work with the Contractor to resolve the verification issue(s). The Contractor shall not proceed with production and placement of a Control Strip under Section 450 until the LTMF is verified by the Engineer.

Table M3.17 – Superpave LTMF Verification Limits

Properties	Test Method	LTMF Verification Limit
Asphalt Binder Content (P_b)	AASHTO T 308	Target \square 0.3%
Gradation Passing #4 (4.75 mm) and Larger Sieves	AASHTO T 30	Target \square 6.0%
Gradation Passing #8 (2.36 mm) Sieve		Target \square 5.0%
Gradation Passing #16 (1.18 mm) to #50 (0.30 mm) Sieve		Target \square 3.0%
Gradation Passing #100 (0.15 mm) Sieve		Target \square 2.0%
Gradation Passing #200 (75 μ m) Sieve		Target \square 1.0%
Bulk Specific Gravity (G_{mb})	AASHTO T 166	Target \pm 0.022
Max. Theo. Specific Gravity (G_{mm})	AASHTO T 209	Target \square 0.020
Air Voids (V_a)	AASHTO R 35	Target \square 1.0%
Voids in Mineral Aggregate (VMA)		Target \square 1.0%
Voids Filled With Asphalt (VFA)		Target \square 5.0%
Rutting and Moisture Susceptibility	AASHTO T 324	Table M3.20

Table M3.18 – OGFC LTMF Verification Limits

Properties	Test Method	LTMF Verification Limit
Asphalt Binder Content (P_b)	AASHTO T 308	Target \square 0.3%
Gradation Passing #4 (4.75 mm) and Larger Sieves	AASHTO T 30	Target \square 6.0%
Gradation Passing #8 (2.36 mm) Sieve		Target \square 5.0%
Gradation Passing #16 (1.18 mm) to #50 (0.30 mm) Sieve		Target \square 3.0%
Gradation Passing #100 (0.15 mm) Sieve		Target \square 2.0%
Gradation Passing #200 (75 μ m) Sieve		Target \square 1.0%
Bulk Specific Gravity (G_{mb})	AASHTO T 331	Target \pm 0.022
Max. Theo. Specific Gravity (G_{mm})	AASHTO T 209	Target \square 0.020
Air Voids (V_a)	AASHTO R 35	Target \square 2.0%
Voids in Mineral Aggregate (VMA)		Target \square 2.0%
Voids Filled with Asphalt (VFA)		Target \square 5.0%
Draindown	AASHTO T 305	\leq 0.3%
Abrasion Loss	AASHTO TP 108	\leq 15%
Tensile Strength Ratio	AASHTO T 283	\geq 70%

Table M3.19 – ARGG LTMF Verification Limits

Properties	Test Method	LTMF Verification Limit
Asphalt Binder Content (P_b)	AASHTO T 308	Target \square 0.3%
Gradation Passing $\frac{3}{4}$ " (19.0 mm) Sieve	AASHTO T 30	Target \square 0.0%
Gradation Passing #4 (4.75 mm) to $\frac{1}{2}$ " Sieve		Target \square 6.0%
Gradation Passing #8 (2.36 mm) Sieve		Target \square 5.0%
Gradation Passing #16 (1.18 mm) to #50 (0.30 mm) Sieve		Target \square 3.0%
Gradation Passing #100 (0.15 mm) Sieve		Target \square 2.0%
Gradation Passing #200 (75 μ m) Sieve		Target \square 1.0%
Bulk Specific Gravity (G_{mb})	AASHTO T 166	Target \pm 0.022
Max. Theo. Specific Gravity (G_{mm})	AASHTO T 209	Target \square 0.020
Air Voids (V_a)	AASHTO R 35	Target \square 1.0%
Voids in Mineral Aggregate (VMA)		Target \square 1.0%
Draindown	AASHTO T 305	\leq 0.3%
Rutting and Moisture Susceptibility	AASHTO T 324	Table M3.20

Evaluation of Rutting and Moisture Sensitivity

Each HMA mixture, with the exception of Base Courses and OGFC, shall be tested by RMS for rutting and moisture sensitivity in accordance with the requirements of AASHTO T 324 using the Hamburg Wheel-Tracking Device (HWTD).

The Engineer may also require that mixtures meet the requirements of AASHTO T 283 with a minimum tensile strength ratio of 80%.

Table M3.20 – Hamburg Wheel Tracking Device Requirements

Traffic Level	Maximum Rut Depth Inches (mm)	Minimum number of passes before Stripping Inflection Point is observed
1	½ (12.5)	10,000
2		15,000
3		15,000

M3.11.6 HMA for Driveways, Sidewalks, Berm, and Curb.

HMA mixtures for driveways, sidewalks, berm, and curb shall conform to the master ranges in Table M3.21. The PGAB shall conform to Subsection M3.01.1. The Contractor shall submit a Job Mix Formula (JMF) prior to production which shows the target aggregate gradation and PG asphalt binder content for each HMA mixture for driveways, sidewalks, berm, and curb.

With the approval of the Engineer, the Contractor may substitute a MassDOT approved 9.5 mm or 12.5 mm Superpave Surface Course mixture (Traffic Level 1 or 2) for Driveways and Sidewalks.

The Contractor shall perform QC testing at the start of plant production and in conjunction with the calibration of the plant in order to verify that the JMF can be produced within the Engineering Limits specified in Table M3.22.

The composition limits in Table M3.21 are HMA mix design master ranges for aggregate gradation and asphalt binder content. The JMF for each HMA mixture type shall establish a single percentage of aggregate passing each required sieve size, and a single percentage of asphalt binder material to be added to the aggregate.

The JMF shall be submitted in writing by the Contractor to the Engineer at least 30 days prior to the start of paving operations and shall include the following as a minimum:

1. Source of materials.
2. Percent of each aggregate stockpile.
3. Percent passing each sieve size.
4. Combined aggregate specific gravity.
5. Percent of asphalt binder.
6. Performance grading test results and Certificate of Compliance certifying the PG grade.
7. Mixing temperature.
8. Compaction temperature.
9. Temperature of mix when discharged from the mixer.
10. Maximum theoretical specific gravity of the mixture.

AASHTO T 195 (Ross Count) with a coating factor of 98% will be used when necessary to evaluate proper mixing time.

The use of recycled materials will be permitted at the option of the Contractor and provided that the end product is in conformance with the designated JMF. The proportion of reclaimed materials (including RAP, PGA, and RAS) in the total mix shall be limited to a maximum of 15%.

All HMA JMFs for sidewalks, pedestrian curb ramps, driveways, and berm will be submitted to the Engineer for approval. The JMF shall bind the Contractor to furnish paving mixtures not only within the master ranges, but also conforming to the exact formula thus set up for the project, within the Engineering Limits found in Table M3.22.

For each project, at least one QC sample shall be randomly obtained by the Contractor for every 2,000 tons produced, but not less than one QC sample per day. The Engineer shall also obtain a minimum of one random Acceptance sample for every 2,000 tons produced. The sample will be tested for conformance with the submitted JMF and Engineering Limits. When testing shows the mixture is not in conformance the Engineer will determine the disposition in accordance with Section 6.04 of Division I.

The JMF for each mixture shall be in effect until modified in writing by the Contractor and approved by the Engineer. Should a change in sources of materials be made, a new JMF must be approved by the Engineer before the new material is used.

Table M3.21 – Master Ranges for HMA for Driveways, Sidewalks, Berm, and Curb

	Nominal Maximum Aggregate Size Control Points (% Passing)			
Mixture Type	Driveways, Sidewalks, and Berm		Berm and Curb Only	
Sieve (Inches)	Min	Max	Min	Max
1	-	-	-	-
3/4	100	-	-	-
1/2	95	100	100	-
3/8	87	93	87	93
#4	57	69	62	73
#8	41	45	52	55
#16	30	36	40	45
#30	21	25	28	34
#50	14	17	18	23
#100	9	12	10	14
#200	4	5	6	6
P _b , %	6.0	6.6	7.4	7.6

Table M3.22 – Engineering Limits for Aggregate Gradation and Asphalt Binder Content

Sieve Designation / Binder Content	Engineering Limits
Passing No. 4 and larger sieve sizes	JMF Target \pm 6%
Passing No. 8 sieve	JMF Target \pm 5%
Passing No. 16 to No. 50 sieves (inclusive)	JMF Target \pm 3%
Passing No. 100 sieve	JMF Target \pm 2%
Passing No. 200 sieve	JMF Target \pm 1%
Asphalt Binder Content	JMF Target \pm 0.4%

M3.11.7 Cold Patch for Temporary Patching.

When HMA is not available due to seasonal limitations the Contractor shall use stockpiled cold patch mixtures approved by the Research & Materials Section.

M3.11.8 Stress Absorbing Membrane & Stress Absorbing Membrane Interlayer.

All Stress Absorbing Membrane (SAM) and Stress Absorbing Membrane Interlayer (SAMI) mixtures shall meet the requirements as specified below. SAM & SAMI mixtures shall be composed of the following:

1. Mineral aggregate
2. Performance Graded Asphalt Binder

A. Aggregate.

The aggregate shall conform to Subsection M3.11.2. Crushed gravel stone will not be permitted. The aggregate shall be pre-heated to a temperature between 200°F and 300°F, and be pre-coated with 0.4% to 0.8% asphalt binder (by weight of aggregate) prior to application. The aggregate shall meet the requirements in Tables M3.23 and M3.24.

Table M3.23 – SAM & SAMI Aggregate Control Points

	Nominal Maximum Aggregate Size – Control Points (% Passing)					
Type	3/8" (9.5 mm)		1/2" (12.5 mm)		3/8" (9.5 mm) SAMI ONLY	
Sieve (Inches)	Min	Max	Min	Max	Min	Max
5/8	100	-	100	-	100	-
1/2	100	-	90	100	100	-
3/8	85	100	25	65	85	100
#4	0	8	0	8	0	30
#8	0	4	0	4	0	5
#200	0	2	0	2	0	2

Table M3.24 – SAM & SAMI Aggregate Source Property Requirements

Source Property Test	Test Method	Limit
Toughness	AASHTO T 96	< 30 %
Flakiness Index (For SAM)	TEX-224-F ⁽¹⁾	< 20%
Flakiness Index (For SAMI)	TEX-224-F ⁽¹⁾	< 30%
(1) Determined following TxDOT's Test Procedure for Determining Flakiness Index.		

B. Performance Graded Asphalt Binder.

The PGAB binder to be applied to the pavement shall be in conformance with Subsection M3.01.2B. Asphalt binder that is pre-coated onto the aggregate shall be in conformance with Subsection M3.01.1.

M3.11.9 Ultrathin Bonded Overlay

All Ultrathin Bonded Overlay (UTBO) mixtures shall meet the requirements as specified below. UTBO mixtures shall be composed of the following:

1. Mineral aggregate.
2. Mineral filler (if required).
3. Performance Graded Asphalt Binder (PGAB).

The use of recycled materials will not be permitted.

A. Coarse Aggregate.

Coarse aggregate shall meet the requirement of M3.11.2A. Where coarse aggregates for these mixes are from more than one source or of more than one type of material, they shall be proportioned and blended to provide a uniform mixture.

B. Fine Aggregate.

Fine aggregate shall meet the requirement of M3.11.2B as well as one of the following. Fine aggregate shall be 100% crushed and consist of one of the following:

1. 100% Stone Sand.
2. A blend of stone sand and stone screenings.

Table M3.25 – Fine Aggregate Consensus Property Requirements

Source Property Test	Test Method	Limit
Sand Equivalence	AASHTO T 176	> 60 %
Methylene Blue	AASHTO T 330	≤ 10 mg/g

C. Mineral Filler

Hydrated lime, fly ash, baghouse fines, and cement are acceptable as mineral filler.

Typical acceptable gradation: #30 - 100% passing
#200 - 75-100% passing

D. Performance Graded Asphalt Binder.

The PGAB utilized in the HMA mixture shall be specified by the Contract and shall comply with the requirements of Subsection M3.01.2.

E. UTBO Mixture Design.

The Contractor shall be responsible for development of all UTBO mixture designs. All UTBO designs shall be developed in accordance with the requirements specified below.

F. Development of Laboratory Trial Mix Formula

The Contractor shall develop and submit a Laboratory Trial Mix Formula (LTMF) for each UTBO mixture type, which is to be proposed as a Job Mix Formula (JMF), a minimum of sixty (60) days prior to UTBO production. Each LTMF shall be submitted with supporting documentation and adequate amount of blended aggregate material and PGAB in order to verify the LTMF. Once verified by the Department, the LTMF may become the Job Mix Formula (JMF) for a project.

G. Specific Gravity Requirements

The individual aggregate, mineral filler, and PGAB specific gravities shall be included with the LTMF. The Contractor shall provide samples of each material a minimum of sixty (60) days prior to production for each LTMF to the Department for verification specific gravity of each stockpile.

H. UTBO Aggregate Gradation Requirements

The combined aggregate blend for each UTBO mixture shall conform to the Gradation Control Point requirements specified in Table M3.26. The results of the selected optimum design aggregate structure shall be plotted on a 0.45 power chart and included with the LTMF.

Table M3.26 – UTBO Aggregate Control Points

	Nominal Maximum Aggregate Size – Control Points (% Passing)					
Type	Type 1		Type 2 ⁽¹⁾		Type 3 ⁽¹⁾	
Sieve (Inches)	Min	Max	Min	Max	Min	Max
¾	100	-	100	-	100	-
½	100	-	92	100	85	100
3/8	85	100	55	90	45	85
#4	24	40	24	41	24	41
#8	21	32	21	33	21	33
#16	16	26	15	26	15	26
#30	12	20	11	20	11	20
#50	8	16	8	16	8	16
#100	5	10	5	10	5	10
#200	5	7	4	7	4	7
(1) When asphalt rubber is specified the gradation master ranges may be modified with the prior approval from the Research & Materials Section.						

I. UTBO Mixture Requirements

The combined mixture for each UTBO mixture shall conform to the mixture requirements specified in Table M3.27. The results of the selected optimum design shall be included with the LTMF.

Table M3.27 – UTBO Mixture Requirements

Property	Requirement
P _b , % (Polymer)	4.8 – 5.2
P _b , % (Asphalt Rubber) ⁽¹⁾	5.8 – 6.2
Draindown, % ⁽²⁾	≤ 0.1
Moisture Susceptibility, % ⁽³⁾	≥ 80
(1) Type 1 UTBO shall not use asphalt rubber. (2) Draindown shall be tested in accordance with AASHTO T 305 at the production temperature. (3) The mixture shall be compacted according to AASHTO T 312 and tested in accordance with AASHTO T 283.	

J. Verification of Laboratory Trial Mix Formula.

The Contractor shall submit an LTMF in accordance with Subsections M3.11.9A to M3.11.9I. The Engineer will perform laboratory verification of each LTMF.

If the Engineer is unable to verify the Contractor's LTMF in accordance with the applicable LTMF Verification Limits in Table M3.28, then the Engineer will work with the Contractor to resolve the verification issue(s). The Contractor shall not proceed with production and placement of a Control Strip under Section 467 until the LTMF is verified by the Engineer.

Table M3.28 – UTBO LTMF Verification Limits

Properties	Test Method	LTMF Verification Limit
Asphalt Binder Content (P_b)	AASHTO T 308	Target \square 0.3%
Gradation Passing $\frac{3}{4}$ " (19.0 mm) Sieve	AASHTO T 30	Target \square 0.0%
Gradation Passing #4 (4.75 mm) and Larger Sieves		Target \square 6.0%
Gradation Passing #8 (2.36 mm) Sieve		Target \square 5.0%
Gradation Passing #16 (1.18 mm) to #50 (0.30 mm) Sieve		Target \square 3.0%
Gradation Passing #100 (0.15 mm) Sieve		Target \square 2.0%
Gradation Passing #200 (75 μ m) Sieve		Target \square 1.0%
Draindown	AASHTO T 305	\leq 0.1%
Tensile Strength Ratio	AASHTO T 283	\geq 80%

M3.12.0 Hot Mix Asphalt Production Facility.

All facilities producing HMA must be approved on an annual basis by the Department. All sources of materials used for the production of HMA must be approved by the Department prior to their use. Such materials shall include:

1. Coarse aggregate.
2. Fine aggregate.
3. Mineral filler.
4. Performance graded asphalt binder.
5. Modifiers and/or additives.

HMA production operations shall follow industry accepted best management practices including:

1. Aggregate handling and stockpile management.
2. Recycled asphalt pavement handling and stockpile management.
3. PGAB storage.
4. Plant process controls.
5. Silo loading.
6. Truck loading.

The plant shall meet the requirements of AASHTO M 156 as well as the following provisions. HMA plants meeting these requirements and which have been approved by RMS shall be listed on the MassDOT QCML.

An adequate quantity of each size aggregate, mineral filler and asphalt binder shall be maintained at the HMA plant site at all times while the plant is in operation to ensure that the plant can continuously produce mixtures that meet these specifications. The quantity of such materials shall never be less than one day's production capacity.

M3.12.1 Scales.

Plant and truck scales shall be certified:

1. At the start of each construction season, prior to use for MassDOT projects.
2. At intervals of not more than 90 calendar days.
3. Whenever the plant changes location.
4. At any time as requested by the Engineer.

M3.12.2 Calibration of Plant Equipment.

The plant's systems shall be calibrated:

1. At the start of each construction season, prior to use for MassDOT projects.
2. Whenever there is a significant change to the material.
3. Whenever a plant component supply system affecting the ingredient proportions has been repaired, replaced, or adjusted.
4. At any time as requested by the Engineer.

M3.12.3 Automatic Recordation.

Recordation equipment shall be provided. Each recorder shall include an automatic printer system. The printer shall be so positioned that the digital display and the printer can be readily observed within the plant's control room by the Engineer and the plant operator, simultaneously. The delivery ticket shall be printed with an original and at least one copy. The original shall be furnished to the Engineer at the paving site and the copy to the Engineer at the plant. The delivery ticket format shall be approved by RMS and will include the following information:

1. Company / plant location.
2. MassDOT contract number and/or distinct project name.
3. MassDOT mix ID number and/or distinct mix description.
4. Percentage of RAP in the mixture.
5. Percentage of asphalt binder in the mixture.
6. Date and time of loading.
7. Sequential load number for the contract for a 24-hour period.
8. Total weight of mix in truck (pay weight).

The following mixture production information shall also be provided:

For Batch Plants

1. Date mixed.
2. Time of batching.
3. Tare weight of aggregate weigh box.
4. Tare weight of PGAB weigh bucket.
5. Moisture content of recycled materials.
6. Target and actual cumulative or net weights as batched for each bin with a batch total for all net ingredients.
7. Target and actual weight of PGAB.
8. Total weight of mix in truck (pay weight).

Note: This information shall be included on the delivery ticket when the mix is batched directly into a truck. When the mix is batched and stored in a silo the information may be separate from the delivery ticket however it must be provided to the Engineer at the plant.

For Drum Plants

1. Percent of mixture as well as the target and actual production rate for each individual mix component including:
 - a. Aggregate
 - b. Mineral Filler
 - c. PGAB
 - d. Recycled materials
 - e. Additives
2. Moisture content of aggregates and recycled materials.
3. PGAB temperature.
4. Target and actual mix temperature.
5. Target and actual mix production rate.

Note: This information is not required to be included on the delivery ticket however it must be provided to the Engineer at the plant.

M3.12.4 Surge and Storage Silo Holding Time.

Unless otherwise permitted by the Engineer, the mixtures shall not be stored in surge and storage bins longer than the following:

1. Unheated and not insulated 2 hours
2. Unheated and insulated with heated gate 15 hours
3. Insulated and heated..... 24 hours

Note: In order to prevent excessive draindown, OGFC shall not be stored in a surge or storage bin for longer than two (2) hours. ARGG shall not be stored for more than six (6) hours.

M3.12.5 Asphalt Release Agents.

The plant shall have a method of applying MassDOT approved asphalt release agents to the haul units in accordance with the Manufacturer's recommendations. Spray systems may either be manual or automated but application of the release agent must be at the rate specified by the Manufacturer.

M3.12.6 Air Quality.

The plant shall be designed and operated to meet all current Federal and State air quality requirements.

M3.12.7 Equipment Failure.

If at any time the automatic proportioning or recording system becomes inoperative, the plant will cease all HMA production. Work will only be allowed to restart once all automatic controls and recording systems are functional.

M3.12.8 HMA Plant Facility Inspection.

The Engineer shall have access at any time to all parts of the plant for:

1. Inspections of the conditions and operations of the plant.
2. Confirmation of the adequacy of the equipment in use.
3. Verification of the character and proportions of the mixture.
4. Determination of temperatures being maintained in the preparation of the mixture.
5. Inspection of incidental related procedures.

M3.13.0 Hot Mix Asphalt Materials Testing Laboratory and Equipment.**M3.13.1 Contractor Quality Control Laboratory.**

All Contractor QC testing shall be performed in laboratories that are approved by RMS and qualified through the NETTCP Laboratory Qualification Program (LQP) or accredited through the AASHTO Accreditation Program (AAP). All laboratories shall maintain a Quality System Manual (QSM) in accordance with the outline maintained by the Research & Materials Section.

1. Laboratories that perform HMA mix designs or QC testing under Section 450 shall at a minimum be qualified as a NETTCP LQP Category 2 laboratory.
2. Laboratories performing only QC testing shall be qualified as a NETTCP LQP Category 3 laboratory.
 - a. Contractors who do not produce mixtures under Section 450 will not be required to have their own laboratory at the production facility but will be required to either test at their central laboratory or hire a Consultant testing company to perform the QC testing required in the specification. The Contractor will still be required to maintain a QSM for the HMA Production Facility.

The Contractor's QC laboratory shall be qualified to perform all testing required by Table M3.29 as well as contract specifications.

Laboratories meeting these requirements, and which have been approved by the RMS shall be listed on the MassDOT QCML.

The Contractor's QC Manager shall have overall responsibility for ensuring that all laboratories utilized for Quality Control are in compliance with the requirements of the NETTCP LQP. This includes providing required AASHTO, ASTM, and NETTCP reference documents and ensuring that all required equipment and tools are properly functioning and calibrated.

The Engineer shall be permitted unrestricted access to inspect and review the Contractor's laboratory facility.

Along with the required testing capabilities the laboratory facilities shall meet the following:

1. Be kept clean and all equipment shall be maintained in proper working condition.
2. Provide adequate environmental control to the satisfaction of the Engineer and must be able to maintain an inside temperature of 68 to 86°F during working hours.
3. Adequate ventilation to remove dust and fumes from the laboratory.
4. Hot and cold potable water.
5. First aid kit and emergency eye wash station.
6. Multi-class ABC fire extinguisher.
7. A restroom shall also be made available within 500 ft of the laboratory during all work shifts. The restroom facilities shall be enclosed in a separate room with proper ventilation and comply with applicable sanitary codes as well as:
 - a. A flush toilet.
 - b. A sink with hot and cold running water.
 - c. A sewer or septic tank with connections.
 - d. Adequate rest room supplies.
 - e. Maintained environmental control and cleanliness.

M3.13.2 Department Acceptance Laboratory at HMA Production Facility

The Engineer shall be provided laboratory working space meeting the requirements of Subsection M3.12.1 as well as the following. A desk must be located in close proximity to the laboratory but be separated from the ovens, sieve shakers, and anything else that can cause poor air and sound quality. The Engineer's desk and laboratory space will not be shared with any other entity.

Contractors who do not produce mixtures under Section 450 will not be required to have a Department Acceptance Laboratory at the production facility but will be required to allow the Engineer to perform Acceptance testing at their central laboratory or Consultant testing company laboratory. These laboratories are still required to meet Subsection M3.12.1.

If the Engineer is unable to perform their duties either due to lack of working space, poor working conditions, or access to equipment it will be considered a laboratory facility deficiency. The Engineer will advise the Contractor in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. Deficiencies shall be grounds for the Engineer to order an immediate stoppage of work until the deficiencies are corrected.

Unless approved by the Engineer, the plant, silos, and sample rack shall be in view of laboratory when performing testing under Section 450.

The Engineer shall be provided with the following:

A. Computer

For plants producing HMA in accordance with Section 450, the Engineer shall be furnished with a computer with high speed internet access which conforms to the requirements determined by RMS. The minimum requirements shall include:

1. The Engineer is required to have one (1) computer at the laboratory.
2. Computers shall be required to have the latest MS Office Professional with all security updates, Antivirus software with all current security updates maintained, and any other software required by RMS.
3. A laser printer with the capability to also scan and copy. The printer shall be compatible and connected to the laboratory's computer.

B. Testing Equipment

The Contractor shall supply the Engineer with the following equipment. This equipment shall only be utilized by the Engineer and shall be labeled as such. It shall be the Contractor's responsibility to maintain and replace equipment as needed.

1. For T 27 and T 30:
 - a. 12-inch sieve stack (2 inch to #200) with cover and pan.
 - b. Mechanical sieve shaker (only for Section 450 Category A Lots).
 - c. Electronic balance (only for Section 450 Category A Lots).
2. For T 166 and T 209:
 - a. Complete setup (only for Section 450).
3. For T 312:
 - a. Gyratory mold.
4. For T 308:
 - a. Ignition oven sample basket.
 - b. Ignition oven and two (2) sample baskets (only for Section 450 Category A Lots).
5. Miscellaneous equipment such as sample buckets, scoops, pans, brushes, thermometers, etc.
6. Oven which meets AASHTO R 30 and is capable of storing the sample buckets for 3 samples (only for Section 450 Category A Lots).
7. Supply of sample boxes.
8. Sample rack which is a suitable sampling platform from which the Engineer is able to stand and sample the material in the truck bed adequately and safely. The rack shall:
 - a. Be of sturdy construction.
 - b. Be able to safely accommodate at least two people at a time (min. standing area of 4 ft x 4 ft).
 - c. Have a safe stairway that is attached to the sampling platform.
 - d. Be at a height which allows the Technician the ability to reach the HMA in the bed of any size truck safely and efficiently.
 - e. Have a mounted spot light to allow for sampling at night.
 - f. Be within 100 ft of the laboratory and visible from the laboratory.
 - g. Meet applicable OSHA standards.

Table M3.29 – Required Test Methods by Laboratory

Test Method	Description	Mix Design Laboratory	QC Laboratory	Department Acceptance Laboratory
AASHTO M 323	Superpave Volumetric Mix Design	X		
AASHTO R 30 ⁽¹⁾	Mixture Conditioning of HMA	X		
AASHTO R 35	Superpave Volumetric Design for Asphalt Mixtures	X		
AASHTO R 47	Reducing Samples of HMA to Testing Size	X	X	X
AASHTO R 66	Sampling of Asphalt Materials		X	
AASHTO R 76	Reducing Samples of Aggregate to Testing Size	X	X	
AASHTO R 79 ⁽²⁾	Vacuum Drying Compacted HMA Specimens		X	
AASHTO R 90	Sampling of Aggregates		X	
AASHTO R 97	Sampling Bituminous Paving Mixtures		X	X
AASHTO T 11	Material Finer Than #200 Sieve by Washing	X	X	X
AASHTO T 27	Sieve Analysis of Fine and Coarse Aggregates	X	X	X
AASHTO T 30	Sieve Analysis of Extracted Aggregate	X	X	X
AASHTO T 84	Specific Gravity and Absorption of Fine Aggregate	X		
AASHTO T 85	Specific Gravity and Absorption of Coarse Aggregates	X		
AASHTO T 96	Coarse Aggregate L.A. Abrasion	X		
AASHTO T 104	Soundness of Aggregates	X		
AASHTO T 166	Bulk Specific gravity of HMA	X	X	X
AASHTO T 176	Sand Equivalence	X		
AASHTO T 209	Theoretical Maximum Specific Gravity of HMA	X	X	X
AASHTO T 255	Moisture Contents of Aggregates		X	
AASHTO T 283 ⁽⁴⁾	Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage	X		
AASHTO T 304	Un-compacted Void Content of Fine Aggregate	X		
AASHTO T 305 ⁽³⁾	Draindown in Uncompacted Asphalt Mixtures	X		
AASHTO T 308	Asphalt Binder Content by Ignition Oven		X	X
AASHTO T 312	Density of HMA by Superpave Gyratory	X	X	X
AASHTO T 329	Moisture Control of HMA		X	X
AASHTO T 331 ⁽⁴⁾	Bulk Specific Gravity and Density of Compacted Asphalt Mixtures Using Automatic Vacuum Sealing	X	X	X
AASHTO T 335	Determining the Percentage of Fracture in Coarse Aggregate	X		
ASTM D3549	Thickness of Compacted HMA Specimens		X	
ASTM D4791	Flat & Elongated Particles in Coarse Aggregate	X		
ASTM D7370 ⁽²⁾	Relative Density and Absorption of Aggregate Using Combined Vacuum Saturation and Rapid Submersion	X		

(1) Two ovens shall be required; one to heat binder, aggregate, and mixing tools to mixing temperature and one to condition the loose mixture at the compaction or conditioning temperature.

(2) Optional test.

(3) Required for Open Graded Friction Course and Asphalt Rubber Gap Graded.

(4) Required for Open Graded Friction Course.

SECTION M5: PIPE, CULVERT SECTIONS AND CONDUIT

Subsection M5.03.10 Corrugated Plastic Pipe.

(page III.74) Replace this subsection with the following:

Pipe shall consist of corrugated polyethylene or polypropylene tubing, flare ends, couplings and fittings. Materials, dimensions, physical properties and fabrication shall be in accordance with AASHTO M 294, Type S or D or AASHTO M330 Type S or D. Perforated pipe shall meet Type SP, DP or CP.

SECTION M6: ROADSIDE DEVELOPMENT MATERIALS

Subsection M6.03.0 Long Term Seed Mixes for Lawns and Slopes.

(page III.79) In table M6.03.0-1 Grass Seed Requirements for Lawn Grass Areas change the proportion of Creeping Red and/or Chewing Fescue from 55% to 59% and change the proportion of Dutch White Clover from 5% to 1%. In table M6.03.0-2 Grass Seed Requirements for Slopes and Shoulders change Kentucky Blue Grass to Tall Fescue. Delete table M6.03.0-3 Grass Seed Requirements for Warm Season Mix.

Subsection M5.03.1 Short Term Erosion Control Seed.

(page III.79) Change the subsection number from M5.03.1 to M6.03.1. Change the table number from M5.03.1-1 to M6.03.1-1.

SECTION M9: MISCELLANEOUS MATERIALS

Subsection M9.08.0: Preformed Sheet Membrane

(page III.128) Replace this subsection with the following:

M9.08.0: Waterproofing Membranes

M9.08.1: Spray Applied Waterproofing Membrane

A. General Requirements

Only products listed on the MassDOT Qualified Construction Materials List (QCML) will be accepted for use. The membrane waterproofing system shall consist of:

- Primer
- One or two coat rapid curing cold liquid spray applied seamless methyl methacrylate, polyurea, or polyurethane methyl methacrylate membrane
- Aggregate keycoat
- Polymer modified tack coat

B. Material Requirements

The total minimum base thickness for the membrane shall be 80 mils measured over peaks. The membrane shall easily accommodate the need for day joints and patch repairs. The membrane shall be able to bridge live cracks up to 1/8 inch in width and meet the criteria specified in Table M9.08.1-2.

The membrane waterproofing system shall be asbestos-free. The chemical composition of the primer, membrane, aggregate keycoat and tack coat that make up the membrane waterproofing system shall conform to the manufacturer's specifications for the material. All components shall be approved by the manufacturer as being compatible for use with the specified membrane. Cleaning solvents shall also be approved by the manufacturer for use with the membrane.

Primer for Spray Applied Membrane

The primer shall promote adhesion of the membrane to the concrete surface.

Table M9.08.1-1: Primer Material Properties

Property	Test	Requirements
Gel Time		> 5 minutes
Tack Free Time		< 2.5 hours, max at 77°F
Adhesion to Concrete	ASTM D7234	≥ 100 psi minimum and failure in concrete

Membrane

The membrane shall be meet the requirements in Table M9.08.1-2.

Table M9.08.1-2: Spray Applied Waterproofing Membrane Material Properties

Property	Test	Requirements
Solids Content		100%
Stability	ASTM C836	≥ 6 months
Crack Bridging (Neat Material + Aggregated Keycoat)	ASTM C1305 ⁽¹⁾	Pass, no cracking
Extensibility after Heat Aging	ASTM C1522	For information only
Percent Elongation at Break	ASTM D638	≥ 130%
Tensile Strength	ASTM D638 Type IV @ 2 in/min	≥ 1,100 psi
Shore Hardness	ASTM D2240 ⁽²⁾	≥ 50 Type 00
Minimum Thickness (Membrane only)	ASTM D6132 or other approved method	≥ 80 mils minimum measured over peaks or ≥ thickness used to pass ASTM C1305 (Whichever thickness is greater)
Membrane Waterproofing System Adhesion to Concrete	ASTM D7234	≥ 100 psi minimum and failure in concrete
Permeance	ASTM E96 Water Method, Procedure B	≤ 1.0 perms

⁽¹⁾ ASTM C1305 shall be modified to 25 cycles at -15°F no failure at 1/8 inch per hour.

⁽²⁾ ASTM D2240 shall be modified per ASTM C836 section 6.5.

Aggregate for Keycoat

The broadcast aggregate shall be durable and provide shear resistant to prevent the hot mix asphalt (HMA) from shoving. Aggregate shall have a minimum Mohs hardness rating of seven (7) and be approved by the manufacturer.

Polymer Modified Tack Coat

The tack coat shall consist of either a polymer modified asphalt emulsion, or a polymer modified asphalt binder approved for use by the membrane waterproofing manufacturer and the Engineer. The tack coat shall be either supplied by the membrane waterproofing manufacturer or by a MassDOT approved asphalt emulsion Supplier.

C. Material Qualification

A manufacturer requesting approval of a spray applied membrane system shall furnish to the Research and Materials Section the following:

1. The membrane system material specifications including product performance data.
2. Certified independent test reports demonstrating conformance to Table M9.08.1-2.
 - The independent lab shall be recognized by the National Cooperation for Laboratory Accreditation (NACLA) in Construction Materials Engineering and Testing (CMET) or an equal program approved by Research and Materials.
 - All testing shall be performed by one independent lab unless approved by the Engineer. Independent test reports must be dated within two (2) years from the initial submission.
 - Samples for all required testing shall be fabricated at the same time. Test reports shall denote the lot of material as well as the sample fabrication and testing dates.
3. MassDOT shall perform prequalification testing on the membrane.
 - Two (2) 10 inch by 10-inch square samples of the proposed membrane with smooth surfaces (no primer or aggregate in the keycoat). The samples shall be a minimum of 80 mils thick or the thickness used to pass the crack bridging requirement found in Table M9.08-4.

All submittals shall be certified to be in conformance with the manufacturer's instructions. Systems qualified by MassDOT per the performance criteria shall be considered for placement on the MassDOT QCML. Membrane waterproofing systems shall remain on the QCML for a period of five (5) years at which time the manufacturer will be required to submit certified test reports demonstrating conformance to this specification.

M9.08.2: Sheet Membrane

A. General Requirements

Only products listed on the MassDOT Qualified Construction Materials List (QCML) will be accepted for use. Chemical composition, physical properties and dimensional requirements of the sheet membrane shall conform to the manufacturer's specifications for the material.

Also, all accessory materials such as, flashing, primer, etc., used in the application of the sheet membrane will be considered a part of this specification and shall conform to the manufacturer's requirements. The membrane waterproofing system shall consist of:

- Primer
- Sheet Membrane
- Mastic

B. Material Requirements

The primer shall meet the requirements of Subsection M9.09.1.

The membrane sheet shall meet the requirements in ASTM D6153 and Table M9.08.2-1.

The mastic for use with rubberized sheets shall be a rubberized asphalt cold-applied joint sealant. The mastic for use with modified bitumen sheet shall be a blend of bituminous and synthetic resins. The mastic shall be approved for use by the manufacturer.

Table M9.08.2-1: Sheet Membrane Material Properties

Property	Test	Requirements
Thickness	ASTM D3767	≥60 mils
Permeance	ASTM E96 Water Method, Procedure B	≤0.1 perms
Pliability	ASTM D146 ⁽¹⁾	No breaks
⁽¹⁾ The test temperature of the specimen shall be 0°F after 24 hours and 180° bend over a ¼ inch mandrel.		

C. Material Qualification

A manufacturer requesting approval of a preformed sheet membrane shall furnish to the Research and Materials Section the following:

1. The membrane system material specifications including product performance data.
2. The peel-off backing material shall be tear resistant to prevent portions of it from remaining after the membrane is applied.
3. Certified independent test reports demonstrating conformance to ASTM D6153, Table M9.08.2-1, and the submitted product performance data.
 - The independent lab shall be recognized by the National Cooperation for Laboratory Accreditation (NACLA) in Construction Materials Engineering and Testing (CMET) or an equal program approved by Research & Materials. All testing shall be performed by the same independent lab
 - Independent test reports must be dated within two (2) years from the initial submission. Samples for all required testing shall be fabricated at the same time. Test reports shall denote the lot of material as well as the sample fabrication and testing dates.
4. A detailed summary of successful installations that have occurred in the United States, including owner contact information, design and construction details (substrate type & condition, membrane system components, hot mix asphalt overlay thickness and mix details, etc.), year constructed, tests performed, performance monitoring and/or testing, and any other additional information requested by the Department.

All submittals shall be certified to be in conformance with the manufacturer's instructions. The Research & Materials Section shall review the manufacturer's submitted documentation. A demonstration of the product's installation and performance may be required to be qualified by MassDOT. Systems qualified by MassDOT shall be considered for placement on the MassDOT QCML. Preformed sheet membrane systems shall remain on the QCML for a period of five (5) years at which time the manufacturer will be required to submit certified test reports demonstrating conformance to this specification.

M9.08.3: Hot Applied Rubberized Asphalt Membrane

A. General Requirements

Only products listed on the MassDOT Qualified Construction Materials List (QCML) will be accepted for use. Chemical composition, physical properties and dimensional requirements of the sheet membrane shall conform to the manufacturer's specifications for the material. The membrane waterproofing system shall consist of:

- Primer
- Hot poured rubberized asphalt membrane consisting of a single component hot applied asphalt
- Protective covering

B. Material Requirements

The primer shall meet the requirements of Subsection M9.09.1.

The membrane shall be able to bridge live cracks up to 1/8 inch in width and meet the criteria specified in Table M9.08.3-1.

The protective covering shall be rolled asphalt sheets conforming to ASTM D6380, Type II.

DOCUMENT 00719

(Revised June 6, 2016 – 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.....	2
1. DEFINITIONS.....	3
2. DBE PARTICIPATION.....	5
a. Goal.....	5
b. Bidders List.....	5
3. CONTRACTOR ASSURANCES.....	6
4. REQUIRED SUBCONTRACT PROVISIONS	6
5. ELIGIBILITY OF DBES	6
a. Massachusetts DBE Directory	6
b. DBE Certification.....	6
c. Joint Venture Approval.....	7
6. COUNTING DBE PARTICIPATION TOWARDS DBE PARTICIPATION GOALS.....	7
a. Commercially Useful Function	7
b. Counting Participation Toward The Contract Participation Goal.....	7
c. Joint Check Policy	9
d. Joint Check Procedure(s).....	10
7. AWARD DOCUMENTATION AND PROCEDURES	11
8. COMPLIANCE.....	13
9. SANCTIONS	16
10. FURTHER INFORMATION; ENFORCEMENT, COOPERATION AND CONFIDENTIALITY.	16
11. LIST OF ADDITIONAL DOCUMENTS.....	18

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:

<i>Type of Info</i>	<i>Website</i>	<i>Description</i>
MassDOT Highway Division Policies and Info	http://www.massdot.state.ma.us/highway/DoingBusinessWithUs/ContractorVendorInformation.aspx	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/small-business/disadvantaged-business-enterprise-dbe-program	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.¹

"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 <http://www.fhwa.dot.gov/resourcecenter/teams/operations/gloss.cfm>

(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 8 %
(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.sdo.osd.state.ma.us> .

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 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 use a 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 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 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 Director of Compliance, MassDOT Office of Civil Rights, 10 Park Plaza, 4th Floor East, Boston, MA, 02116.
- 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, non-discriminatory 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) 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)

*** END OF DOCUMENT ***

DOCUMENT 00760

FHWA-1273

REQUIRED CONTRACT PROVISIONS FOR FEDERAL-AID CONSTRUCTION CONTRACTS

Revised May 1, 2012

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Government wide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

- A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (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).

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.

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). 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 bid proposal or request for proposal 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).

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.

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. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 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 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, 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 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, 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 230, 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 (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 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 35 and 29 CFR 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.

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, 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 who 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.

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, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure 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. 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, 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, 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 there under. 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, 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 and 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. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor 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 contracting agency deems appropriate.

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 \$10,000 or more.

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, 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). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

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

a. All laborers and mechanics employed or working upon the site of the work, 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 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.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. 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 shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4).

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 classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall 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. (1) The contracting officer shall 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 shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore 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 utilized 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) 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 shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. 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.

(3) 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 shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour 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.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall 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.

c. 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 shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. 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, 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.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, 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.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, 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 section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) 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 section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall 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. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of

the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed 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 Regulations, 29 CFR part 3;

(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 of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, 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 may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed 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 Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall 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 the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall 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, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. 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. 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

journeymen 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.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 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.

9. Disputes concerning labor standards. 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 he or she) 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 section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

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

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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 watchmen 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.

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. 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 watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 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.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or 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, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

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

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" 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:

(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.

2. 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. 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.

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

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 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.

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 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).

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 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 1, 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

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

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

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.

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.

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.

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.

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 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee 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 grantee or subgrantee 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.

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.

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. 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 Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

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. 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) 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;

(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; 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.

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

2. 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)

a. By signing and submitting this proposal, the prospective lower tier 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.

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 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 grantee or subgrantee 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 grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers to 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.

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.

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 Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

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.

* * * * *

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

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall 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 20).

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.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

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.

END OF DOCUMENT

DOCUMENT 00811

SPECIAL PROVISIONS
MONTHLY PRICE ADJUSTMENT FOR HOT MIX ASPHALT (HMA) MIXTURES
ENGLISH AND METRIC UNITS
Revised: 06/04/2019

This provision applies to all projects using greater than 100 tons (91 megagrams) 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/2019-massdot-contract-price-adjustments> within two (2) business days 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. This method of period price determination was formerly called the New Asphalt Period Price Method. Separate website postings using both the New Asphalt Period Price Method and the Old Asphalt Period Price Method were discontinued after June 2013.

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 Standard Specifications for Highways and Bridges, Division III, Section M3.11.03.

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.

***** END OF DOCUMENT *****

THIS PAGE INTENTIONALLY LEFT BLANK

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

*** END OF DOCUMENT ***

THIS PAGE INTENTIONALLY LEFT BLANK

DOCUMENT 00813

SPECIAL PROVISIONS

PRICE ADJUSTMENTS FOR STRUCTURAL STEEL AND REINFORCING STEEL

January 19, 2021

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 in which MassDOT opened bids for the project. This date is used to select the Base Price Index.

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 = $\$0.82/\text{Pound} \times 0.950 = \$0.78/\text{Pound}$

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	\$0.35
2	ASTM A27 (AASHTO M103) Steel Castings, H-Pile Points & Pipe Pile Shoes (See Note below.)	\$0.48
3	ASTM A668 / A668M (AASHTO M102) Steel Forgings	\$0.48
4	ASTM A108 (AASHTO M169) Steel Forgings for Shear Studs	\$0.52
5	ASTM A709/A709M Grade 36 / AASHTO M270M/M270 Grade 36 or 250 Structural Steel Plate	\$0.55
6	ASTM A709/A709M Grade 36 / AASHTO M270M/M270 Grade 36 or 250 Structural Steel Shapes	\$0.51
7	ASTM A709/A709M Grade 50 / AASHTO M270M/M270 Grade 50 or 345 Structural Steel Plate	\$0.55
8	ASTM A709/A709M Grade 50 / AASHTO M270M/M270 Grade 50 or 345 Structural Steel Shapes	\$0.51
9	ASTM A709/A709M Grade 50WT / AASHTO M270M/M270 Grade 50WT or 345WT Structural Steel Plate	\$0.56
10	ASTM A709/A709M Grade 50WT / AASHTO M270M/M270 Grade 50WT or 345WT Structural Steel Shapes	\$0.52
11	ASTM A709/A709M Grade 50W / AASHTO M270M/M270 Grade 50W 345W Structural Steel Plate	\$0.56
12	ASTM A709/A709M Grade 50W / AASHTO M270M/M270 Grade 50W or 345W Structural Steel Shapes	\$0.52
13	ASTM A709/A709M Grade HPS 50W / AASHTO M270M/M270 Grade HPS 50W or 345W Structural Steel Plate	\$0.59
14	ASTM A709/A709M Grade HPS 70W / AASHTO M270M/M270 Grade HPS 70W or 485W Structural Steel Plate	\$0.62
15	ASTM A514/A514M-05 Grade HPS 100W / AASHTO M270M/M270 Grade HPS 100W or 690W Structural Steel Plate	\$0.96
16	ASTM A992/A992M Grade 50S / AASHTO M270M/M270 Grade 50S or 345S Structural Steel Plate	\$0.56
17	ASTM A992/A992M Grade 50S / AASHTO M270M/M270 Grade 50S or 345S Structural Steel Shapes	\$0.52
18	ASTM A276 Type 316 Stainless Steel	\$2.86
19	ASTM A240 Type 316 Stainless Steel	\$2.86
20	ASTM A148 Grade 80/50 Steel Castings (See Note below.)	\$0.99
21	ASTM A53 Grade B Structural Steel Pipe	\$0.63
22	ASTM A500 Grades A, B, 36 & 50 Structural Steel Pipe	\$0.63
23	ASTM A252, Grades 240 (36 KSI) & 414 (60 KSI) Pipe Pile	\$0.50
24	ASTM 252, Grade 2 Permanent Steel Casing	\$0.50
25	ASTM A36 (AASHTO M183) for H-piles, steel supports and sign supports	\$0.54
26	ASTM A328 / A328M, Grade 50 (AASHTO M202) Steel Sheetpiling	\$0.93
27	ASTM A572 / A572M, Grade 50 Sheetpiling	\$0.93
28	ASTM A36/36M, Grade 50	\$0.55
29	ASTM A570, Grade 50	\$0.54
30	ASTM A572 (AASHTO M223), Grade 50 H-Piles	\$0.55
31	ASTM A1085 Grade A (50 KSI) Steel Hollow Structural Sections (HSS), heat-treated per ASTM A1085 Supplement S1	\$0.63
32	AREA 140 LB Rail and Track Accessories	\$0.33

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.

END OF DOCUMENT

THIS PAGE IS INTENTIONALLY LEFT BLANK

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.

*** END OF DOCUMENT ***

THIS PAGE INTENTIONALLY LEFT BLANK

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 151 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

*** END OF DOCUMENT ***

THIS PAGE INTENTIONALLY LEFT BLANK

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.

*** END OF DOCUMENT ***

THIS PAGE INTENTIONALLY LEFT BLANK

DOCUMENT 00859

CONTRACTOR/SUBCONTRACTOR CERTIFICATION FORM ‡

 (Contractor) **Date:** _____
 ‡This form shall be prepared and submitted to MassDOT for each and every subcontractor; the Prime Contractor shall ensure that the indicated documents have been given, as applicable, to its SubContractors.

 (Subcontractor) ☐ District Approved Subcontractor

Contract No: 113892 **Project No:** 605356 **Federal Aid No:** NHP(BR-ON)-003S(205)X

Location: Williamstown

Project Description: Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2
(Main Street) over the Green River (Re-Advertised Project)

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 : <http://www.massdot.state.ma.us/Debarred.aspx>.
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: _____

 (Print Name and Title)

Telephone Number: _____

Federal I.D. Number: _____

Estimated Start Date: _____

Estimated Completion Date: _____

Estimated Dollar Amount: _____

 (Authorized Signature)

 (Date)

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 than 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 WAGE RATES

THIS PAGE INTENTIONALLY LEFT BLANK



CHARLES D. BAKER
Governor

KARYN E. POLITO
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**

ROSALIN ACOSTA
Secretary
MICHAEL FLANAGAN
Director

Awarding Authority: MassDOT Highway
Contract Number: 113892 **City/Town:** WILLIAMSTOWN
Description of Work: WILLIAMSTOWN - Federal Aid Project No. NHP(BR-ON)-003S(205)X Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River
Job Location: Route 2 (Main Street) over the Green River

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- 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 from the Department of Labor Standards (“DLS”) if it has not opened bids or selected a contractor within 90 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 any sub-contractor.
 - All apprentices working on the project are required to be registered with the Massachusetts Department of Labor Standards, Division of Apprentice Standards (DLS/DAS). Apprentice must keep his/her apprentice identification card on his/her person 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 DLS/DAS regardless of whether or not they are registered with any other federal, state, local, or private agency must be paid the journeyworker's rate for the trade.**
 - 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. Awarding authorities are required to request these updates 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, 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. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F “rental of equipment” contracts.
 - Every contractor or subcontractor which performs construction work on the project is required to 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. A sample of a payroll reporting form may be obtained at <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.
 - Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
 - 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.
-

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2020	\$35.15	\$12.91	\$14.82	\$0.00	\$62.88
	06/01/2021	\$35.95	\$12.91	\$14.82	\$0.00	\$63.68
	08/01/2021	\$35.95	\$13.41	\$14.82	\$0.00	\$64.18
	12/01/2021	\$35.95	\$13.41	\$16.01	\$0.00	\$65.37
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2020	\$35.22	\$12.91	\$14.82	\$0.00	\$62.95
	06/01/2021	\$36.02	\$12.91	\$14.82	\$0.00	\$63.75
	08/01/2021	\$36.02	\$13.41	\$14.82	\$0.00	\$64.25
	12/01/2021	\$36.02	\$13.41	\$16.01	\$0.00	\$65.44
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2020	\$35.34	\$12.91	\$14.82	\$0.00	\$63.07
	06/01/2021	\$36.14	\$12.91	\$14.82	\$0.00	\$63.87
	08/01/2021	\$36.14	\$13.41	\$14.82	\$0.00	\$64.37
	12/01/2021	\$36.14	\$13.41	\$16.01	\$0.00	\$65.56
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 3)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$28.53	\$8.60	\$13.37	\$0.00	\$50.50
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 4 (HEAVY & HIGHWAY)</i>	12/01/2020	\$30.24	\$8.60	\$14.44	\$0.00	\$53.28
	06/01/2021	\$31.06	\$8.60	\$14.44	\$0.00	\$54.10
	12/01/2021	\$31.87	\$8.60	\$14.44	\$0.00	\$54.91
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS WORKER (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD)</i>	12/01/2020	\$34.29	\$12.80	\$8.95	\$0.00	\$56.04
ASPHALT RAKER <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$28.03	\$8.60	\$13.37	\$0.00	\$50.00
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 4 (HEAVY & HIGHWAY)</i>	12/01/2020	\$29.74	\$8.60	\$14.44	\$0.00	\$52.78
	06/01/2021	\$30.56	\$8.60	\$14.44	\$0.00	\$53.60
	12/01/2021	\$31.37	\$8.60	\$14.44	\$0.00	\$54.41
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
AUTOMATIC GRADER-EXCAVATOR (RECLAIMER) <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$36.22	\$12.47	\$14.50	\$0.00	\$63.19
	06/01/2021	\$37.04	\$12.47	\$14.50	\$0.00	\$64.01
	12/01/2021	\$37.87	\$12.47	\$14.50	\$0.00	\$64.84
	06/01/2022	\$38.74	\$12.47	\$14.50	\$0.00	\$65.71
	12/01/2022	\$39.62	\$12.47	\$14.50	\$0.00	\$66.59
	06/01/2023	\$40.57	\$12.47	\$14.50	\$0.00	\$67.54
	12/01/2023	\$41.52	\$12.47	\$14.50	\$0.00	\$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER OPERATOR <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$36.22	\$12.47	\$14.50	\$0.00	\$63.19
	06/01/2021	\$37.04	\$12.47	\$14.50	\$0.00	\$64.01
	12/01/2021	\$37.87	\$12.47	\$14.50	\$0.00	\$64.84
	06/01/2022	\$38.74	\$12.47	\$14.50	\$0.00	\$65.71
	12/01/2022	\$39.62	\$12.47	\$14.50	\$0.00	\$66.59
	06/01/2023	\$40.57	\$12.47	\$14.50	\$0.00	\$67.54
	12/01/2023	\$41.52	\$12.47	\$14.50	\$0.00	\$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$28.03	\$8.60	\$13.37	\$0.00	\$50.00
For apprentice rates see "Apprentice- LABORER"						
BATCH/CEMENT PLANT - ON SITE <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$35.69	\$12.47	\$14.50	\$0.00	\$62.66
	06/01/2021	\$36.51	\$12.47	\$14.50	\$0.00	\$63.48
	12/01/2021	\$37.34	\$12.47	\$14.50	\$0.00	\$64.31
	06/01/2022	\$38.21	\$12.47	\$14.50	\$0.00	\$65.18
	12/01/2022	\$39.09	\$12.47	\$14.50	\$0.00	\$66.06
	06/01/2023	\$40.04	\$12.47	\$14.50	\$0.00	\$67.01
	12/01/2023	\$40.99	\$12.47	\$14.50	\$0.00	\$67.96
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$28.53	\$8.60	\$13.37	\$0.00	\$50.50
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 4 (HEAVY & HIGHWAY)</i>	12/01/2020	\$30.24	\$8.60	\$14.44	\$0.00	\$53.28
	06/01/2021	\$31.06	\$8.60	\$14.44	\$0.00	\$54.10
	12/01/2021	\$31.87	\$8.60	\$14.44	\$0.00	\$54.91
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	01/01/2020	\$46.10	\$7.07	\$17.98	\$0.00	\$71.15

Apprentice - BOILERMAKER - Local 29**Effective Date -** 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$29.97	\$7.07	\$11.69	\$0.00	\$48.73
2	65	\$29.97	\$7.07	\$11.69	\$0.00	\$48.73
3	70	\$32.27	\$7.07	\$12.59	\$0.00	\$51.93
4	75	\$34.58	\$7.07	\$13.49	\$0.00	\$55.14
5	80	\$36.88	\$7.07	\$14.38	\$0.00	\$58.33
6	85	\$39.19	\$7.07	\$15.29	\$0.00	\$61.55
7	90	\$41.49	\$7.07	\$16.18	\$0.00	\$64.74
8	95	\$43.80	\$7.07	\$17.09	\$0.00	\$67.96

Notes:**Apprentice to Journeyworker Ratio:1:4**

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) <i>BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD)</i>	02/01/2021	\$44.16	\$11.39	\$20.02	\$0.00	\$75.57
	08/01/2021	\$45.56	\$11.39	\$20.18	\$0.00	\$77.13
	02/01/2022	\$46.09	\$11.39	\$20.18	\$0.00	\$77.66

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
----------------	----------------	-----------	--------	---------	---------------------------	------------

Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 Springfield/Pittsfield**Effective Date - 02/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.08	\$11.39	\$20.02	\$0.00	\$53.49
2	60	\$26.50	\$11.39	\$20.02	\$0.00	\$57.91
3	70	\$30.91	\$11.39	\$20.02	\$0.00	\$62.32
4	80	\$35.33	\$11.39	\$20.02	\$0.00	\$66.74
5	90	\$39.74	\$11.39	\$20.02	\$0.00	\$71.15

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.78	\$11.39	\$20.18	\$0.00	\$54.35
2	60	\$27.34	\$11.39	\$20.18	\$0.00	\$58.91
3	70	\$31.89	\$11.39	\$20.18	\$0.00	\$63.46
4	80	\$36.45	\$11.39	\$20.18	\$0.00	\$68.02
5	90	\$41.00	\$11.39	\$20.18	\$0.00	\$72.57

Notes:**Apprentice to Journeyworker Ratio:1:5**

BULLDOZER/POWER SHOVEL/TREE SHREDDER	12/01/2020	\$36.22	\$12.47	\$14.50	\$0.00	\$63.19
/CLAM SHELL OPERATING	06/01/2021	\$37.04	\$12.47	\$14.50	\$0.00	\$64.01
ENGINEERS LOCAL 98	12/01/2021	\$37.87	\$12.47	\$14.50	\$0.00	\$64.84
	06/01/2022	\$38.74	\$12.47	\$14.50	\$0.00	\$65.71
	12/01/2022	\$39.62	\$12.47	\$14.50	\$0.00	\$66.59
	06/01/2023	\$40.57	\$12.47	\$14.50	\$0.00	\$67.54
	12/01/2023	\$41.52	\$12.47	\$14.50	\$0.00	\$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN	12/01/2020	\$41.05	\$8.60	\$17.47	\$0.00	\$67.12
LABORERS - FOUNDATION AND MARINE	06/01/2021	\$42.07	\$8.60	\$17.47	\$0.00	\$68.14
	12/01/2021	\$43.08	\$8.60	\$17.47	\$0.00	\$69.15
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER	12/01/2020	\$39.90	\$8.60	\$17.47	\$0.00	\$65.97
LABORERS - FOUNDATION AND MARINE	06/01/2021	\$40.92	\$8.60	\$17.47	\$0.00	\$66.99
	12/01/2021	\$41.93	\$8.60	\$17.47	\$0.00	\$68.00
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN	12/01/2020	\$39.90	\$8.60	\$17.47	\$0.00	\$65.97
LABORERS - FOUNDATION AND MARINE	06/01/2021	\$40.92	\$8.60	\$17.47	\$0.00	\$66.99
	12/01/2021	\$41.93	\$8.60	\$17.47	\$0.00	\$68.00
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR	12/01/2020	\$28.03	\$8.60	\$13.37	\$0.00	\$50.00
LABORERS - ZONE 4 (BUILDING & SITE)						
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARPENTER	09/01/2020	\$37.98	\$7.84	\$17.27	\$0.00	\$63.09
CARPENTERS LOCAL 336 - BERKSHIRE COUNTY	03/01/2021	\$38.48	\$7.84	\$17.27	\$0.00	\$63.59
	09/01/2021	\$38.98	\$7.84	\$17.27	\$0.00	\$64.09
	03/01/2022	\$39.48	\$7.84	\$17.27	\$0.00	\$64.59
	09/01/2022	\$39.98	\$7.84	\$17.27	\$0.00	\$65.09
	03/01/2023	\$40.48	\$7.84	\$17.27	\$0.00	\$65.59

Apprentice - CARPENTER - Local 336 Berkshire**Effective Date - 09/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.99	\$7.84	\$1.40	\$0.00	\$28.23
2	60	\$22.79	\$7.84	\$1.40	\$0.00	\$32.03
3	70	\$26.59	\$7.84	\$13.07	\$0.00	\$47.50
4	75	\$28.49	\$7.84	\$13.07	\$0.00	\$49.40
5	80	\$30.38	\$7.84	\$14.47	\$0.00	\$52.69
6	80	\$30.38	\$7.84	\$14.47	\$0.00	\$52.69
7	90	\$34.18	\$7.84	\$15.87	\$0.00	\$57.89
8	90	\$34.18	\$7.81	\$15.87	\$0.00	\$57.86

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.24	\$7.84	\$1.40	\$0.00	\$28.48
2	60	\$23.09	\$7.84	\$1.40	\$0.00	\$32.33
3	70	\$26.94	\$7.84	\$13.07	\$0.00	\$47.85
4	75	\$28.86	\$7.84	\$13.07	\$0.00	\$49.77
5	80	\$30.78	\$7.84	\$14.47	\$0.00	\$53.09
6	80	\$30.78	\$7.84	\$14.47	\$0.00	\$53.09
7	90	\$34.63	\$7.84	\$15.87	\$0.00	\$58.34
8	90	\$34.63	\$7.81	\$15.87	\$0.00	\$58.31

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
 Step 1&2 \$26.31/ 3&4 \$31.49/ 5&6 \$48.90/ 7&8 \$54.09

Apprentice to Journeyworker Ratio:1:5

CARPENTER WOOD FRAME	04/01/2020	\$22.66	\$7.21	\$4.80	\$0.00	\$34.67
CARPENTERS-ZONE 3 (Wood Frame)	04/01/2021	\$23.16	\$7.21	\$4.80	\$0.00	\$35.17
	04/01/2022	\$23.66	\$7.21	\$4.80	\$0.00	\$35.67
	04/01/2023	\$24.16	\$7.21	\$4.80	\$0.00	\$36.17

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 - 04/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$13.60	\$7.21	\$0.00	\$0.00	\$20.81
2	60	\$13.60	\$7.21	\$0.00	\$0.00	\$20.81
3	65	\$14.73	\$7.21	\$0.00	\$0.00	\$21.94
4	70	\$15.86	\$7.21	\$0.00	\$0.00	\$23.07
5	75	\$17.00	\$7.21	\$3.80	\$0.00	\$28.01
6	80	\$18.13	\$7.21	\$3.80	\$0.00	\$29.14
7	85	\$19.26	\$7.21	\$3.80	\$0.00	\$30.27
8	90	\$20.39	\$7.21	\$3.80	\$0.00	\$31.40

Effective Date - 04/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$13.90	\$7.21	\$0.00	\$0.00	\$21.11
2	60	\$13.90	\$7.21	\$0.00	\$0.00	\$21.11
3	65	\$15.05	\$7.21	\$0.00	\$0.00	\$22.26
4	70	\$16.21	\$7.21	\$0.00	\$0.00	\$23.42
5	75	\$17.37	\$7.21	\$3.80	\$0.00	\$28.38
6	80	\$18.53	\$7.21	\$3.80	\$0.00	\$29.54
7	85	\$19.69	\$7.21	\$3.80	\$0.00	\$30.70
8	90	\$20.84	\$7.21	\$3.80	\$0.00	\$31.85

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
 Step 1&2 \$17.41/ 3&4 \$19.67/ 5&6 \$26.87/ 7&8 \$29.14

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING

01/01/2020

\$41.94

\$12.70

\$17.64

\$0.62

\$72.90

BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD)

Apprentice - CEMENT MASONRY/PLASTERING - Springfield/Pittsfield**Effective Date - 01/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.97	\$12.70	\$15.41	\$0.00	\$49.08
2	60	\$25.16	\$12.70	\$17.64	\$0.62	\$56.12
3	65	\$27.26	\$12.70	\$17.64	\$0.62	\$58.22
4	70	\$29.36	\$12.70	\$17.64	\$0.62	\$60.32
5	75	\$31.46	\$12.70	\$17.64	\$0.62	\$62.42
6	80	\$33.55	\$12.70	\$17.64	\$0.62	\$64.51
7	90	\$37.75	\$12.70	\$17.64	\$0.62	\$68.71

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 <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$28.03	\$8.60	\$13.37	\$0.00	\$50.00
For apprentice rates see "Apprentice- LABORER"						
COMPRESSOR OPERATOR <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$35.69	\$12.47	\$14.50	\$0.00	\$62.66
	06/01/2021	\$36.51	\$12.47	\$14.50	\$0.00	\$63.48
	12/01/2021	\$37.34	\$12.47	\$14.50	\$0.00	\$64.31
	06/01/2022	\$38.21	\$12.47	\$14.50	\$0.00	\$65.18
	12/01/2022	\$39.09	\$12.47	\$14.50	\$0.00	\$66.06
	06/01/2023	\$40.04	\$12.47	\$14.50	\$0.00	\$67.01
	12/01/2023	\$40.99	\$12.47	\$14.50	\$0.00	\$67.96
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CRANE OPERATOR <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$39.72	\$12.47	\$14.50	\$0.00	\$66.69
	06/01/2021	\$40.54	\$12.47	\$14.50	\$0.00	\$67.51
	12/01/2021	\$41.37	\$12.47	\$14.50	\$0.00	\$68.34
	06/01/2022	\$42.24	\$12.47	\$14.50	\$0.00	\$69.21
	12/01/2022	\$43.12	\$12.47	\$14.50	\$0.00	\$70.09
	06/01/2023	\$44.07	\$12.47	\$14.50	\$0.00	\$71.04
	12/01/2023	\$45.02	\$12.47	\$14.50	\$0.00	\$71.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) <i>PAINTERS LOCAL 35 - ZONE 3</i>	01/01/2021	\$52.06	\$8.25	\$22.75	\$0.00	\$83.06

Apprentice - PAINTER Local 35 - BRIDGES/TANKS**Effective Date -** 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.03	\$8.25	\$0.00	\$0.00	\$34.28
2	55	\$28.63	\$8.25	\$6.16	\$0.00	\$43.04
3	60	\$31.24	\$8.25	\$6.72	\$0.00	\$46.21
4	65	\$33.84	\$8.25	\$7.28	\$0.00	\$49.37
5	70	\$36.44	\$8.25	\$19.39	\$0.00	\$64.08
6	75	\$39.05	\$8.25	\$19.95	\$0.00	\$67.25
7	80	\$41.65	\$8.25	\$20.51	\$0.00	\$70.41
8	90	\$46.85	\$8.25	\$21.63	\$0.00	\$76.73

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$40.05	\$8.60	\$17.32	\$0.00	\$65.97
	06/01/2021	\$41.07	\$8.60	\$17.32	\$0.00	\$66.99
	12/01/2021	\$42.08	\$8.60	\$17.32	\$0.00	\$68.00
	06/01/2022	\$43.08	\$8.60	\$17.32	\$0.00	\$69.00
	12/01/2022	\$44.08	\$8.60	\$17.32	\$0.00	\$70.00
	06/01/2023	\$45.08	\$8.60	\$17.32	\$0.00	\$71.00
	12/01/2023	\$46.33	\$8.60	\$17.32	\$0.00	\$72.25
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: BACKHOE/LOADER/HAMMER OPERATOR <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$41.05	\$8.60	\$17.32	\$0.00	\$66.97
	06/01/2021	\$42.07	\$8.60	\$17.32	\$0.00	\$67.99
	12/01/2021	\$43.08	\$8.60	\$17.32	\$0.00	\$69.00
	06/01/2022	\$44.08	\$8.60	\$17.32	\$0.00	\$70.00
	12/01/2022	\$45.08	\$8.60	\$17.32	\$0.00	\$71.00
	06/01/2023	\$46.08	\$8.60	\$17.32	\$0.00	\$72.00
	12/01/2023	\$47.33	\$8.60	\$17.32	\$0.00	\$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$40.80	\$8.60	\$17.32	\$0.00	\$66.72
	06/01/2021	\$41.82	\$8.60	\$17.32	\$0.00	\$67.74
	12/01/2021	\$42.83	\$8.60	\$17.32	\$0.00	\$68.75
	06/01/2022	\$43.83	\$8.60	\$17.32	\$0.00	\$69.75
	12/01/2022	\$44.83	\$8.60	\$17.32	\$0.00	\$70.75
	06/01/2023	\$45.83	\$8.60	\$17.32	\$0.00	\$71.75
	12/01/2023	\$47.08	\$8.60	\$17.32	\$0.00	\$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$41.05	\$8.60	\$17.32	\$0.00	\$66.97
	06/01/2021	\$42.07	\$8.60	\$17.32	\$0.00	\$67.99
	12/01/2021	\$43.08	\$8.60	\$17.32	\$0.00	\$69.00
	06/01/2022	\$44.08	\$8.60	\$17.32	\$0.00	\$70.00
	12/01/2022	\$45.08	\$8.60	\$17.32	\$0.00	\$71.00
	06/01/2023	\$46.08	\$8.60	\$17.32	\$0.00	\$72.00
	12/01/2023	\$47.33	\$8.60	\$17.32	\$0.00	\$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$40.80	\$8.60	\$17.32	\$0.00	\$66.72
	06/01/2021	\$41.82	\$8.60	\$17.32	\$0.00	\$67.74
	12/01/2021	\$42.83	\$8.60	\$17.32	\$0.00	\$68.75
	06/01/2022	\$43.83	\$8.60	\$17.32	\$0.00	\$69.75
	12/01/2022	\$44.83	\$8.60	\$17.32	\$0.00	\$70.75
	06/01/2023	\$45.83	\$8.60	\$17.32	\$0.00	\$71.75
	12/01/2023	\$47.08	\$8.60	\$17.32	\$0.00	\$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$40.05	\$8.60	\$17.32	\$0.00	\$65.97
	06/01/2021	\$41.07	\$8.60	\$17.32	\$0.00	\$66.99
	12/01/2021	\$42.08	\$8.60	\$17.32	\$0.00	\$68.00
	06/01/2022	\$43.08	\$8.60	\$17.32	\$0.00	\$69.00
	12/01/2022	\$44.08	\$8.60	\$17.32	\$0.00	\$70.00
	06/01/2023	\$45.08	\$8.60	\$17.32	\$0.00	\$71.00
	12/01/2023	\$46.33	\$8.60	\$17.32	\$0.00	\$72.25
For apprentice rates see "Apprentice- LABORER"						
DIVER <i>PILE DRIVER LOCAL 56 (ZONE 3)</i>	08/01/2020	\$68.70	\$9.40	\$23.12	\$0.00	\$101.22
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 3)</i>	08/01/2020	\$49.07	\$9.40	\$23.12	\$0.00	\$81.59
For apprentice rates see "Apprentice- PILE DRIVER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 3)</i>	08/01/2020	\$73.60	\$9.40	\$23.12	\$0.00	\$106.12
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 3)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) <i>DRAWBRIDGE - SEIU LOCAL 888</i>	07/01/2020	\$26.77	\$6.67	\$3.93	\$0.16	\$37.53
ELECTRICIAN (Including Core Drilling) <i>ELECTRICIANS LOCAL 7</i>	01/03/2021	\$44.61	\$11.50	\$12.99	\$0.00	\$69.10
	06/27/2021	\$45.21	\$11.75	\$13.26	\$0.00	\$70.22
	01/02/2022	\$45.81	\$12.00	\$13.42	\$0.00	\$71.23
	07/03/2022	\$46.41	\$12.25	\$13.69	\$0.00	\$72.35
	01/01/2023	\$47.01	\$12.50	\$13.96	\$0.00	\$73.47

Apprentice - ELECTRICIAN - Local 7**Effective Date - 01/03/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$17.84	\$6.90	\$0.54	\$0.00	\$25.28
2	45	\$20.07	\$6.90	\$0.60	\$0.00	\$27.57
3	50	\$22.31	\$11.50	\$7.02	\$0.00	\$40.83
4	55	\$24.54	\$11.50	\$7.09	\$0.00	\$43.13
5	65	\$29.00	\$11.50	\$8.81	\$0.00	\$49.31
6	70	\$31.23	\$11.50	\$9.94	\$0.00	\$52.67

Effective Date - 06/27/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$18.08	\$7.05	\$0.54	\$0.00	\$25.67
2	45	\$20.34	\$7.05	\$0.61	\$0.00	\$28.00
3	50	\$22.61	\$11.75	\$7.08	\$0.00	\$41.44
4	55	\$24.87	\$11.75	\$7.15	\$0.00	\$43.77
5	65	\$29.39	\$11.75	\$8.93	\$0.00	\$50.07
6	70	\$31.65	\$11.75	\$10.10	\$0.00	\$53.50

Notes:

Steps 1-2 are 1000 hrs; Steps 3-6 are 1500 hrs.

Apprentice to Journeyworker Ratio:2:3****

ELEVATOR CONSTRUCTOR <i>ELEVATOR CONSTRUCTORS LOCAL 41</i>	01/01/2021	\$56.69	\$15.88	\$19.31	\$0.00	\$91.88
	01/01/2022	\$58.62	\$16.03	\$20.21	\$0.00	\$94.86

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - ELEVATOR CONSTRUCTOR - Local 41						
Effective Date - 01/01/2021						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.35	\$15.88	\$0.00	\$0.00	\$44.23
2	55	\$31.18	\$15.88	\$19.31	\$0.00	\$66.37
3	65	\$36.85	\$15.88	\$19.31	\$0.00	\$72.04
4	70	\$39.68	\$15.88	\$19.31	\$0.00	\$74.87
5	80	\$45.35	\$15.88	\$19.31	\$0.00	\$80.54
Effective Date - 01/01/2022						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$29.31	\$16.03	\$0.00	\$0.00	\$45.34
2	55	\$32.24	\$16.03	\$20.21	\$0.00	\$68.48
3	65	\$38.10	\$16.03	\$20.21	\$0.00	\$74.34
4	70	\$41.03	\$16.03	\$20.21	\$0.00	\$77.27
5	80	\$46.90	\$16.03	\$20.21	\$0.00	\$83.14
Notes:						
Steps 1-2 are 6 mos.; Steps 3-5 are 1 year						
Apprentice to Journeyworker Ratio:1:1						
ELEVATOR CONSTRUCTOR HELPER	01/01/2021	\$39.68	\$15.88	\$19.31	\$0.00	\$74.87
ELEVATOR CONSTRUCTORS LOCAL 41	01/01/2022	\$41.03	\$16.03	\$20.21	\$0.00	\$77.27
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & BEAM RAIL ERECTOR	12/01/2020	\$28.03	\$8.60	\$13.37	\$0.00	\$50.00
LABORERS - ZONE 4 (BUILDING & SITE)						
For apprentice rates see "Apprentice- LABORER"						
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY)	12/01/2020	\$29.74	\$8.60	\$14.44	\$0.00	\$52.78
LABORERS - ZONE 4 (HEAVY & HIGHWAY)	06/01/2021	\$30.56	\$8.60	\$14.44	\$0.00	\$53.60
	12/01/2021	\$31.37	\$8.60	\$14.44	\$0.00	\$54.41
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FIELD ENG.INST/ROD-BLDG,SITE,HVY/HWY	06/01/1999	\$18.84	\$4.80	\$4.10	\$0.00	\$27.74
OPERATING ENGINEERS LOCAL 98						
FIELD ENG.PARTY CHIEF:BLDG,SITE,HVY/HWY	06/01/1999	\$21.33	\$4.80	\$4.10	\$0.00	\$30.23
OPERATING ENGINEERS LOCAL 98						
FIELD ENG.SURVEY CHIEF-BLDG,SITE,HVY/HWY	06/01/1999	\$22.33	\$4.80	\$4.10	\$0.00	\$31.23
OPERATING ENGINEERS LOCAL 98						
FIRE ALARM INSTALLER	01/03/2021	\$44.61	\$11.50	\$12.99	\$0.00	\$69.10
ELECTRICIANS LOCAL 7	06/27/2021	\$45.21	\$11.75	\$13.26	\$0.00	\$70.22
	01/02/2022	\$45.81	\$12.00	\$13.42	\$0.00	\$71.23
	07/03/2022	\$46.41	\$12.25	\$13.69	\$0.00	\$72.35
	01/01/2023	\$47.01	\$12.50	\$13.96	\$0.00	\$73.47
For apprentice rates see "Apprentice- ELECTRICIAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING <i>ELECTRICIANS</i>	01/03/2021	\$44.61	\$11.50	\$12.99	\$0.00	\$69.10
<i>LOCAL 7</i>	06/27/2021	\$45.21	\$11.75	\$13.26	\$0.00	\$70.22
	01/02/2022	\$45.81	\$12.00	\$13.42	\$0.00	\$71.23
	07/03/2022	\$46.41	\$12.25	\$13.69	\$0.00	\$72.35
	01/01/2023	\$47.01	\$12.50	\$13.96	\$0.00	\$73.47
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$35.69	\$12.47	\$14.50	\$0.00	\$62.66
	06/01/2021	\$36.51	\$12.47	\$14.50	\$0.00	\$63.48
	12/01/2021	\$37.34	\$12.47	\$14.50	\$0.00	\$64.31
	06/01/2022	\$38.21	\$12.47	\$14.50	\$0.00	\$65.18
	12/01/2022	\$39.09	\$12.47	\$14.50	\$0.00	\$66.06
	06/01/2023	\$40.04	\$12.47	\$14.50	\$0.00	\$67.01
	12/01/2023	\$40.99	\$12.47	\$14.50	\$0.00	\$67.96

Apprentice - OPERATING ENGINEERS - Local 98 Class 3**Effective Date -** 12/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$21.41	\$12.47	\$14.50	\$0.00	\$48.38
2	70	\$24.98	\$12.47	\$14.50	\$0.00	\$51.95
3	80	\$28.55	\$12.47	\$14.50	\$0.00	\$55.52
4	90	\$32.12	\$12.47	\$14.50	\$0.00	\$59.09

Effective Date - 06/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$21.91	\$12.47	\$14.50	\$0.00	\$48.88
2	70	\$25.56	\$12.47	\$14.50	\$0.00	\$52.53
3	80	\$29.21	\$12.47	\$14.50	\$0.00	\$56.18
4	90	\$32.86	\$12.47	\$14.50	\$0.00	\$59.83

Notes:

Steps 1-2 are 1000 hrs.; Steps 3-4 are 2000 hrs.

Apprentice to Journeyworker Ratio:1:6

FLAGGER & SIGNALER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 4 (HEAVY & HIGHWAY)</i>	12/01/2020	\$24.50	\$8.60	\$14.44	\$0.00	\$47.54
	06/01/2021	\$24.50	\$8.60	\$14.44	\$0.00	\$47.54
	12/01/2021	\$24.50	\$8.60	\$14.44	\$0.00	\$47.54
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE III</i>	09/01/2020	\$37.88	\$7.84	\$17.27	\$0.00	\$62.99

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - FLOORCOVERER - Local 2168 Zone III						
Effective Date - 09/01/2020						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.94	\$7.84	\$1.40	\$0.00	\$28.18
2	55	\$20.83	\$7.84	\$1.40	\$0.00	\$30.07
3	60	\$22.73	\$7.84	\$13.07	\$0.00	\$43.64
4	65	\$24.62	\$7.84	\$13.07	\$0.00	\$45.53
5	70	\$26.52	\$7.84	\$14.47	\$0.00	\$48.83
6	75	\$28.41	\$7.84	\$14.47	\$0.00	\$50.72
7	80	\$30.30	\$7.84	\$15.87	\$0.00	\$54.01
8	85	\$32.20	\$7.84	\$15.87	\$0.00	\$55.91
Notes: Steps are 750 hrs. % After 09/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps) Step 1&2 \$26.29/ 3&4 \$31.43/ 5&6 \$48.83/ 7&8 \$54.01						
Apprentice to Journeyworker Ratio:1:1						

FORK LIFT <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$35.91	\$12.47	\$14.50	\$0.00	\$62.88
	06/01/2021	\$36.73	\$12.47	\$14.50	\$0.00	\$63.70
	12/01/2021	\$37.56	\$12.47	\$14.50	\$0.00	\$64.53
	06/01/2022	\$38.43	\$12.47	\$14.50	\$0.00	\$65.40
	12/01/2022	\$39.31	\$12.47	\$14.50	\$0.00	\$66.28
	06/01/2023	\$40.26	\$12.47	\$14.50	\$0.00	\$67.23
	12/01/2023	\$41.21	\$12.47	\$14.50	\$0.00	\$68.18
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATORS/LIGHTING PLANTS <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$32.46	\$12.47	\$14.50	\$0.00	\$59.43
	06/01/2021	\$33.28	\$12.47	\$14.50	\$0.00	\$60.25
	12/01/2021	\$34.11	\$12.47	\$14.50	\$0.00	\$61.08
	06/01/2022	\$34.98	\$12.47	\$14.50	\$0.00	\$61.95
	12/01/2022	\$35.86	\$12.47	\$14.50	\$0.00	\$62.83
	06/01/2023	\$36.81	\$12.47	\$14.50	\$0.00	\$63.78
	12/01/2023	\$37.76	\$12.47	\$14.50	\$0.00	\$64.73
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) <i>GLAZIERS LOCAL 1333</i>	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	12/01/2020	\$36.22	\$12.47	\$14.50	\$0.00	\$63.19
OPERATING ENGINEERS LOCAL 98	06/01/2021	\$37.04	\$12.47	\$14.50	\$0.00	\$64.01
	12/01/2021	\$37.87	\$12.47	\$14.50	\$0.00	\$64.84
	06/01/2022	\$38.74	\$12.47	\$14.50	\$0.00	\$65.71
	12/01/2022	\$39.62	\$12.47	\$14.50	\$0.00	\$66.59
	06/01/2023	\$40.57	\$12.47	\$14.50	\$0.00	\$67.54
	12/01/2023	\$41.52	\$12.47	\$14.50	\$0.00	\$68.49

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

HVAC (DUCTWORK)	01/01/2021	\$37.24	\$10.64	\$17.33	\$1.96	\$67.17
SHEETMETAL WORKERS LOCAL 63	07/01/2021	\$38.29	\$10.64	\$17.33	\$1.99	\$68.25
	01/01/2022	\$39.29	\$10.64	\$17.33	\$2.02	\$69.28

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS)	01/03/2021	\$44.61	\$11.50	\$12.99	\$0.00	\$69.10
ELECTRICIANS LOCAL 7	06/27/2021	\$45.21	\$11.75	\$13.26	\$0.00	\$70.22
	01/02/2022	\$45.81	\$12.00	\$13.42	\$0.00	\$71.23
	07/03/2022	\$46.41	\$12.25	\$13.69	\$0.00	\$72.35
	01/01/2023	\$47.01	\$12.50	\$13.96	\$0.00	\$73.47

For apprentice rates see "Apprentice- ELECTRICIAN"

HVAC (TESTING AND BALANCING - AIR)	01/01/2021	\$37.24	\$10.64	\$17.33	\$1.96	\$67.17
SHEETMETAL WORKERS LOCAL 63	07/01/2021	\$38.29	\$10.64	\$17.33	\$1.99	\$68.25
	01/01/2022	\$39.29	\$10.64	\$17.33	\$2.02	\$69.28

For apprentice rates see "Apprentice- SHEET METAL WORKER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING -WATER) <i>PLUMBERS & PIPEFITTERS LOCAL 104 WESTERN DIVISION</i>	09/17/2020	\$42.21	\$9.30	\$16.60	\$0.00	\$68.11
	03/17/2021	\$43.21	\$9.30	\$16.60	\$0.00	\$69.11
	09/17/2021	\$44.21	\$9.30	\$16.60	\$0.00	\$70.11
	03/17/2022	\$45.46	\$9.30	\$16.60	\$0.00	\$71.36
	09/17/2022	\$46.46	\$9.30	\$16.60	\$0.00	\$72.36
	03/17/2023	\$47.71	\$9.30	\$16.60	\$0.00	\$73.61
	09/17/2023	\$48.71	\$9.30	\$16.60	\$0.00	\$74.61
	03/17/2024	\$49.96	\$9.30	\$16.60	\$0.00	\$75.86
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC <i>PLUMBERS & PIPEFITTERS LOCAL 104 WESTERN DIVISION</i>	09/17/2020	\$42.21	\$9.30	\$16.60	\$0.00	\$68.11
	03/17/2021	\$43.21	\$9.30	\$16.60	\$0.00	\$69.11
	09/17/2021	\$44.21	\$9.30	\$16.60	\$0.00	\$70.11
	03/17/2022	\$45.46	\$9.30	\$16.60	\$0.00	\$71.36
	09/17/2022	\$46.46	\$9.30	\$16.60	\$0.00	\$72.36
	03/17/2023	\$47.71	\$9.30	\$16.60	\$0.00	\$73.61
	09/17/2023	\$48.71	\$9.30	\$16.60	\$0.00	\$74.61
	03/17/2024	\$49.96	\$9.30	\$16.60	\$0.00	\$75.86
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) <i>LABORERS - ZONE 4 (HEAVY & HIGHWAY)</i>	12/01/2020	\$30.24	\$8.60	\$14.44	\$0.00	\$53.28
	06/01/2021	\$31.06	\$8.60	\$14.44	\$0.00	\$54.10
	12/01/2021	\$31.87	\$8.60	\$14.44	\$0.00	\$54.91
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
INSULATOR (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD)</i>	09/01/2020	\$39.20	\$13.80	\$17.14	\$0.00	\$70.14
	09/01/2021	\$41.60	\$13.80	\$17.14	\$0.00	\$72.54
	09/01/2022	\$44.05	\$13.80	\$17.14	\$0.00	\$74.99

Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Springfield**Effective Date - 09/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.60	\$13.80	\$12.42	\$0.00	\$45.82
2	60	\$23.52	\$13.80	\$13.36	\$0.00	\$50.68
3	70	\$27.44	\$13.80	\$14.31	\$0.00	\$55.55
4	80	\$31.36	\$13.80	\$15.25	\$0.00	\$60.41

Effective Date - 09/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.80	\$13.80	\$12.42	\$0.00	\$47.02
2	60	\$24.96	\$13.80	\$13.36	\$0.00	\$52.12
3	70	\$29.12	\$13.80	\$14.31	\$0.00	\$57.23
4	80	\$33.28	\$13.80	\$15.25	\$0.00	\$62.33

Notes:

Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
IRONWORKER/WELDER <i>IRONWORKERS LOCAL 12</i>	05/01/2017	\$30.50	\$6.50	\$18.55	\$0.00	\$55.55

Apprentice - IRONWORKER - Local 12**Effective Date -** 05/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$18.30	\$6.50	\$3.25	\$0.00	\$28.05
2	70	\$21.35	\$6.50	\$13.78	\$0.00	\$41.63
3	80	\$24.40	\$6.50	\$15.29	\$0.00	\$46.19
4	90	\$27.45	\$6.50	\$16.80	\$0.00	\$50.75

Notes:

Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

JACKHAMMER & PAVING BREAKER OPERATOR <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$28.03	\$8.60	\$13.37	\$0.00	\$50.00
--	------------	---------	--------	---------	--------	---------

For apprentice rates see "Apprentice- LABORER"

LABORER <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$27.78	\$8.60	\$13.37	\$0.00	\$49.75
---	------------	---------	--------	---------	--------	---------

Apprentice - LABORER - Zone 4 Building and Site**Effective Date -** 12/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$16.67	\$8.60	\$13.37	\$0.00	\$38.64
2	70	\$19.45	\$8.60	\$13.37	\$0.00	\$41.42
3	80	\$22.22	\$8.60	\$13.37	\$0.00	\$44.19
4	90	\$25.00	\$8.60	\$13.37	\$0.00	\$46.97

Notes:**Apprentice to Journeyworker Ratio:1:5**

LABORER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 4 (HEAVY & HIGHWAY)</i>	12/01/2020	\$29.49	\$8.60	\$14.44	\$0.00	\$52.53
	06/01/2021	\$30.31	\$8.60	\$14.44	\$0.00	\$53.35
	12/01/2021	\$31.12	\$8.60	\$14.44	\$0.00	\$54.16

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - LABORER (Heavy and Highway) - Zone 4						
Effective Date - 12/01/2020						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$17.69	\$8.60	\$14.44	\$0.00	\$40.73
2	70	\$20.64	\$8.60	\$14.44	\$0.00	\$43.68
3	80	\$23.59	\$8.60	\$14.44	\$0.00	\$46.63
4	90	\$26.54	\$8.60	\$14.44	\$0.00	\$49.58
Effective Date - 06/01/2021						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$18.19	\$8.60	\$14.44	\$0.00	\$41.23
2	70	\$21.22	\$8.60	\$14.44	\$0.00	\$44.26
3	80	\$24.25	\$8.60	\$14.44	\$0.00	\$47.29
4	90	\$27.28	\$8.60	\$14.44	\$0.00	\$50.32
Notes:						
Apprentice to Journeyworker Ratio:1:5						
LABORER: CARPENTER TENDER LABORERS - ZONE 4 (BUILDING & SITE)	12/01/2020	\$27.78	\$8.60	\$13.37	\$0.00	\$49.75
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER LABORERS - ZONE 4 (BUILDING & SITE)	12/01/2020	\$27.78	\$8.60	\$13.37	\$0.00	\$49.75
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER LABORERS - ZONE 4 (BUILDING & SITE)	12/01/2020	\$27.87	\$8.60	\$13.66	\$0.00	\$50.13
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER LABORERS - ZONE 4 (BUILDING & SITE)	12/01/2020	\$29.78	\$8.60	\$13.37	\$0.00	\$51.75
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) LABORERS - ZONE 4 (HEAVY & HIGHWAY)	12/01/2020	\$29.74	\$8.60	\$14.44	\$0.00	\$52.78
	06/01/2021	\$30.56	\$8.60	\$14.44	\$0.00	\$53.60
	12/01/2021	\$31.37	\$8.60	\$14.44	\$0.00	\$54.41
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
LABORER: MULTI-TRADE TENDER LABORERS - ZONE 4 (BUILDING & SITE)	12/01/2020	\$27.78	\$8.60	\$13.37	\$0.00	\$49.75
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER LABORERS - ZONE 4 (BUILDING & SITE)	12/01/2020	\$27.78	\$8.60	\$13.37	\$0.00	\$49.75
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 4 (BUILDING & SITE)	12/01/2020	\$28.03	\$8.60	\$13.37	\$0.00	\$50.00
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) LABORERS - ZONE 4 (HEAVY & HIGHWAY)	12/01/2020	\$29.74	\$8.60	\$14.44	\$0.00	\$52.78
	06/01/2021	\$30.56	\$8.60	\$14.44	\$0.00	\$53.60
	12/01/2021	\$31.37	\$8.60	\$14.44	\$0.00	\$54.41
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
MARBLE & TILE FINISHERS	02/01/2021	\$36.17	\$11.39	\$19.35	\$0.00	\$66.91
BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE	08/01/2021	\$37.17	\$11.39	\$19.48	\$0.00	\$68.04
	02/01/2022	\$37.62	\$11.39	\$19.48	\$0.00	\$68.49

Apprentice - MARBLE-TILE FINISHER-Local 3 Marble/Tile (Spr/Pitt)**Effective Date - 02/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.09	\$11.39	\$19.35	\$0.00	\$48.83
2	60	\$21.70	\$11.39	\$19.35	\$0.00	\$52.44
3	70	\$25.32	\$11.39	\$19.35	\$0.00	\$56.06
4	80	\$28.94	\$11.39	\$19.35	\$0.00	\$59.68
5	90	\$32.55	\$11.39	\$19.35	\$0.00	\$63.29

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.59	\$11.39	\$19.48	\$0.00	\$49.46
2	60	\$22.30	\$11.39	\$19.48	\$0.00	\$53.17
3	70	\$26.02	\$11.39	\$19.48	\$0.00	\$56.89
4	80	\$29.74	\$11.39	\$19.48	\$0.00	\$60.61
5	90	\$33.45	\$11.39	\$19.48	\$0.00	\$64.32

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

12/01/2020	\$36.22	\$12.47	\$14.50	\$0.00	\$63.19
06/01/2021	\$37.04	\$12.47	\$14.50	\$0.00	\$64.01
12/01/2021	\$37.87	\$12.47	\$14.50	\$0.00	\$64.84
06/01/2022	\$38.74	\$12.47	\$14.50	\$0.00	\$65.71
12/01/2022	\$39.62	\$12.47	\$14.50	\$0.00	\$66.59
06/01/2023	\$40.57	\$12.47	\$14.50	\$0.00	\$67.54
12/01/2023	\$41.52	\$12.47	\$14.50	\$0.00	\$68.49

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANIC/WELDER/BOOM TRUCK

OPERATING ENGINEERS LOCAL 98

12/01/2020	\$35.69	\$12.47	\$14.50	\$0.00	\$62.66
06/01/2021	\$36.51	\$12.47	\$14.50	\$0.00	\$63.48
12/01/2021	\$37.34	\$12.47	\$14.50	\$0.00	\$64.31
06/01/2022	\$38.21	\$12.47	\$14.50	\$0.00	\$65.18
12/01/2022	\$39.09	\$12.47	\$14.50	\$0.00	\$66.06
06/01/2023	\$40.04	\$12.47	\$14.50	\$0.00	\$67.01
12/01/2023	\$40.99	\$12.47	\$14.50	\$0.00	\$67.96

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
MILLWRIGHT (Zone 3)	01/04/2021	\$37.96	\$9.40	\$20.45	\$0.00	\$67.81
MILLWRIGHTS LOCAL 1121 - Zone 3	01/03/2022	\$39.21	\$9.40	\$20.45	\$0.00	\$69.06
	01/02/2023	\$40.46	\$9.40	\$20.45	\$0.00	\$70.31

Apprentice - MILLWRIGHT - Local 1121 Zone 3**Effective Date -** 01/04/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$20.88	\$9.40	\$5.58	\$0.00	\$35.86
2	65	\$24.67	\$9.40	\$16.90	\$0.00	\$50.97
3	75	\$28.47	\$9.40	\$17.92	\$0.00	\$55.79
4	85	\$32.27	\$9.40	\$18.93	\$0.00	\$60.60

Effective Date - 01/03/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$21.57	\$9.40	\$5.58	\$0.00	\$36.55
2	65	\$25.49	\$9.40	\$16.90	\$0.00	\$51.79
3	75	\$29.41	\$9.40	\$17.92	\$0.00	\$56.73
4	85	\$33.33	\$9.40	\$18.93	\$0.00	\$61.66

Notes: Step 1&2 Appr. indentured after 1/1/2020 receive no pension,
but do receive annuity. (Step 1 \$5.58, Step 2 \$6.50)
Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:5

MORTAR MIXER	12/01/2020	\$28.03	\$8.60	\$13.37	\$0.00	\$50.00
LABORERS - ZONE 4 (BUILDING & SITE)						

For apprentice rates see "Apprentice- LABORER"

OILER	12/01/2020	\$31.38	\$12.47	\$14.50	\$0.00	\$58.35
OPERATING ENGINEERS LOCAL 98	06/01/2021	\$32.20	\$12.47	\$14.50	\$0.00	\$59.17
	12/01/2021	\$33.03	\$12.47	\$14.50	\$0.00	\$60.00
	06/01/2022	\$33.90	\$12.47	\$14.50	\$0.00	\$60.87
	12/01/2022	\$34.78	\$12.47	\$14.50	\$0.00	\$61.75
	06/01/2023	\$35.73	\$12.47	\$14.50	\$0.00	\$62.70
	12/01/2023	\$36.68	\$12.47	\$14.50	\$0.00	\$63.65

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

OTHER POWER DRIVEN EQUIPMENT - CLASS VI	12/01/2020	\$29.40	\$12.47	\$14.50	\$0.00	\$56.37
OPERATING ENGINEERS LOCAL 98	06/01/2021	\$30.22	\$12.47	\$14.50	\$0.00	\$57.19
	12/01/2021	\$31.05	\$12.47	\$14.50	\$0.00	\$58.02
	06/01/2022	\$31.92	\$12.47	\$14.50	\$0.00	\$58.89
	12/01/2022	\$32.80	\$12.47	\$14.50	\$0.00	\$59.77
	06/01/2023	\$33.75	\$12.47	\$14.50	\$0.00	\$60.72
	12/01/2023	\$34.70	\$12.47	\$14.50	\$0.00	\$61.67

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

PAINTER (BRIDGES/TANKS)	01/01/2021	\$52.06	\$8.25	\$22.75	\$0.00	\$83.06
PAINTERS LOCAL 35 - ZONE 3						

Classification

Effective Date

Base Wage

Health

Pension

Supplemental
Unemployment

Total Rate

Apprentice - PAINTER Local 35 - BRIDGES/TANKS**Effective Date -** 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.03	\$8.25	\$0.00	\$0.00	\$34.28
2	55	\$28.63	\$8.25	\$6.16	\$0.00	\$43.04
3	60	\$31.24	\$8.25	\$6.72	\$0.00	\$46.21
4	65	\$33.84	\$8.25	\$7.28	\$0.00	\$49.37
5	70	\$36.44	\$8.25	\$19.39	\$0.00	\$64.08
6	75	\$39.05	\$8.25	\$19.95	\$0.00	\$67.25
7	80	\$41.65	\$8.25	\$20.51	\$0.00	\$70.41
8	90	\$46.85	\$8.25	\$21.63	\$0.00	\$76.73

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) *

01/01/2021

\$35.43

\$8.25

\$18.85

\$0.00

\$62.53

* If 30% or more of surfaces to be painted are new construction,

NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 3

Apprentice - PAINTER Local 35 Zone 3 - Spray/Sandblast - New**Effective Date -** 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$17.72	\$8.25	\$0.00	\$0.00	\$25.97
2	55	\$19.49	\$8.25	\$4.02	\$0.00	\$31.76
3	60	\$21.26	\$8.25	\$4.38	\$0.00	\$33.89
4	65	\$23.03	\$8.25	\$4.75	\$0.00	\$36.03
5	70	\$24.80	\$8.25	\$16.66	\$0.00	\$49.71
6	75	\$26.57	\$8.25	\$17.03	\$0.00	\$51.85
7	80	\$28.34	\$8.25	\$17.39	\$0.00	\$53.98
8	90	\$31.89	\$8.25	\$18.12	\$0.00	\$58.26

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT)

01/01/2021

\$32.75

\$8.25

\$18.85

\$0.00

\$59.85

PAINTERS LOCAL 35 - ZONE 3

Classification

Effective Date

Base Wage

Health

Pension

Supplemental
Unemployment

Total Rate

Apprentice - PAINTER Local 35 Zone 3 - Spray/Sandblast - Repaint**Effective Date -** 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$16.38	\$8.25	\$0.00	\$0.00	\$24.63
2	55	\$18.01	\$8.25	\$4.02	\$0.00	\$30.28
3	60	\$19.65	\$8.25	\$4.38	\$0.00	\$32.28
4	65	\$21.29	\$8.25	\$4.75	\$0.00	\$34.29
5	70	\$22.93	\$8.25	\$16.66	\$0.00	\$47.84
6	75	\$24.56	\$8.25	\$17.03	\$0.00	\$49.84
7	80	\$26.20	\$8.25	\$17.39	\$0.00	\$51.84
8	90	\$29.48	\$8.25	\$18.12	\$0.00	\$55.85

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	01/01/2021	\$34.03	\$8.25	\$18.85	\$0.00	\$61.13
--------------------------------	------------	---------	--------	---------	--------	---------

* If 30% or more of surfaces to be painted are new construction,
NEW paint rate shall be used. *PAINTERS LOCAL 35 - ZONE 3*

Apprentice - PAINTER - Local 35 Zone 3 - BRUSH NEW**Effective Date -** 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$17.02	\$8.25	\$0.00	\$0.00	\$25.27
2	55	\$18.72	\$8.25	\$4.02	\$0.00	\$30.99
3	60	\$20.42	\$8.25	\$4.38	\$0.00	\$33.05
4	65	\$22.12	\$8.25	\$4.75	\$0.00	\$35.12
5	70	\$23.82	\$8.25	\$16.66	\$0.00	\$48.73
6	75	\$25.52	\$8.25	\$17.03	\$0.00	\$50.80
7	80	\$27.22	\$8.25	\$17.39	\$0.00	\$52.86
8	90	\$30.63	\$8.25	\$18.12	\$0.00	\$57.00

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT)	01/01/2021	\$31.35	\$8.25	\$18.85	\$0.00	\$58.45
----------------------------------	------------	---------	--------	---------	--------	---------

PAINTERS LOCAL 35 - ZONE 3

Classification

Effective Date

Base Wage

Health

Pension

Supplemental
Unemployment

Total Rate

Apprentice - PAINTER Local 35 Zone 3 - BRUSH REPAINT**Effective Date - 01/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$15.68	\$8.25	\$0.00	\$0.00	\$23.93
2	55	\$17.24	\$8.25	\$4.02	\$0.00	\$29.51
3	60	\$18.81	\$8.25	\$4.38	\$0.00	\$31.44
4	65	\$20.38	\$8.25	\$4.75	\$0.00	\$33.38
5	70	\$21.95	\$8.25	\$16.66	\$0.00	\$46.86
6	75	\$23.51	\$8.25	\$17.03	\$0.00	\$48.79
7	80	\$25.08	\$8.25	\$17.39	\$0.00	\$50.72
8	90	\$28.22	\$8.25	\$18.12	\$0.00	\$54.59

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY)	12/01/2020	\$29.49	\$8.60	\$14.44	\$0.00	\$52.53
LABORERS - ZONE 4 (HEAVY & HIGHWAY)	06/01/2021	\$30.31	\$8.60	\$14.44	\$0.00	\$53.35
	12/01/2021	\$31.12	\$8.60	\$14.44	\$0.00	\$54.16
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PANEL & PICKUP TRUCKS DRIVER	12/01/2020	\$34.98	\$12.91	\$14.82	\$0.00	\$62.71
TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	06/01/2021	\$35.78	\$12.91	\$14.82	\$0.00	\$63.51
	08/01/2021	\$35.78	\$13.41	\$14.82	\$0.00	\$64.01
	12/01/2021	\$35.78	\$13.41	\$16.01	\$0.00	\$65.20
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)	08/01/2020	\$43.53	\$9.40	\$23.12	\$0.00	\$76.05
PILE DRIVER LOCAL 56 (ZONE 3)						
For apprentice rates see "Apprentice- PILE DRIVER"						
PILE DRIVER	08/01/2020	\$43.53	\$9.40	\$23.12	\$0.00	\$76.05
PILE DRIVER LOCAL 56 (ZONE 3)						

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	12/01/2020	\$28.03	\$8.60	\$13.37	\$0.00	\$50.00
LABORERS - ZONE 4 (BUILDING & SITE)						
For apprentice rates see "Apprentice- LABORER"						
PIPELAYER (HEAVY & HIGHWAY)	12/01/2020	\$29.74	\$8.60	\$14.44	\$0.00	\$52.78
LABORERS - ZONE 4 (HEAVY & HIGHWAY)	06/01/2021	\$30.56	\$8.60	\$14.44	\$0.00	\$53.60
	12/01/2021	\$31.37	\$8.60	\$14.44	\$0.00	\$54.41

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PLUMBER & PIPEFITTER	09/17/2020	\$42.21	\$9.30	\$16.60	\$0.00	\$68.11
PLUMBERS & PIPEFITTERS LOCAL 104 WESTERN DIVISION	03/17/2021	\$43.21	\$9.30	\$16.60	\$0.00	\$69.11
	09/17/2021	\$44.21	\$9.30	\$16.60	\$0.00	\$70.11
	03/17/2022	\$45.46	\$9.30	\$16.60	\$0.00	\$71.36
	09/17/2022	\$46.46	\$9.30	\$16.60	\$0.00	\$72.36
	03/17/2023	\$47.71	\$9.30	\$16.60	\$0.00	\$73.61
	09/17/2023	\$48.71	\$9.30	\$16.60	\$0.00	\$74.61
	03/17/2024	\$49.96	\$9.30	\$16.60	\$0.00	\$75.86

Apprentice - PLUMBER/PIPEFITTER - Local 104 Western**Effective Date - 09/17/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$18.99	\$9.30	\$9.85	\$0.00	\$38.14
2	50	\$21.11	\$9.30	\$9.85	\$0.00	\$40.26
3	55	\$23.22	\$9.30	\$9.85	\$0.00	\$42.37
4	60	\$25.33	\$9.30	\$9.85	\$0.00	\$44.48
5	65	\$27.44	\$9.30	\$9.85	\$0.00	\$46.59
6	70	\$29.55	\$9.30	\$9.85	\$0.00	\$48.70
7	75	\$31.66	\$9.30	\$9.85	\$0.00	\$50.81
8	80	\$33.77	\$9.30	\$9.85	\$0.00	\$52.92
9	80	\$33.77	\$9.30	\$16.60	\$0.00	\$59.67
10	80	\$33.77	\$9.30	\$16.60	\$0.00	\$59.67

Effective Date - 03/17/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$19.44	\$9.30	\$9.85	\$0.00	\$38.59
2	50	\$21.61	\$9.30	\$9.85	\$0.00	\$40.76
3	55	\$23.77	\$9.30	\$9.85	\$0.00	\$42.92
4	60	\$25.93	\$9.30	\$9.85	\$0.00	\$45.08
5	65	\$28.09	\$9.30	\$9.85	\$0.00	\$47.24
6	70	\$30.25	\$9.30	\$9.85	\$0.00	\$49.40
7	75	\$32.41	\$9.30	\$9.85	\$0.00	\$51.56
8	80	\$34.57	\$9.30	\$9.85	\$0.00	\$53.72
9	80	\$34.57	\$9.30	\$16.60	\$0.00	\$60.47
10	80	\$34.57	\$9.30	\$16.60	\$0.00	\$60.47

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.) <i>PLUMBERS & PIPEFITTERS LOCAL 104 WESTERN DIVISION</i>	09/17/2020	\$42.21	\$9.30	\$16.60	\$0.00	\$68.11
	03/17/2021	\$43.21	\$9.30	\$16.60	\$0.00	\$69.11
	09/17/2021	\$44.21	\$9.30	\$16.60	\$0.00	\$70.11
	03/17/2022	\$45.46	\$9.30	\$16.60	\$0.00	\$71.36
	09/17/2022	\$46.46	\$9.30	\$16.60	\$0.00	\$72.36
	03/17/2023	\$47.71	\$9.30	\$16.60	\$0.00	\$73.61
	09/17/2023	\$48.71	\$9.30	\$16.60	\$0.00	\$74.61
	03/17/2024	\$49.96	\$9.30	\$16.60	\$0.00	\$75.86
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 4 (HEAVY & HIGHWAY)</i>	12/01/2020	\$29.74	\$8.60	\$14.44	\$0.00	\$52.78
	06/01/2021	\$30.56	\$8.60	\$14.44	\$0.00	\$53.60
	12/01/2021	\$31.37	\$8.60	\$14.44	\$0.00	\$54.41
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWDERMAN & BLASTER <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$28.78	\$8.60	\$13.37	\$0.00	\$50.75
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 4 (HEAVY & HIGHWAY)</i>	12/01/2020	\$30.49	\$8.60	\$14.44	\$0.00	\$53.53
	06/01/2021	\$31.31	\$8.60	\$14.44	\$0.00	\$54.35
	12/01/2021	\$32.12	\$8.60	\$14.44	\$0.00	\$55.16
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$36.22	\$12.47	\$14.50	\$0.00	\$63.19
	06/01/2021	\$37.04	\$12.47	\$14.50	\$0.00	\$64.01
	12/01/2021	\$37.87	\$12.47	\$14.50	\$0.00	\$64.84
	06/01/2022	\$38.74	\$12.47	\$14.50	\$0.00	\$65.71
	12/01/2022	\$39.62	\$12.47	\$14.50	\$0.00	\$66.59
	06/01/2023	\$40.57	\$12.47	\$14.50	\$0.00	\$67.54
	12/01/2023	\$41.52	\$12.47	\$14.50	\$0.00	\$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$35.69	\$12.47	\$14.50	\$0.00	\$62.66
	06/01/2021	\$36.51	\$12.47	\$14.50	\$0.00	\$63.48
	12/01/2021	\$37.34	\$12.47	\$14.50	\$0.00	\$64.31
	06/01/2022	\$38.21	\$12.47	\$14.50	\$0.00	\$65.18
	12/01/2022	\$39.09	\$12.47	\$14.50	\$0.00	\$66.06
	06/01/2023	\$40.04	\$12.47	\$14.50	\$0.00	\$67.01
	12/01/2023	\$40.99	\$12.47	\$14.50	\$0.00	\$67.96
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER <i>TEAMSTERS 404 - Construction Service (Northampton)</i>	05/01/2020	\$22.44	\$11.07	\$6.50	\$0.00	\$40.01
RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 4 (BUILDING & SITE)</i>	12/01/2020	\$28.03	\$8.60	\$13.37	\$0.00	\$50.00
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ROLLER OPERATOR <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$35.08	\$12.47	\$14.50	\$0.00	\$62.05
	06/01/2021	\$35.90	\$12.47	\$14.50	\$0.00	\$62.87
	12/01/2021	\$36.73	\$12.47	\$14.50	\$0.00	\$63.70
	06/01/2022	\$37.60	\$12.47	\$14.50	\$0.00	\$64.57
	12/01/2022	\$38.48	\$12.47	\$14.50	\$0.00	\$65.45
	06/01/2023	\$39.43	\$12.47	\$14.50	\$0.00	\$66.40
	12/01/2023	\$40.38	\$12.47	\$14.50	\$0.00	\$67.35
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Coal tar pitch) <i>ROOFERS LOCAL 248</i>	07/16/2020	\$33.66	\$11.75	\$16.20	\$0.00	\$61.61
For apprentice rates see "Apprentice- ROOFER"						
ROOFER (Inc.Roofing Waterproofing &Roofing Damproofg) <i>ROOFERS LOCAL 248</i>	07/16/2020	\$33.16	\$11.75	\$15.70	\$0.00	\$60.61

Apprentice - ROOFER - Local 248**Effective Date - 07/16/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$19.90	\$11.75	\$0.00	\$0.00	\$31.65
2	65	\$21.55	\$11.75	\$15.70	\$0.00	\$49.00
3	70	\$23.21	\$11.75	\$15.70	\$0.00	\$50.66
4	75	\$24.87	\$11.75	\$15.70	\$0.00	\$52.32
5	80	\$26.53	\$11.75	\$15.70	\$0.00	\$53.98
6	85	\$28.19	\$11.75	\$15.70	\$0.00	\$55.64
7	90	\$29.84	\$11.75	\$15.70	\$0.00	\$57.29
8	95	\$31.50	\$11.75	\$15.70	\$0.00	\$58.95

Notes:

Steps are 750 hrs.Roofing(Tear Off)1:1; Same as above

Apprentice to Journeyworker Ratio:1:3

ROOFER SLATE / TILE / PRECAST CONCRETE <i>ROOFERS LOCAL 248</i>	07/16/2020	\$33.66	\$11.75	\$16.20	\$0.00	\$61.61
For apprentice rates see "Apprentice- ROOFER"						
SCRAPER <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$35.69	\$12.47	\$14.50	\$0.00	\$62.66
	06/01/2021	\$36.51	\$12.47	\$14.50	\$0.00	\$63.48
	12/01/2021	\$37.34	\$12.47	\$14.50	\$0.00	\$64.31
	06/01/2022	\$38.21	\$12.47	\$14.50	\$0.00	\$65.18
	12/01/2022	\$39.09	\$12.47	\$14.50	\$0.00	\$66.06
	06/01/2023	\$40.04	\$12.47	\$14.50	\$0.00	\$67.01
	12/01/2023	\$40.99	\$12.47	\$14.50	\$0.00	\$67.96

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SELF-POWERED ROLLERS AND COMPACTORS (TAMPERS) <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$35.08	\$12.47	\$14.50	\$0.00	\$62.05
	06/01/2021	\$35.90	\$12.47	\$14.50	\$0.00	\$62.87
	12/01/2021	\$36.73	\$12.47	\$14.50	\$0.00	\$63.70
	06/01/2022	\$37.60	\$12.47	\$14.50	\$0.00	\$64.57
	12/01/2022	\$38.48	\$12.47	\$14.50	\$0.00	\$65.45
	06/01/2023	\$39.43	\$12.47	\$14.50	\$0.00	\$66.40
	12/01/2023	\$40.38	\$12.47	\$14.50	\$0.00	\$67.35
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
SELF-PROPELLED POWER BROOM <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$32.46	\$12.47	\$14.50	\$0.00	\$59.43
	06/01/2021	\$33.28	\$12.47	\$14.50	\$0.00	\$60.25
	12/01/2021	\$34.11	\$12.47	\$14.50	\$0.00	\$61.08
	06/01/2022	\$34.98	\$12.47	\$14.50	\$0.00	\$61.95
	12/01/2022	\$35.86	\$12.47	\$14.50	\$0.00	\$62.83
	06/01/2023	\$36.81	\$12.47	\$14.50	\$0.00	\$63.78
	12/01/2023	\$37.76	\$12.47	\$14.50	\$0.00	\$64.73
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
SHEETMETAL WORKER <i>SHEETMETAL WORKERS LOCAL 63</i>	01/01/2021	\$37.24	\$10.64	\$17.33	\$1.96	\$67.17
	07/01/2021	\$38.29	\$10.64	\$17.33	\$1.99	\$68.25
	01/01/2022	\$39.29	\$10.64	\$17.33	\$2.02	\$69.28

Apprentice - SHEET METAL WORKER - Local 63**Effective Date - 01/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$16.76	\$4.79	\$4.67	\$0.79	\$27.01
2	50	\$18.62	\$5.32	\$5.19	\$0.87	\$30.00
3	55	\$20.48	\$5.85	\$9.33	\$1.07	\$36.73
4	60	\$22.34	\$6.38	\$9.33	\$1.14	\$39.19
5	65	\$24.21	\$6.92	\$9.33	\$1.21	\$41.67
6	70	\$26.07	\$7.45	\$9.33	\$1.29	\$44.14
7	75	\$27.93	\$7.98	\$9.33	\$1.36	\$46.60
8	80	\$29.79	\$8.51	\$16.29	\$1.64	\$56.23
9	85	\$31.65	\$9.04	\$16.29	\$1.71	\$58.69
10	90	\$33.52	\$9.58	\$16.29	\$1.78	\$61.17

Notes:**Apprentice to Journeyworker Ratio:1:3**

SPECIALIZED EARTH MOVING EQUIP < 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2020	\$35.44	\$12.91	\$14.82	\$0.00	\$63.17
	06/01/2021	\$36.24	\$12.91	\$14.82	\$0.00	\$63.97
	08/01/2021	\$36.24	\$13.41	\$14.82	\$0.00	\$64.47
	12/01/2021	\$36.24	\$13.41	\$16.01	\$0.00	\$65.66
SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2020	\$35.73	\$12.91	\$14.82	\$0.00	\$63.46
	06/01/2021	\$36.53	\$12.91	\$14.82	\$0.00	\$64.26
	08/01/2021	\$36.53	\$13.41	\$14.82	\$0.00	\$64.76
	12/01/2021	\$36.53	\$13.41	\$16.01	\$0.00	\$65.95

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 669</i>	01/01/2019	\$41.51	\$10.02	\$13.08	\$0.00	\$64.61

Apprentice - SPRINKLER FITTER - Local 669**Effective Date -** 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$18.68	\$7.75	\$0.00	\$0.00	\$26.43
2	50	\$20.76	\$7.75	\$0.00	\$0.00	\$28.51
3	55	\$22.83	\$10.02	\$7.25	\$0.00	\$40.10
4	60	\$24.91	\$10.02	\$7.25	\$0.00	\$42.18
5	65	\$26.98	\$10.02	\$7.50	\$0.00	\$44.50
6	70	\$29.06	\$10.02	\$7.50	\$0.00	\$46.58
7	75	\$31.13	\$10.02	\$7.50	\$0.00	\$48.65
8	80	\$33.21	\$10.02	\$7.50	\$0.00	\$50.73
9	85	\$35.28	\$10.02	\$7.50	\$0.00	\$52.80
10	90	\$37.36	\$10.02	\$7.50	\$0.00	\$54.88

Notes:**Apprentice to Journeyworker Ratio:1:1**

TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 7</i>	01/03/2021	\$44.61	\$11.50	\$12.99	\$0.00	\$69.10
	06/27/2021	\$45.21	\$11.75	\$13.26	\$0.00	\$70.22
	01/02/2022	\$45.81	\$12.00	\$13.42	\$0.00	\$71.23
	07/03/2022	\$46.41	\$12.25	\$13.69	\$0.00	\$72.35
	01/01/2023	\$47.01	\$12.50	\$13.96	\$0.00	\$73.47

Classification

Effective Date

Base Wage

Health

Pension

Supplemental
Unemployment

Total Rate

Apprentice - TELECOMMUNICATION TECHNICIAN - Local 7**Effective Date -** 01/03/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$17.84	\$6.90	\$0.54	\$0.00	\$25.28
2	45	\$20.07	\$6.90	\$0.60	\$0.00	\$27.57
3	50	\$22.31	\$11.50	\$7.02	\$0.00	\$40.83
4	55	\$24.54	\$11.50	\$7.09	\$0.00	\$43.13
5	65	\$29.00	\$11.50	\$8.78	\$0.00	\$49.28
6	70	\$31.23	\$11.50	\$9.89	\$0.00	\$52.62

Effective Date - 06/27/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$18.08	\$7.05	\$0.54	\$0.00	\$25.67
2	45	\$20.34	\$7.05	\$0.61	\$0.00	\$28.00
3	50	\$22.61	\$11.75	\$7.08	\$0.00	\$41.44
4	55	\$24.87	\$11.75	\$7.15	\$0.00	\$43.77
5	65	\$29.39	\$11.75	\$8.93	\$0.00	\$50.07
6	70	\$31.65	\$11.75	\$10.10	\$0.00	\$53.50

Notes:

Steps are 800 hours

Apprentice to Journeyworker Ratio:1:1**TERRAZZO FINISHERS***BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE*

02/01/2021	\$54.69	\$11.39	\$22.09	\$0.00	\$88.17
08/01/2021	\$56.09	\$11.39	\$22.25	\$0.00	\$89.73
02/01/2022	\$56.68	\$11.39	\$22.25	\$0.00	\$90.32

Classification			Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - TERRAZZO FINISHER-Local 3 Marble/Tile (Spr/Ptt)								
Effective Date - 02/01/2021								
Step	percent	Apprentice Base Wage		Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$27.35		\$11.39	\$22.09	\$0.00	\$60.83	
2	60	\$32.81		\$11.39	\$22.09	\$0.00	\$66.29	
3	70	\$38.28		\$11.39	\$22.09	\$0.00	\$71.76	
4	80	\$43.75		\$11.39	\$22.09	\$0.00	\$77.23	
5	90	\$49.22		\$11.39	\$22.09	\$0.00	\$82.70	
Effective Date - 08/01/2021								
Step	percent	Apprentice Base Wage		Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$28.05		\$11.39	\$22.25	\$0.00	\$61.69	
2	60	\$33.65		\$11.39	\$22.25	\$0.00	\$67.29	
3	70	\$39.26		\$11.39	\$22.25	\$0.00	\$72.90	
4	80	\$44.87		\$11.39	\$22.25	\$0.00	\$78.51	
5	90	\$50.48		\$11.39	\$22.25	\$0.00	\$84.12	
Notes:								
Apprentice to Journeyworker Ratio:1:5								
TERRAZZO MECHANIC			02/01/2021	\$55.77	\$11.39	\$22.08	\$0.00	\$89.24
BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE			08/01/2021	\$57.17	\$11.39	\$22.24	\$0.00	\$90.80
			02/01/2022	\$57.74	\$11.39	\$22.24	\$0.00	\$91.37

Classification**Effective Date****Base Wage****Health****Pension****Supplemental
Unemployment****Total Rate****Apprentice - TERRAZZO MECH - Local 3 Marble/Tile (Spr/Pitt)****Effective Date - 02/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.89	\$11.39	\$22.08	\$0.00	\$61.36
2	60	\$33.46	\$11.39	\$22.08	\$0.00	\$66.93
3	70	\$39.04	\$11.39	\$22.08	\$0.00	\$72.51
4	80	\$44.62	\$11.39	\$22.08	\$0.00	\$78.09
5	90	\$50.19	\$11.39	\$22.08	\$0.00	\$83.66

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.59	\$11.39	\$22.24	\$0.00	\$62.22
2	60	\$34.30	\$11.39	\$22.24	\$0.00	\$67.93
3	70	\$40.02	\$11.39	\$22.24	\$0.00	\$73.65
4	80	\$45.74	\$11.39	\$22.24	\$0.00	\$79.37
5	90	\$51.45	\$11.39	\$22.24	\$0.00	\$85.08

Notes:**Apprentice to Journeyworker Ratio:1:5**

TEST BORING DRILLER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2020	\$41.30	\$8.60	\$17.47	\$0.00	\$67.37
	06/01/2021	\$42.32	\$8.60	\$17.47	\$0.00	\$68.39
	12/01/2021	\$43.33	\$8.60	\$17.47	\$0.00	\$69.40
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2020	\$40.02	\$8.60	\$17.47	\$0.00	\$66.09
	06/01/2021	\$41.04	\$8.60	\$17.47	\$0.00	\$67.11
	12/01/2021	\$42.05	\$8.60	\$17.47	\$0.00	\$68.12
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2020	\$39.90	\$8.60	\$17.47	\$0.00	\$65.97
	06/01/2021	\$40.92	\$8.60	\$17.47	\$0.00	\$66.99
	12/01/2021	\$41.93	\$8.60	\$17.47	\$0.00	\$68.00
For apprentice rates see "Apprentice- LABORER"						
TRACTORS <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2020	\$35.08	\$12.47	\$14.50	\$0.00	\$62.05
	06/01/2021	\$35.90	\$12.47	\$14.50	\$0.00	\$62.87
	12/01/2021	\$36.73	\$12.47	\$14.50	\$0.00	\$63.70
	06/01/2022	\$37.60	\$12.47	\$14.50	\$0.00	\$64.57
	12/01/2022	\$38.48	\$12.47	\$14.50	\$0.00	\$65.45
	06/01/2023	\$39.43	\$12.47	\$14.50	\$0.00	\$66.40
	12/01/2023	\$40.38	\$12.47	\$14.50	\$0.00	\$67.35
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2020	\$36.02	\$12.91	\$14.82	\$0.00	\$63.75
	06/01/2021	\$36.82	\$12.91	\$14.82	\$0.00	\$64.55
	08/01/2021	\$36.82	\$13.41	\$14.82	\$0.00	\$65.05
	12/01/2021	\$36.82	\$13.41	\$16.01	\$0.00	\$66.24

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	12/01/2020	\$52.13	\$8.60	\$17.92	\$0.00	\$78.65
	06/01/2021	\$53.15	\$8.60	\$17.92	\$0.00	\$79.67
	12/01/2021	\$54.16	\$8.60	\$17.92	\$0.00	\$80.68
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	12/01/2020	\$54.13	\$8.60	\$17.92	\$0.00	\$80.65
	06/01/2021	\$55.15	\$8.60	\$17.92	\$0.00	\$81.67
	12/01/2021	\$56.16	\$8.60	\$17.92	\$0.00	\$82.68
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2020	\$44.20	\$8.60	\$17.92	\$0.00	\$70.72
	06/01/2021	\$45.22	\$8.60	\$17.92	\$0.00	\$71.74
	12/01/2021	\$46.23	\$8.60	\$17.92	\$0.00	\$72.75
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2020	\$46.20	\$8.60	\$17.92	\$0.00	\$72.72
	06/01/2021	\$47.22	\$8.60	\$17.92	\$0.00	\$73.74
	12/01/2021	\$48.23	\$8.60	\$17.92	\$0.00	\$74.75
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2020	\$35.44	\$12.91	\$14.82	\$0.00	\$63.17
	06/01/2021	\$36.24	\$12.91	\$14.82	\$0.00	\$63.97
	08/01/2021	\$36.24	\$13.41	\$14.82	\$0.00	\$64.47
	12/01/2021	\$36.24	\$13.41	\$16.01	\$0.00	\$65.66
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 4 (HEAVY & HIGHWAY)</i>	12/01/2020	\$29.74	\$8.60	\$14.44	\$0.00	\$52.78
	06/01/2021	\$30.56	\$8.60	\$14.44	\$0.00	\$53.60
	12/01/2021	\$31.37	\$8.60	\$14.44	\$0.00	\$54.41
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WATER METER INSTALLER <i>PLUMBERS & PIPEFITTERS LOCAL 104 WESTERN DIVISION</i>	09/17/2020	\$42.21	\$9.30	\$16.60	\$0.00	\$68.11
	03/17/2021	\$43.21	\$9.30	\$16.60	\$0.00	\$69.11
	09/17/2021	\$44.21	\$9.30	\$16.60	\$0.00	\$70.11
	03/17/2022	\$45.46	\$9.30	\$16.60	\$0.00	\$71.36
	09/17/2022	\$46.46	\$9.30	\$16.60	\$0.00	\$72.36
	03/17/2023	\$47.71	\$9.30	\$16.60	\$0.00	\$73.61
	09/17/2023	\$48.71	\$9.30	\$16.60	\$0.00	\$74.61
	03/17/2024	\$49.96	\$9.30	\$16.60	\$0.00	\$75.86
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Marine Drilling						
BLASTER <i>MARINE DRILLING</i>	01/01/2018	\$41.82	\$7.63	\$3.60	\$0.00	\$53.05
BOAT CAPTAIN <i>MARINE DRILLING</i>	01/01/2018	\$33.87	\$7.63	\$3.30	\$0.00	\$44.80
BOAT CAPTAIN / Over 1,000 hp <i>MARINE DRILLING</i>	01/01/2018	\$38.06	\$7.63	\$3.60	\$0.00	\$49.29
CORE DRILLER <i>MARINE DRILLING</i>	01/01/2018	\$31.43	\$7.63	\$2.90	\$0.00	\$41.96
CORE DRILLER HELPER <i>MARINE DRILLING</i>	01/01/2018	\$28.47	\$7.63	\$3.00	\$0.00	\$39.10
DRILLER <i>MARINE DRILLING</i>	01/01/2018	\$39.70	\$7.63	\$3.60	\$0.00	\$50.93
ENGINEER <i>MARINE DRILLING</i>	01/01/2018	\$39.69	\$7.63	\$3.50	\$0.00	\$50.82

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HELPER <i>MARINE DRILLING</i>	01/01/2018	\$34.24	\$7.63	\$3.00	\$0.00	\$44.87
MACHINIST <i>MARINE DRILLING</i>	01/01/2018	\$38.88	\$7.63	\$3.30	\$0.00	\$49.81
OILER - MARINE DRILLING <i>MARINE DRILLING</i>	01/01/2018	\$34.24	\$7.63	\$3.00	\$0.00	\$44.87
TUG DECKHAND <i>MARINE DRILLING</i>	01/01/2018	\$27.61	\$7.63	\$3.00	\$0.00	\$38.24
WELDER <i>MARINE DRILLING</i>	01/01/2018	\$38.88	\$7.63	\$3.30	\$0.00	\$49.81
Op Eng Marine (Dredging Work)						
BOAT OPERATOR <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$29.26	\$7.63	\$3.30	\$0.00	\$40.19
CERTIFIED WELDER <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$31.09	\$7.63	\$3.60	\$0.00	\$42.32
CHIEF WELDER/ CHIEF MATE <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$33.02	\$7.63	\$3.60	\$0.00	\$44.25
DERRICK / SPIDER / SPILLBARGE OPERATOR <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$33.02	\$7.63	\$3.60	\$0.00	\$44.25
DRAG BARGE OPERATOR / WELDER / MATE <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$30.24	\$7.63	\$3.30	\$0.00	\$41.17
ENGINEER / ELECTRICIAN <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$33.02	\$7.63	\$3.60	\$0.00	\$44.25
LICENSED BOAT OPERATOR <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$33.02	\$7.63	\$3.60	\$0.00	\$44.25
LICENSED TUG OPERATOR OVER 1000HP <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$38.18	\$7.63	\$3.60	\$0.00	\$49.41
MAINTENANCE ENGINEER <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$33.03	\$7.63	\$3.60	\$0.00	\$44.26
OILER - MARINE DIVISION <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$24.30	\$7.63	\$3.00	\$0.00	\$34.93
OPERATOR / LEVERMAN <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$38.18	\$7.63	\$3.60	\$0.00	\$49.41
RODMAN / SCOWMAN <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$24.30	\$7.63	\$3.00	\$0.00	\$34.93
SHOREMAN / DECKHAND <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$24.30	\$7.63	\$3.00	\$0.00	\$34.93
Outside Electrical - West						
EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i>	09/01/2019	\$44.67	\$8.00	\$12.55	\$0.00	\$65.22
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i>	09/01/2019	\$30.58	\$8.00	\$5.48	\$0.00	\$44.06
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN / TRUCK DRIVER <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i>	09/01/2019	\$39.97	\$8.00	\$10.96	\$0.00	\$58.93
For apprentice rates see "Apprentice- LINEMAN"						
HEAVY EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i>	09/01/2019	\$47.01	\$8.00	\$13.22	\$0.00	\$68.23
For apprentice rates see "Apprentice- LINEMAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
JOURNEYMAN LINEMAN <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i>	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 <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i>	02/04/2019	\$30.73	\$4.70	\$3.17	\$0.00	\$38.60
TELEDATA LINEMAN/EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i>	02/04/2019	\$28.93	\$4.70	\$3.14	\$0.00	\$36.77
TELEDATA WIREMAN/INSTALLER/TECHNICIAN <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i>	02/04/2019	\$28.93	\$4.70	\$3.14	\$0.00	\$36.77
TRACTOR-TRAILER DRIVER <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i>	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 TimetablesTimetableGoals (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

<u>STATE:</u>	<u>Goals (percent)</u>
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 contract, 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 contract, 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 2

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 than 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

MINIMUM WAGES FOR FEDERAL AND FEDERALLY ASSISTED CONTRACTS

Revised February 20, 2019



DEPARTMENT OF LABOR

Employment Standards Administration

**MINIMUM WAGES FOR
FEDERAL AND FEDERALLY
ASSISTED CONSTRUCTION**

THIS PAGE INTENTIONALLY LEFT BLANK



"General Decision Number: MA20210016 01/01/2021

Superseded General Decision Number: MA20200016

State: Massachusetts

Construction Type: Highway

County: Berkshire County in Massachusetts.

HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.95 for calendar year 2021 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, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.95 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 calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/01/2021

ENGI0004-019 06/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Group 1.....	\$ 48.73	29.25+A
GROUP 1.....	\$ 49.33	29.75
Group 2.....	\$ 48.23	29.25+A
GROUP 2.....	\$ 48.81	29.75

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Labor Day, Memorial Day, Independence Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day, Christmas Day

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

Group 1: Broom/Sweeper; Crane; Gradall; Post Driver
(Guardrail/Fences)
Group 2: Bulldozer; Grader/Blade

ENGI0098-010 12/01/2016

Rates	Fringes
-------	---------

POWER EQUIPMENT OPERATOR

Group 1.....	\$ 33.68	23.96+A
Group 2.....	\$ 33.37	23.96+A
Group 4.....	\$ 32.54	23.96+A

Footnote:

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: Backhoe/Excavator/Trackhoe; Bobcat/Skid Steer/Skid Loader; Loader

Group 2: Milling Machine; Paver (Asphalt, Aggregate, and Concrete)

Group 4: Roller

* IRON0007-027 03/16/2020

	Rates	Fringes
IRONWORKER (ORNAMENTAL AND STRUCTURAL)	\$ 35.33	30.01

LABO0473-007 06/01/2018

	Rates	Fringes
LABORER (Common or General)	\$ 27.58	22.29
TRAFFIC CONTROL (Flagger)	\$ 21.50	22.29

LABO0596-005 06/04/2018

	Rates	Fringes
LABORER (Form Work Only).....	\$ 31.00	22.19

PAIN0035-023 07/01/2019

	Rates	Fringes
PAINTER (Steel).....	\$ 50.66	30.90

SUMA2014-006 01/11/2017

	Rates	Fringes
CARPENTER.....	\$ 44.11	21.41
CEMENT MASON/CONCRETE FINISHER...	\$ 52.13	20.89
ELECTRICIAN.....	\$ 47.13	13.41
IRONWORKER, REINFORCING.....	\$ 46.21	21.27
LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor.....	\$ 33.10	18.09
LABORER: Concrete Saw (Hand Held/Walk Behind).....	\$ 44.43	14.18
LABORER: Landscape.....	\$ 36.62	16.00
OPERATOR: Forklift.....	\$ 51.63	0.00
OPERATOR: Mechanic.....	\$ 48.14	17.02

OPERATOR: Piledriver.....	\$ 43.87	18.04
PAINTER: Spray (Linestriping)....	\$ 38.30	17.43
TRAFFIC CONTROL:		
Laborer-Cones/ Barricades/Barrels - Setter/Mover/Sweeper.....		
	\$ 43.73	15.06
TRUCK DRIVER: Concrete Truck....	\$ 33.69	15.79
TRUCK DRIVER: Dump Truck.....	\$ 38.94	12.00
TRUCK DRIVER: Flatbed Truck.....	\$ 48.53	0.00

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

=====

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 www.dol.gov/whd/govcontracts.

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) (ii)).

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.

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 Regional Office for the area in which the survey was conducted because those Regional Offices have 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.

=====

END OF GENERAL DECISION

DOCUMENT A00801

SPECIAL PROVISIONS**WILLIAMSTOWN****Federal Aid Project No. NHP(BR-ON)-003S(205)X
Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams)
Route 2 (Main Street) over the Green River
(Re-Advertised Project)**

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

All work under this Contract shall be done in conformance with the *2020 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 Massachusetts Amendments; the *1968 Standard Drawings for Traffic Signals and Highway Lighting*; *The American Standard for Nursery Stock*; the Plans and these Special Provisions.

The work under this Contract is for the replacement of Bridge No. W-37-015, which carries Route 2 (Main Street) over the Green River in the Town of Williamstown, Massachusetts. The bridge was built in 1939 and is comprised of steel rolled beams with a reinforced concrete deck. The proposed bridge shall match the existing layout as it will be a two-span structure with a pier located in the center of the waterway.

The existing superstructure and portions of the existing substructure are to be removed. Proposed integral abutments will be constructed behind the existing abutments. The existing west abutment will be demolished to an elevation that provides adequate space for bridge inspections. The east abutment will be cut down lower than the west abutment to make it possible in the future to connect trails along the river below the bridge. The new concrete pier will be built on top of the existing pier footing and will be founded on steel piles. The proposed superstructure will be comprised of NEXT F beams, a concrete deck, and a paved roadway. The proposed roadway will have the same horizontal alignment and a similar vertical profile as the existing roadway.

The structure will be replaced in stages to maximize the amount of time two lanes of traffic can be maintained over the bridge during construction. To minimize traffic impacts, travel lanes will only be shifted from the current horizontal alignment for two stages. In order to accomplish these goals, there is a slight overbuild of the structure on the south side that will result in 5'-1" wider roadway.

SCOPE OF WORK (Continued)

The proposed curb-to-curb width over the bridge of 45'-1" allows for two 12'-0" travel lanes, an 8'-0" westbound shoulder, and a 13'-1" eastbound shoulder. Two 5'-6" sidewalks with S3-TL4 bridge rail are also proposed and will connect with existing sidewalks at all four corners of the bridge. The proposed bridge is 128'-6" between joints, but the total project length is 732 feet.

A cofferdam will be required to remove the existing pier wall and to build the proposed pier in stages. For constructability, a temporary water diversion plan is proposed that allows all flowing water to be diverted to the west span. A water diversion dam will allow for construction equipment to be placed in the east span riverbed. **The cofferdams shall only be installed and removed during the period from April 16 thru October 31, in accordance with permits obtained for this project.**

Additional work to be completed includes an integral retaining wall at the northwest corner, a temporary pedestrian bridge, and utility relocations. There is a electric substation at the northwest corner of the bridge and a retaining wall will be used to maintain the existing grading in that area. A pre-engineered temporary panelized pedestrian bridge is proposed on the south side of the bridge in order to provide pedestrian access throughout construction. Various utilities are located within the project limits that must be relocated to facilitate construction. The Contractor shall, as part of this work, coordinate with all utility owners before and during construction.

The bridge shall remain open to vehicular traffic during construction. Stage construction will allow one lane of traffic in each direction for the majority of project duration. Short-term detours will be required for full roadway closures when cranes are in position to install NEXT F beams and 24 hours after initial set of the concrete deck Stage 2, Pour 1. Pedestrian and bicycle accommodations shall be provided throughout construction.

The work includes bridge construction, roadway reconstruction, drainage modifications, pavement markings, landscaping, and other incidental items necessary to complete the required work. All work shall be performed in accordance with all environmental permits included in this contract document.

SUBSECTION 7.05 INSURANCE REQUIREMENTS**B. Public Liability Insurance**

The insurance requirements set forth in this section 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.

SUBSECTION 7.05 INSURANCE REQUIREMENTS (Continued)**Paragraph 4**

Asbestos Liability Insurance shall be obtained for this project. The Contractor and the Massachusetts Department of Transportation 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 1:00 P.M. on the Thursday 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 massdot specifications@dot.state.ma.us The MassDOT project file number and municipality is to be placed in the subject line.

ACCESS MASSDOT HIGHWAY INFORMATION ON WEBSITE

Access MassDOT Highway Information related to Construction, Design/Engineering, Contractor/Vendor Information, Approved Materials and Fabricators, Manuals, Publications and Forms at:

<http://www.mass.gov/massdot/highway>

CONTRACTOR/SUBCONTRACTOR CERTIFICATION – CONTRACT COMPLIANCE
(Revision 03-23-10)

Pursuant to 23 C.F.R. § 633.101 et seq., the Federal Highway Administration requires each contractor to “insert in each subcontract, except as excluded by law or regulation, the required contract provisions contained in Form FHWA–1273 and further requires their inclusion in any lower tier subcontract that may in turn be made. The required contract provisions of Form FHWA–1273 shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the requirements contained in the provisions of Form FHWA–1273.” The prime contractor shall therefore comply with the reporting and certification requirements provided in MassDOT’s CONTRACTOR/SUBCONTRACTOR CERTIFICATION Form (DOT-DIST-192) certifying compliance with 23 C.F.R. § 633.101 for each subcontract agreement entered into by the contractor. The contractor shall provide a fully executed original copy of said CONTRACTOR/SUBCONTRACTOR CERTIFICATION Form to MassDOT upon execution of any subcontract agreement. Failure to comply with the reporting and certification requirement of the CONTRACTOR/SUBCONTRACTOR CERTIFICATION Form may result in action against the prequalification status of the prime contractor with MassDOT.

COVID 19 GUIDELINES AND PROCEDURES

Commonwealth of Massachusetts COVID-19 GUIDELINES AND PROCEDURES FOR ALL CONSTRUCTION SITES AND WORKERS AT ALL PUBLIC WORK dated March 2020 as amended shall be adhered to.

It is the Contractor's responsibility to stay current with any changes or addendums issued to these guidelines. For copies of the guidelines go to:

<https://www.mass.gov/covid-19-guidelines-and-procedures-for-all-construction-sites-and-workers-at-all-public-work>

These Guidelines and Procedures will remain in effect until further notice. At the start of the Work the Contractor is required to submit a letter to the Engineer certifying that the Contractor is in compliance with CDC, OSHA and the Commonwealth's COVID-19 guidelines. The certification applies to the general contractor as well as all subcontractors engaged with the Work covered under this contract. No Work will be allowed to begin until the letter is submitted and approved by the Engineer. In addition, on a daily basis, the Contractor is required to submit a copy of the MassDOT Contractor COVID-19 Guidelines Compliance Checklist to the Engineer. If the Contractor fails to submit the daily checklist no work will be allowed until one is submitted. Any items checked with a NO will require immediate corrective action by the Contractor before any Work can begin.

Per Subsection 5.09 – Inspection of the Work - the Contractor is required to provide assistance to the Engineer to make a complete and detailed inspection of the work. That assistance includes furnishing equipment to perform the inspection, therefore the Contractor will be required to provide CDC compliant Personal Protective Equipment (PPE) to Department personnel field staff. The CDC compliant PPE shall consist of face masks, gloves and eye protection.

All costs associated with compliance with this provision are considered to be incidental to the contract cost and therefore the contractor will not be entitled to any additional compensation.

NORTHERN LONG-EARED BAT PROTECTION

The U.S. Fish and Wildlife Service (USFWS) has listed the northern long-eared bat as threatened 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 Optional Framework to Streamline Section 7 Consultation and is consistent with the Programmatic Biological Opinion under the authority of section 4(d) of the Endangered Species Act and the Final 4(d) Rule published in the Federal Register on January 14, 2016. No conservation measures or time of year restrictions on tree cutting are required. 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, additional review may be required by the USFWS, and time of year restrictions could apply to such tree cutting.

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.

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.

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.

HOLIDAY WORK RESTRICTIONS (Continued)**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

No work that will disrupt travel on the existing roadways (lane closures, lane shifts, trenching, etc.) shall be done from 5:00AM to 9:00 AM and 3:00 PM to 7:00PM without the approval of the Engineer. Short duration lane closure between 9:00 AM and 3:00 PM Monday through Friday may be approved by the Engineer on a limited basis for material and/or equipment delivery purposes only.

It is anticipated that work that will disrupt travel on the existing roadways (paving, micro-milling, trenching, etc.) will occur at night between the hours of 7:00 PM and 5:00 AM. For night work, the Contractor shall maintain one travel lane in each direction at a minimum. Further, night work shall occur Sunday through Thursday as approved by the Engineer.

Work on this project may be performed five days per week with the Contractor and all Subcontractors working on the same shift Monday through Friday, between the hours of 7:00 AM and 3:30 PM. Night time operations shall be performed between the hours of 7:00 PM and 5:00 AM. Work on this project outside of existing roadway areas or within established stage work zones as shown on the plans may be performed at any time.

No work shall be done on this contract on Saturdays, Sundays (except night work as noted above) or holidays. No work shall occur during holiday weekends; on the day before or the day after a long weekend which involves a holiday without prior approval by the Engineer.

The Contractor shall submit the proposed work hours to the Engineer for approval prior to commencement of construction activities.

PROSECUTION OF WORK AND PROVISIONS FOR TRAVEL

(Amending and Supplementing Subsection 8.03)

Route 2 (Main Street) shall remain open to vehicular traffic during construction. Stage construction will allow one lane of traffic in each direction for the majority of project duration. Short-term detours will be allowed for full roadway closures when cranes are in position to install NEXT F beams and 24 hours after initial set of the concrete deck Stage 2, Pour 1. Pedestrian and bicycle accommodations shall be provided throughout construction. The Contractor shall establish the traffic detour route in accordance with the Contract Plans provided and as approved by the Engineer.

The Contractor shall not close the roadway bridge to traffic or implement any traffic control plans until the following minimum criteria have been met:

- The Contractor provided Assembly Plan submittal, Quality Control Plan for Precast Concrete Bridge Element Assembly, and superstructure demolition procedures have been approved.
- All construction and detour signing has been installed as noted on the Plans and approved in the field by the Engineer.
- All barriers and temporary fencing as noted on the Plans have been delivered to the site.
- Overhead utilities are temporarily relocated and underground utilities relocated.
- Final approval of the bridge closure setup has been authorized in the field by the Engineer.

The Contractor shall not open the new bridge sections to traffic or remove any traffic control plans until the following minimum criteria have been met:

- The proposed bridge substructure is installed, including approach slabs and wingwalls, as indicated on the plans for each stage.
- The proposed bridge superstructure is installed, including beams, deck, sidewalks, and railings, as indicated on the plans for each stage.
- Both courses of asphalt are placed on bridge and base course of asphalt is placed at approaches.
- All utilities carried on the bridge are installed in their permanent locations and tested.

Before starting any work under this Contract, the Contractor shall submit a Schedule of Operations as provided in Subsection 8.02 and shall become familiar with existing conditions of the areas in which he is to perform the work, as stipulated in Subsection 2.03. He shall coordinate his work with any work to be done by the Public Utilities or other agencies, and he shall so schedule his operations as to cause the least interruption to the normal flow of vehicular traffic. Particular care shall be exercised to establish and maintain such methods and procedures as will not create hazards of an unusual nature.

The Contractor shall not proceed with pavement surfacing operations without the specific written approval of the Engineer.

PROSECUTION OF WORK AND PROVISIONS FOR TRAVEL (Continued)

The Contractor shall remove all material spilled from his trucks on existing pavement over which it is hauled, or otherwise deposited thereon whenever, in the judgment of the Engineer, the accumulation is sufficient to cause the formation of mud or dust, or interfere with drainage or create a traffic hazard. Should the Contractor, during the proposed work, lose any material, machinery or equipment into the river waters, he shall forthwith recover or remove such obstruction.

In case of damage to utilities, the Contractor shall promptly notify the Owner and shall, if requested, furnish manpower under the Owner's direction in getting access to the utility. Pipes or other structures, damaged by the operation of the Contractor, may be repaired by the Owner, either the municipality or the utility company, at the Contractor's expense.

Contractual Milestones:

This Contract contains the following Contractual Milestones that are to 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 accepted baseline Contract Progress Schedule.

- **MS#01 – Contractor Field Completion:** The Contractor shall achieve Contractor Field Completion within 1,832 calendar days from Notice to Proceed.

Contractor Field Completion shall be defined as the date that completion of all physical contract Work has been performed, including the completion of the punchlist work and the Contractor has fully de-mobilized from the field operations.

Interim Milestones:

- **MS#02 – Substantial Completion:** The Contractor shall achieve Substantial Completion within 1,802 calendar days from Notice to Proceed.

Substantial Completion shall be described as the date that a walkthrough of the entire contract Work has been performed by the Resident Engineer, and the Work required by the Contract, including paperwork, has been completed, except for work having a contract price of less than one percent of the adjusted contract price, including overruns, under runs and all contract amendments. All Material submittals must have been received by the District Materials Lab.

- **MS#03 – Full Beneficial Use:** The Contractor shall achieve Full Beneficial Use within 1,780 calendar days from Notice to Proceed.

Full Beneficial Use shall be described as the date that 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.

LIMITATION OF OPERATIONS

(Add/amend the following at the end of Subsection 8.06)

Access Restraints:

This contract will contain Access Restraint(s) to provide an anticipated start date of certain portions of the Work that are restrained by a Utility Party. 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:** Completion of enabling work Phase 1a – OHW relocation along north sidewalk. Utility companies will be restricted from any physical work to allow the contractor to complete the enabling work for OHW relocation along the north sidewalk ninety-seven (97) days from Notice to Proceed.
- **AR#02 – Access Restraint #02:** Completion of OHW along north sidewalk relocation. The Contractor will be restricted from any physical work to allow the utility companies to relocate OHW along north sidewalk one hundred ninety-eight (198) days from Notice to Proceed.
- **AR#03 – Access Restraint #03:** Completion of enabling work Phase 1b – gas main relocation. Utility companies will be restricted from any physical work to allow the Contractor to complete the enabling work for the gas main relocation five hundred twenty (520) days from Notice to Proceed.
- **AR#04 – Access Restraint #04:** Completion of enabling work for Phase 1c & 2 – utility pole and OHW temporary relocation. Utility companies will be restricted from any physical work to allow the Contractor to complete the enabling work for the utility pole and OHW temporary relocation seven hundred thirty-nine (739) days from Notice to Proceed.

LIMITATION OF OPERATIONS (Continued)

- **AR#05 – Access Restraint #05:** Completion of enabling work for Phase 2a – underground conduit installation (betterment work). Utility companies will be restricted from any physical work to allow the Contractor to complete the enabling work for the underground conduit installation (betterment work) nine hundred eight (908) days from Notice to Proceed.
- **AR#06 – Access Restraint #06:** Completion of enabling work for Phase 3 – utility pole and OHW permanent relocation. Utility companies will be restricted from any physical work to allow the Contractor to complete the enabling work for the underground conduit installation (betterment work) one thousand five hundred twenty-four (1,524) days from Notice to Proceed.

Seasonal Restrictions:

Additionally, this contract contains the following work restrictions:

1. Water access – The cofferdams must be installed and removed between April 16 and October 31 in accordance with the Division of Fisheries and Wildlife Best Management Practices.
2. Winter Restriction – no concrete placement, applying of waterproofing sealant, or soil compaction will occur between December 1 and March 15.
3. Intermediate and Final Paving (HMA) – no paving (HMA) placement will occur between November 15 and April 1.
4. Loam and Seed – planting can occur from April 1 to December 1, with the assumptions and consideration that seeding quantity will be increased if seeding work occurs from May 16 to October 1.

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.

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 3.5 Million 18-kip (80-kn) ESALs.

**GENERAL REQUIREMENTS FOR DEMOLITION AND
WORK INVOLVING PAINTED STEEL**

(02/06/2020)

Demolition and work involving painted steel shall conform to the requirements of Section 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 Sections 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 Section 961.68 “Handling of Hazardous Waste and Reporting Release Programs”.

The applicable submittals shall be according to Section 961.69 “Submittals”.

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.

**GENERAL REQUIREMENTS FOR DEMOLITION AND
WORK INVOLVING PAINTED STEEL** (Continued)

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 Section 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.

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.

DESIGNER/PROJECT MANAGER

DESIGNER
CME Associates, Inc.
Bryan L. Busch, P.E.
(860) 290-4100

MassDOT PROJECT MANAGER
Harry Adolphe, Project Manager
(857) 368-9324

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.

NOTICE TO OWNERS OF UTILITIES

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 at least one week in advance of the commencement of operations that will affect the utilities. The Contractor shall, at the same time, file a copy of such notice with the Engineer.

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 the Town and then locate the utilities

Town officials are shown at the Town's website.

Town's website located at <http://www.mass.gov/portal/government/local/>
from "Cities and Towns" select City/Town link.

Open official Town's home page and locate Town officials.

Completeness of this list is not guaranteed by MassDOT.

NOTICE TO OWNERS OF UTILITIES (Continued)

DPW/WATER/SEWER:

Williamstown DPW
675 Simonds Rd.
Williamstown, MA 01267

Chris Lemoine
413-458-5159
clemoine@williamstownma.gov

ELECTRIC:

National Grid (A)
548 Haydenville Road
Leeds, MA 01053

Sandra Annis
413-582-7424
sandra.annis@nationalgrid.com

GAS:

Berkshire Gas Co.
115 Cheshire Road
Pittsfield, MA 01201

Paul Scarpa
413-445-0383
pscarpa@berkshiregas.com

TELEPHONE:

Verizon
385 Myles Standish Blvd.
Taunton, MA 02780

Karen Mealey
774-409-3160
karen.m.mealey@verizon.com

CABLE:

Charter Communications
1021 High Bridge Road.
Rotterdam, NY 12303

John Leone
518-640-8864
John.Leone@Charter.com

FirstLight
359 Corporate Drive
Portsmouth, NH 03801

Paulie Polacke
ppolacke@firstlight.net

Crown Castle
80 Central Street
Boxborough, MA 01719

Mark Bonanno
508-616-7818
mark.bonanno@crowncastle.com

OTHER:

Axia KCST
30 Elmview Circle
Dover, NH 03820

Jason Wing
403-538-4545
jason.wing@axia.com

NATIONAL GRID EMERGENCY TELEPHONE NUMBERS**GAS:**

Emergency: 1-800-233-5325

New Service: 1- 877-696-4743

Customer Support: 1-800-732-3400

ELECTRIC:

Outage/ Emergency: 1-800-465-1212

New Service: 1-800-375-4730

Customer Support: 1-800-322-3223

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.

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 Contractor 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.

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.

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 Subsection 722.20 - 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.

SECTION 722 (Continued)**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.

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.

SECTION 722 (Continued)

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 fragment 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.

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.

SECTION 722 (Continued)**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.

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.

SECTION 722 (Continued)

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.

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.

SECTION 722 (Continued)

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.

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.

SECTION 722 (Continued)

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 100.79 **REMOVE AND RESET BRONZE MEDALLIONS** **EACH**

The work under this item shall include the removal, transporting, storing, and resetting of the existing medallions at East and West bridge end posts.

There are circular bronze medallions embedded in existing concrete ends posts. The Contractor shall carefully remove, clean, and install the medallions at East and West bridge end posts of the new precast highway guardrail transitions as indicated on the contract plans (see bridge plans sheet 27 of 29). The Contractor shall prepare and submit a plan indicating his/her proposed installation procedures and methods to be used to the Engineer for approval.

METHOD OF MEASUREMENT

Item 100.79 will be measured for payment by the Each, medallion removed and reset, complete in place.

BASIS OF PAYMENT

Item 100.79 will be paid for at the contract unit price per Each, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 101.01**CLEARING AND GRUBBING****LUMP SUM**

The work under this Item shall conform to the relevant provisions of Subsection 101 of the Standard Specifications and the following:

Clearing and grubbing shall extend from the back of the existing sidewalk to the proposed permanent or temporary bottom of slope, whichever is the furthest.

Clearing and grubbing for construction access shall also be included in this item. Clearing and grubbing for construction access shall be kept to a minimum to reduce the riverbank disturbance and total disturbance area.

The limits of clearing and grubbing shall be staked and approved by the Engineer prior to start of this work.

Areas cleared and grubbed to the temporary slope limits or for construction access shall be regraded to the permanent slope limits and stabilized with loam, seed, and jute mesh as specified on the plans.

The estimated clearing and grubbing upset area is 0.4 acre.

BASIS OF PAYMENT

Item 101.01 will be paid for at the contract unit price per Lump Sum, which price shall include all labor, materials, equipment and incidental costs required to complete the work described above as shown on the plans and/or as required by the Engineer. Payment for the regrading shall be included at the contract unit price for Earth Excavation. Payment for the loam, jute mesh and seed will be at the contract unit price for those individual items.

ITEM 102.521**TREE AND PLANT PROTECTION FENCE****FOOT**

The work under this Item shall conform to the relevant provisions of Subsections 644 and 771 of the Standard Specifications and the following:

Work under this item consists of furnishing, installing, removing and resetting, maintaining fence in a vertical and effective position at all times, and final removal of temporary fence.

The purpose of the fence is to prevent damage to tree roots, tree trunks, soil, and all other vegetation within a delineated Tree and Plant Protection Zone (TPPZ) as shown on the plans, as directed by the Engineer, and as described herein.

Protection shall be for the duration of the construction activities unless otherwise directed.

MATERIALS

Temporary Fence shall be such that it provides a minimum 48-inch tall barrier that remains vertical and effective (not sagging) for the duration of period required. Fence shall be plastic orange safety fence (recommended where high visibility is necessary), wooden snow fencing, or other approved material.

Per the Arborist or Engineer, additional posts, deeper post depths, and/or additional attachments will be used if the fabric or fence sags, leans or otherwise shows signs of failing to create a sufficient barrier to access.

REFERENCES

If requested, the Contractor shall provide to the Engineer one copy of the American National Standards Institute (ANSI) A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance Part 1, Pruning and Part 5, Construction Management Standard. Provision of reference shall be incidental to this item.

ESTABLISHMENT OF TPPZ

Fencing shall be used for construction areas, staging areas, and stockpile areas as shown on the plans and as directed by the Engineer to establish the Tree and Plant Protection Zone (TPPZ).

Fence shall be located as close to the work zone limit and as far from the trunk as possible to maximize the area to be protected. Fence shall run parallel and adjacent to construction activity to create a barrier between the work zone and the root zone or designated limit of plants and soils to be protected.

When construction activities surround (or have the potential to surround) trees or plants to be protected, a circular enclosure shall be used. In these instances, the TPPZ limit shall be the Drip Line of each tree or as close as possible to the Drip Line, and as shown on the plans and details. The Drip Line is defined as the limit of tree canopy.

ITEM 102.521 (Continued)

The Contractor shall not engage in any construction activity within the TPPZ without the approval of the Engineer, including: operating, moving or storing equipment; storing supplies or materials; locating temporary facilities including trailers or portable toilets; and shall not permit employees to traverse the area to access adjacent areas of the project or use the area for lunch or any other work breaks.

METHOD OF WORK

Fence shall be installed prior to any construction work or staging activities and shall be installed and maintained in a vertical and effective position at all times.

Fence shall be repositioned where and as necessary for optimum effectiveness. Repositioning shall be incidental to this item. Fence shall not be moved without prior approval by the Engineer.

The TPPZ shall be protected at all times from compaction of the soil; damage of any kind to trunks, bark, branches, leaves, and roots of all plants; and contamination of the soil with construction materials, debris, silt, fuels, oils, and any chemicals substance. In the event of spills, compaction or damage, the Contractor shall take corrective action immediately using methods approved by the Engineer in coordination with an Arborist.

After construction activities are completed, or when directed by the Engineer, fence, stakes, and other materials shall be removed and disposed off-site by the Contractor.

REQUIRED WORK WITHIN THE TPPZ

In the event that grading, trenching, utility work, or storage is unavoidable within the TPPZ, the Engineer shall be notified. Measures may be required for tree protection and preservations, including air spading, the use of six inch depth of wood chips or approved matting for root protection, pruning of branches, and/or trunk protection. These protection measures will be paid under applicable items.

Landscaping work specified within the TPPZ shall be accomplished by hand tools. Where hand work is not feasible, with permission of the Engineer, work shall be conducted with the smallest mechanized equipment necessary.

TREE AND PLANT DAMAGES OR LOSS

If the TPPZ is intruded upon, at the discretion of the Engineer, the Contractor will be required to provide a more durable barrier (e.g., Jersey Barriers) to secure the area. Cost of furnishing and installing additional or more durable barrier shall be borne by the Contractor.

If the Contractor intrudes into a TPPZ without approval, soil will be considered compacted and tree root damage will be assumed. Action will be taken as specified below.

In the event that trees designated for protection under this item are damaged, including root damage from unapproved trespassing onto the root zone, the Contractor shall, at his own expense obtain an Arborist. The Arborist shall be approved by MassDOT.

ITEM 102.521 (Continued)

If, based on the recommendations of the Arborist, the Engineer determines that damages can be remedied by corrective measures, such as repairing trunk or limb injury, soil compaction remediation, pruning, and/or watering, the damage will be repaired as soon as possible within the appropriate season for such work and according to industry standards.

If the Engineer determines that damages are irreparable, the Contractor shall pay for the damages in the amount of \$500.00 per diameter inch at breast height (DBH) per tree.

Additionally, if the Engineer determines that the damages are such that the tree is sufficiently compromised as to pose a future safety hazard, the tree shall be removed. Tree removal will include clean up of all wood parts, grinding of the stump to a depth sufficient to plant a replacement tree or plant, removal of all chips from the stump site, and filling the resulting hole with topsoil.

Shrubs will be replaced with a plant of similar species and equal size or the largest size plants reasonably available. The Engineer will approve the size and quality of the replacement plant. Replacement will include a minimum of one year of watering and care.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 102.521 will be measured and paid for payment by the foot of Tree and Plant Protection Fence, complete in place. This includes all labor, materials, equipment, maintenance, final removal and disposal of the protective materials, damages repair, and all incidental cost required to complete the work.

Payment of 40 percent of value will be made upon installation of Fence. The remaining 60 percent will be made when protection materials have been removed and disposed off-site.

No separate payment will be made for costs of remedial actions, including addition of more durable barriers, or arborist services, but all costs in connection therewith shall be included in the Contract unit price bid.

In the event of irreparable damage due to lack of proper protective measures being take there will be no compensation in addition to the \$500.00 per diameter inch penalty.

ITEM 114.1**DEMOLITION OF SUPERSTRUCTURE
OF BRIDGE NO. W-37-015 (0AL)****LUMP SUM**

The work to be done under this Item shall conform to the relevant provisions of Subsection 112 of the Standard Specifications and the following:

The work under this Item includes the removal and proper disposal of the existing superstructure including the wearing surface, bridge railings, concrete sidewalks, reinforced concrete deck, steel beams, steel diaphragms, bearing assemblies, and any other superstructure elements attached to the beams.

EXISTING FLOWER BOXES

The Contractor shall carefully remove and stack all of the flower boxes fixed to the existing metal bridge railings at the start of construction and deliver the boxes to the Williamstown DPW or an another area designated to be appropriate by a town representative. After delivery, the Contractor has no further obligations related to the flower boxes as they shall not be installed on the proposed structure during construction. This work is considered incidental to the demolition of the existing bridge and no additional compensation will be provided.

CONSTRUCTION METHODS

The Contractor will make their own investigation of the structure to be demolished including the materials that are part of the structure. No increase will be made to the bid price due to the nature of the materials involved in the demolition. All costs for permits, dump fees, taxes, etc. shall be included in the bid price of the demolition item.

The Contractor shall take care not to damage any portion of the substructure scheduled to remain as part of the demolition work under this Item. Any items required to be retained as part of the permanent structure which are damaged or otherwise made unsatisfactory for continued use by the Contractor's operations, shall be repaired at the Contractor's expense, as directed by the Engineer.

The Contractor shall make adequate provisions, including the erection of a temporary protective shielding for protection of the waterway, roadway, and personnel from damage or injury due to demolition operations and debris removal. See Item 994.01 of these special provisions.

All materials removed under this Item shall become the property of the Contractor and shall be removed from the jobsite and properly disposed of, unless such materials are designated to be reused in the proposed construction.

ITEM 114.1 (Continued)

The Contractor shall prepare and submit a plan indicating his/her proposed demolition procedures and methods to be used including equipment, tools, devices, crane capacity and location, lifting hardware, schedule of operations, methods of utility protection (if required) to the Engineer for approval. The requirements for the equipment and all procedures used shall be in conformance with Subsection 960.61 Erection, of the Standard Specification. The demolition procedures and any necessary calculations and drawings shall be stamped by a Professional Engineer registered in Massachusetts certifying that all existing structural members are suitably braced and have sufficient capacity throughout the demolition operation. The Contractor shall consider all loading combinations including traffic and the Contractor's equipment at each stage of the construction. Calculations shall be performed in conformance with the latest AASHTO Standard Specification for Highway Bridges, AASHTO Guide Design Specification for Bridge Temporary Works, and AASHTO Construction Handbook for Bridge Temporary Works. Work under this Item will not start until the Engineer has provided written approval to the Contractor.

BASIS OF PAYMENT

Item 114.1 will be paid for at the Contract unit price per Lump Sum for Demolition of Superstructure of Bridge No. W-37-015 (0AL), which price shall include all labor, materials, equipment, design, submittals, professional engineering costs, all required submittals, and all incidental costs required to complete the work.

The demolition of portions of the reinforced concrete substructure elements is included in Item 127.1 Reinforced Concrete Excavation.

ITEM 127.1**REINFORCED CONCRETE EXCAVATION****CUBIC YARD**

Work under this Item shall conform to the relevant provisions of Subsection 120 of the Standard Specifications and the following:

The work to be done under this item includes furnishing all labor and equipment necessary to perform demolition and removal of the existing bridge abutments, wingwalls, and pier to the limits shown on the plans. Coring through existing concrete foundations to provide holes or openings for pile driving is also included under this item.

The demolition of portions of the reinforced concrete substructure elements is included in Item 127.1 Reinforced Concrete Excavation.

Prior to the start of work, the Contractor shall locate all utilities and shall submit to the Engineer and the utility companies his proposed method of protecting them during the demolition operations. Procedure submittal shall not serve to relieve the Contractor of his responsibility to protect all utilities from damage at all times. Any damage done to utilities by the Contractor shall be immediately repaired at his expense.

The Contractor shall also prepare and submit a plan indicating his/her proposed demolition procedures and methods to be used including equipment, tools, devices, and schedule of operations to the Engineer for review. Work under this item may not commence until the Engineer has given written approval.

Temporary shielding to prevent debris from falling into the waterway below the bridge shall be paid for under Item 994.01 Temporary Protective Shielding Bridge No. W-37-015 (0AL). Any equipment, debris or excavated material that falls into the river due to the Contractor's activities shall be promptly removed by him at his expense and as directed by the Engineer.

Any temporary earth support, earth excavation, and gravel borrow for backfilling required to perform the demolition of these items shall be considered incidental to the project.

EQUIPMENT

Surface preparation and concrete removal equipment will be of the following types:

- (1) Pneumatic and Power Driven Chipping Hammers in excess of thirty-five-pound class may be used for the removal of concrete where sound or unsound concrete may be encountered in the areas of known demolition. The Contractor will take care not to damage the reinforcing steel that will be re-used in the proposed construction. The Engineer may reject methods or equipment that may render the reinforcing steel unsuitable for re-use.
- (2) Grit Blasting Equipment: Grit blasting equipment will be capable of removing rust and old concrete from exposed reinforcing steel when deemed necessary.

The Engineer may reject the use of any methods or equipment that causes undue vibration or possible damage to the structure or any part of the structure during the work.

ITEM 127.1 (Continued)**CONSTRUCTION METHODS**

The edges of all areas where concrete is removed under this Item shall be saw cut to a maximum depth of 1/2 inch prior to excavation and all costs in connection with such work will be incidental to this Item.

The Contractor will clean all reinforcement bars and concrete surfaces exposed by grit blasting. No grease, dust, rust, or laitance will be allowed to remain.

Care shall be taken during the removal of the designated portions of the structure to avoid damaging the portions that are to remain in place. Any damage caused by the Contractor to the existing structure that is designated to remain in place shall be repaired or replaced by the Contractor at its own expense to the satisfaction of the Engineer.

Any existing reinforcing steel that is unsuitable for further use through no fault of the Contractor will be replaced under the appropriate Steel Reinforcement for Structures item. All reinforcing steel that is loose will be tied tightly together using wire ties.

The Contractor shall prepare and submit a plan indicating his/her proposed concrete removal procedures and methods to be used including crane, or other hoisting equipment, capacity and location, equipment, tools, devices, schedule of operations, provisions to be made for the protection of the public, 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. Erection, of the Standard Specifications for Highways and Bridges. The demolition procedures and any necessary calculations and drawings shall be stamped by a Professional Engineer registered in Massachusetts. Demolition under this Item shall not commence until the Engineer has given written approval.

METHOD OF MEASUREMENT

Item 127.1 will be measured for payment by the Cubic Yard, of excavated concrete. Pay limits for Item 127.1 are restricted to the demolition elevations and dimensions provided in the plans.

BASIS OF PAYMENT

Item 127. will be paid for at the Contract unit price per Cubic Yard, which price shall include all labor, materials, equipment, design, submittals, professional engineering costs, all required submittals, sawcutting, and all incidental costs required to complete the work.

Removal of existing concrete required to drive piles through existing foundations will be paid under this item. Holes for pile driving may be made larger than shown on the plans, however, there will be no compensation for any concrete excavation beyond the limits provided.

ITEM 153.1**CONTROLLED DENSITY FILL –
NON-EXCAVATABLE****CUBIC YARD**

The work under this item shall conform to Section 150 of the Standard Specification and the following:

Controlled density fill (CDF) shall be used to backfill around the base of the precast guardrail transitions as shown on the Plans.

CDF shall not be used to backfill utility excavations or trenches.

Controlled density fill shall conform to the requirements of Subsection M4.08.0 Type 1. The Producer of the Controlled Density Fill material shall be selected from the MassDOT Qualified Construction Materials list.

METHOD OF MEASUREMENT

Item 153.1 will be measured for payment by the cubic yard of material used within the pay lines shown on the plans.

BASIS OF PAYMENT

Item 153.1 will be paid for at the contract unit price per Cubic Yard, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 182.1**INSPECTION AND TESTING FOR ASBESTOS****LUMP SUM**

The work shall include the inspecting and testing of all materials suspected of containing asbestos. When any demolition is required to enable the inspection and testing of the suspected material it will be considered incidental to this Item and the Contractor must perform all asbestos handling and testing in accordance with the regulations stated below.

Dust suppression in the form of light water sprays, foams, dust suppressants and calcium chloride will be implemented as required to control dusting during any disturbance of asbestos suspected material. Alternatively, intrusive activities may be reduced or curtailed under high wind or heavy rain conditions, which in the opinion of the Health And Safety Plan (HASP) may pose a safety hazard to the workers.

The Contractor shall employ the services of a Massachusetts licensed "Asbestos Inspector" to inspect the material to determine whether or not "ITEM 182.2 REMOVAL OF ASBESTOS" is required. Should the asbestos inspector determine laboratory testing is required, a state certified laboratory shall be used to perform all necessary tests.

REGULATIONS

U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA) including but not limited to:

- 29 CFR 1910 Section 1001 and 29 CFR 1926 Section 58 Occupational exposure to Asbestos, Tremolite, Anthophyllite and Actinolite, Final Rule
- 29 CFR 1910 Section 134 Respiration Protection
- 29 CFR 1926 Construction Industry
- 29 CFR 1910 Section 2 Access to Employee Exposure and Medical Records
- 29 CFR 1910 Section 1200 Hazard Communication
- 29 CFR 1910 Section 145 Specifications for Accident Prevention Signs and Tags

U.S. Environmental Protection Agency, (EPA) including but not limited to:

- 40 CFR 762, CPTS 62044, FRL 2843-9, Federal Register Vol. 50 no.134, July 12, 1985
p.28530 - 28540 Asbestos Abatement Projects Rule
- 40 CFR 61 Subpart A Regulation for Asbestos
- 40 CFR 61 Subpart M (Revised Subpart B) National Emission Standard for Asbestos

U.S. Department of Transportation 49 CFR 172 and 173

Massachusetts Department of Labor and Industries Regulations, (DLI) including but not limited to:

- 453 CMR 6.00 Removal, Containment and Encapsulation of Asbestos

ITEM 182.1 (Continued)

Massachusetts Department of Environmental Protection (DEP) including but not limited to (supplementing subsection 7.01):

310 CMR 7.00, Section 7.09 Odor and Dust, Section 7.10 Noise, Section 7.15 Air Pollution
Control Regulations
310 CMR 18.00 and 19.00 Solid Waste Regulations

Massachusetts Division of Industrial Safety 45 CMR 10.00

Local Requirements including but not limited to those of Health Departments, Fire Departments and Inspection Services Departments

Wherever there is a conflict or overlap of the above references, the most stringent provision shall apply.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and payment will be at the contract unit price per Lump Sum for ITEM 182.1 INSPECTION AND TESTING FOR ASBESTOS as specified above including all materials, tools, equipment and labor to complete the inspecting and testing of the asbestos suspected material.

All costs in the connection with the protection of general public, private property, and all costs associated with the proper inspecting and testing of the material shall be included in the price and no additional compensation will be allowed.

ITEM 182.2**REMOVAL OF ASBESTOS****FOOT**

The work shall include the removal and satisfactory disposal of existing asbestos. The Contractor's attention is directed to the fact that existing asbestos shall be inspected and tested prior to removal, to determine if special removal and disposal is required. The Contractor shall follow all the rules and regulations stated in "ITEM 182.1 INSPECTION AND TESTING FOR ASBESTOS". If asbestos is present, the Contractor shall follow all the rules and regulations stated in the section "REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS", under this item. The Contractor should notify and coordinate his/her efforts with the proper utility accordingly.

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

This section specifies the requirements for the handling and removal of asbestos containing material. The Contractor must perform all asbestos handling and removal work in accordance with these specifications and the following additional requirements.

U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA) including but not limited to:

- 29 CFR 1910 Section 1001 and 29 CFR 1926 Section 58 Occupational exposure to Asbestos, Tremolite, Anthophyllite and Actinolite, Final Rule
- 29 CFR 1910 Section 134 Respiration Protection
- 29 CFR 1926 Construction Industry
- 29 CFR 1910 Section 2 Access to Employee Exposure and Medical Records
- 29 CFR 1910 Section 1200 Hazard Communication
- 29 CFR 1910 Section 145 Specifications for Accident Prevention Signs and Tags

U.S. Environmental Protection Agency, (EPA) including but not limited to:

- 40 CFR 762, CPTS 62044, FRL 2843-9, Federal Register Vol. 50 no.134, July 12, 1985 p.28530 - 28540 Asbestos Abatement Projects Rule
- 40 CFR 61 Subpart A Regulation for Asbestos
- 40 CFR 61 Subpart M (Revised Subpart B) National Emission Standard for Asbestos

U.S. Department of Transportation 49 CFR 172 and 173

Massachusetts Department of Labor and Industries Regulations, (DLI) including but not limited to:

- 453 CMR 6.00 Removal, Containment and Encapsulation of Asbestos

Massachusetts Department of Environmental Protection (DEP) including but not limited to (supplementing subsection 7.01):

- 310 CMR 7.00, Section 7.09 Odor and Dust, Section 7.10 Noise, Section 7.15 Air Pollution Control Regulations
- 310 CMR 18.00 and 19.00 Solid Waste Regulations
- Massachusetts Division of Industrial Safety 45 CMR 10.00

ITEM 182.2 (Continued)

Local Requirements including but not limited to those of Health Departments, Fire Departments and Inspection Services Departments.

Wherever there is a conflict or overlap of the above references, the most stringent provision shall apply.

All asbestos material shall be removed and properly disposed of by a contractor or subcontractor with a current Massachusetts Abatement Contractors License issued by the Department of Labor and Industries. Work shall be supervised by a competent person as required by OSHA in 29 CFR 1926 to ensure regulatory compliance. This person must have completed a course at an EPA Training Center or equivalent course in asbestos abatement procedures, have had a minimum of four years on-the-job training and meet any additional requirements set forth in 29 CFR 1926 for a Competent Person. This person must also be certified by the Commonwealth as an Asbestos Abatement Supervisor and Asbestos Abatement Project Designer as required by 453 CMR 6.00.

Asbestos removal work shall be coordinated with all other work under the contract and shall be completed prior to performing any activities which could disturb the asbestos material or produce airborne asbestos fibers.

Dust suppression in the form of light water sprays, foams, dust suppressants and calcium chloride will be implemented as required to control dusting during trenching and excavation. Alternatively, intrusive activities may be reduced or curtailed under high wind or heavy rain conditions, which in the opinion of the Health and Safety Plan (HASP) may pose a safety hazard to the workers.

NOTIFICATION AND PERMITS

The Contractor shall prepare a formal pre-notification form at least ten (10) days prior to the start of asbestos removal work. This form must be submitted to the appropriate Regional Office of the Massachusetts Department of Environmental Protection and to the U.S. Environmental Protection Agency Region I Air and Hazardous Material Division. A copy of the submitted forms must be provided to the Engineer and kept at the work site.

Prior to starting any work, the Contractor shall also obtain any required asbestos removal permit(s) from the city/town. A copy of the permit(s) must be provided to the Engineer and posted at the work site.

The Contractor shall also obtain and pay all other applicable asbestos waste transportation and disposal permits, licenses and fees.

ITEM 182.2 (Continued)**STANDARD OPERATING PROCEDURES**

The standard operating procedure shall ensure the following:

1. Proper site security including posting of warning signs and restricting access to prevent unauthorized entry into the work spaces.
2. Proper protective clothing and respiratory protection prior to entering the work spaces.
3. Safe work practices including provisions for communications; exclusion of eating, drinking, smoking, or use of procedures or equipment that would in any way reduce the effectiveness of respiratory protection or other engineering controls.
4. Proper exit practices from the work space through the showering and decontamination facilities.
5. Removing asbestos containing material in ways that minimize release of fibers.
6. Packing, labeling, loading, transporting and disposing of contaminated material in a way that minimizes or prevents exposure and contamination.
7. Emergency evacuation of personnel, for medical or safety (fire and smoke) so that exposure will be minimized.
8. Safety from accidents in the work space, especially from electrical shocks, slippery surfaces and entanglements in loose hoses and equipment.
9. Provisions for effective supervision and OSHA - specified personnel air monitoring for exposure during work.

REQUIRED SUBMITTALS

The Contractor shall submit to the Engineer the following listed items at least ten (10) calendar days prior to the start of asbestos work. No asbestos removal work activities shall commence until these items are reviewed by the Engineer, unless otherwise waived. Submittals shall be clearly labeled and in sufficient detail to enable the Engineer to form an opinion as to its conformity to the specifications.

1. Name, experience and DLI certification of proposed Supervisors and Foreman responsible for asbestos work.
2. Summary of workforce by disciplines and a notarized statement documenting that all proposed workers, by name, have received all required medical exams and have been properly trained and certified for asbestos removal work, respirator use and appropriate Massachusetts DLI, EPA and OSHA standards.

ITEM 182.2 (Continued)

3. Notarized statement that workers are physically fit and able to wear and use the type of respiratory protection proposed for the project. Notarized certification signed by an officer of the abatement contracting firm that exposure measurements, medical surveillance and worker training records are being kept in conformance with 29 CFR 1926.
4. Written plan of action and standard operating procedures (HASP) to include: location and layout of decontamination areas; sequencing of asbestos work; detailed schedule of work activities by date and interface with other project activities which affect work performance; methods used to assure safety and security; worker protection and exposure monitoring; contingency and emergency evacuation procedures; detailed description of methods to be employed to control pollution; waste handling procedures.
5. Written respiratory protection program specifying level of protection intended for each operation required by the project and details of daily inspection and maintenance elements.
6. Copies of the U.S. EPA, State and local asbestos removal pre-notification forms. If applicable, lists and copies of all permits, licenses, or manifests which will be applied for and used.
7. Name, location and applicable approval certificates for primary and secondary landfill for disposal of asbestos-containing or asbestos contaminated waste. Name, address and licenses number(s) of hauler permitted to transport waste. (Submit copies of completed manifests upon disposal).

The Contractor must provide copies of daily inspection and record logs upon request of the Engineer, at any time during project. This information will include but is not limited to work area entry data, respirator inspections and maintenance, HEPA-exhaust inspections and maintenance and other work applicable activities or reports of accidents or unusual events.

METHOD OF MEASUREMENT

ITEM 182.2 will be measured by the FOOT for the complete removal and disposal of the asbestos containing material.

BASIS OF PAYMENT

Payment will be at the contract unit price per FOOT for ITEM 182.2 REMOVAL OF ASBESTOS, as specified above including all materials, tools, equipment and labor necessary to complete the work specified above.

All costs in connection with the protection of the general public, private property and all costs associated with the proper disposal of the material removed shall be included in the price and no additional compensation will be allowed.

ITEM 184.1**DISPOSAL OF TREATED WOOD PRODUCTS****TON**

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.

<u>ITEM 250.031</u>	<u>3 INCH POLYVINYL CHLORIDE DRAIN PIPE</u>	<u>FOOT</u>
----------------------------	--	--------------------

Work under this item shall conform to the relevant provisions of Subsection 230 and the following:

Plastic storm drain pipe shall comply with ASTM D 1785 (latest revision) for Polyvinyl chloride (PVC) pipe. All PVC pipes shall be SCH 40.

Joints for PVC pipe shall be bell and spigot ends with the use of primer and solvent cement.

METHOD OF MEASUREMENT

Item 250.031, 3 Inch Polyvinyl Chloride Drain Pipe will be measured per foot in accordance with the provisions of Subsection 230.80 of the Standard Specifications.

BASIS OF PAYMENT

Item 250.031, 3 Inch Polyvinyl Chloride Drain Pipe, will be paid for at the contract unit price per foot complete in place in accordance with the provisions of Subsection 230.81 of the Standard Specifications and shall include any necessary fittings to complete the work specified.

ITEM 250.061**SEWER VENT PIPE RELOCATION****LUMP SUM**

The work under this Item shall conform to the relevant provisions of Subsection 301 of the Standard Specifications and the following:

Work under this Item shall include the temporary and permanent relocation of one existing 6" steel sanitary sewer vent pipe from the old bridge wingwall to the new wingwall. Temporary location during construction shall be approved by the engineer.

If required, pipe shall be cut and reconnected with 6" solid sleeve coupling connectors. If additional pipe is required, it shall match the material, thickness, and coating of the existing vent pipe. At a minimum, the pipe shall be anchored at a location 2' below the top of pipe for the permanent location of the sewer vent pipe and shall be anchored by a 2" wide x 1/4" thick stainless steel strap with 3/8" stainless steel anchor bolts. All materials and construction shall be approved by and meet the Williamstown Department of Public Works standards, <https://www.ecode360.com/10811287>.

Sewer vent pipe relocation shall be approved and accepted by the engineer and Williamstown Department of Public Works.

Vent piping shall be air tested pursuant to ASTM F1417 "Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air." The maximum air pressure used for the test shall be 9 psig.

BASIS OF PAYMENT

Item 250.061 will be paid for at the Contract Bid Price per LUMP SUM, which price shall be the full payment of all labor, material, equipment and incidental costs required to complete the work, including installation, testing, fittings, couplings, hangers, straps, etc as approved and accepted by the Engineer.

<u>ITEM 303.08</u>	<u>8 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT)</u>	<u>FOOT</u>
<u>ITEM 303.12</u>	<u>12 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT)</u>	<u>FOOT</u>
<u>ITEM 309</u>	<u>DUCTILE IRON FITTINGS FOR WATER PIPE</u>	<u>POUND</u>
<u>ITEM 315.08</u>	<u>8 INCH WATER MAIN REMOVED AND STACKED</u>	<u>FOOT</u>
<u>ITEM 315.12</u>	<u>12 INCH WATER MAIN REMOVED AND STACKED</u>	<u>FOOT</u>
<u>ITEM 350.08</u>	<u>8 INCH GATE AND GATE BOX</u>	<u>EACH</u>
<u>ITEM 350.12</u>	<u>12 INCH GATE AND GATE BOX</u>	<u>EACH</u>
<u>ITEM 371.08</u>	<u>8 INCH COUPLING</u>	<u>EACH</u>
<u>ITEM 371.12</u>	<u>12 INCH COUPLING</u>	<u>EACH</u>
<u>ITEM 372.08</u>	<u>8 INCH FLEXIBLE EXPANSION JOINT</u>	<u>EACH</u>
<u>ITEM 372.012</u>	<u>12 INCH FLEXIBLE EXPANSION JOINT</u>	<u>EACH</u>
<u>ITEM 373.08</u>	<u>8 INCH WATER PIPE INSULATION</u>	<u>FOOT</u>
<u>ITEM 373.12</u>	<u>12 INCH WATER PIPE INSULATION</u>	<u>FOOT</u>

Work under this Item shall conform to the applicable provisions of Section 300 of the Standard Specifications and the following:

All work shall be coordinated with the Williamstown Department of Public Works for conformance with the latest AWWA practices and Municipal requirements, including all testing procedures. All pipe shall be Ductile Iron Class 52 CL in accordance with the Williamstown Department of Public Works standards, <https://www.ecode360.com/10811287> through Government/documents/town code/ chapter113, section 16.

.

The Williamstown Department of Public Works shall be given at least 48 hours advance notice before any work commences that will affect their water mains and at least 24 hours notice prior to shutting off valves.

Information relative to the existing mains can be obtained by the Contractor from the Williamstown Department of Public Works, but such data is not guaranteed as to the exact size location and elevation. The Contractor shall verify the location, size and elevation of all affected pipe, as necessary, or as directed by the Engineer.

Gate valves shall conform to AWWA Standard C-500.

ITEMS 303.08, 303.12, 309., 315.08, 315.12, 350.08, 350.12, 371.08, 371.12, 372.012, 372.08, 373.08 & 373.12 (Continued)

Gate valves shall open left (counter-clockwise) and shall meet material requirements as specified in AWWA Standard C-500. The Williamstown Department of Public Works shall approve the gate valves prior to installation.

All valves shall be carefully installed and supported in their respective positions free from distortion and strain. Care shall be taken to prevent damage or injury to the valves and appurtenances during handling and installation.

All material shall be carefully inspected for defects in workmanship and all debris and foreign material cleaned out of valve openings and seats. All mechanisms shall be operated to check for proper functioning, and all nuts and bolts checked for tightness.

Valves and other equipment which do not operate easily or are otherwise defective shall be repaired or replaced at the Contractor's expense.

Each valve shall be provided with a box which has a close fitting 6-inch diameter cover and is substantially dirt-tight. The top of the cover shall be flush with the top of the box rim. The word "WATER" or "SEWER" shall be cast in the top of the cover.

Gate boxes shall be manufactured in North America. The minimum inside diameter of the boxes shall be 5 ¼-inches in diameter and the lengths shall be as necessary to suit the ground elevation and the depth of each valve operator, regardless of the depth of cover.

When there is more than 6 feet of cover, valve operators shall have non-rising extension stems which raise the operating nut to a depth of approximately 4 feet below grade. The extension stem shall have a centering support ring at the upper end. The lower socket shall be tapped with a set screw into the valve nut to prevent the extension stem from lifting off the valve nut.

Gate boxes shall be of cast iron and of the adjustable sliding, heavy pattern type. They shall be so designed and constructed as to prevent direct transmission of traffic loads to the pipe or valve. The upper or sliding section of the box shall be provided with a flange on the top of the section (not on the bottom) having sufficient bearing area to prevent undue settlement. The lower section of the box shall be designed to enclose the operating nut and stuffing box of the valve and to rest on the backfill. The boxes shall be adjustable through at least 6 inches vertically without reduction of lap between sections to less than 8 inches.

Gate boxes and extensions shall meet Williamstown Department of Public Works standards.

Gate boxes shall be set plumb, flush with the ground or paved surface, and centered directly over the operating nut of the valves. Earth fill shall be carefully tamped around the gate boxes to a distance of 4 feet on all sides of the boxes or to the undisturbed trench face, if less than 4 feet.

Flexible expansion joints shall be manufactured of ductile iron in accordance with ASTM A536 Grade 65-45-12. Each flexible expansion joint shall be capable of deflecting and expanding at the same time. Each ball joint shall possess an external rubber boot to prevent penetration of outside debris. All hardware, nuts, bolts, and straps shall be Type 304 stainless steel.

ITEMS 303.08, 303.12, 309., 315.08, 315.12, 350.08, 350.12, 371.08, 371.12, 372.012, 372.08, 373.08 & 373.12 (Continued)

All ductile iron components shall be coated internally and externally with 15 mils of fusion bonded epoxy and shall be holiday tested with a 1500 volt spark test, both of which conform to the requirements ANSI/AWWA C213. Every flexible joint unit shall be cycled and pressure tested at 350 psi for 3"-24" and 250 psi for 30" and above prior to shipment.

Valves shall be operational and accessible at all times during construction. The Contractor shall verify proper operation of all valves in the presence of the Engineer and/or the Williamstown Department of Public Works following completion of the project.

The Contractor shall perform the work in accordance with the information shown on the plans and in accordance with Williamstown Department of Public Works standards. The work outlined in these sections is for a complete and functioning system at the conclusion of the project. For incidental items not specifically called out in these specifications or on the construction plans, they should be considered incidental to the project and the cost shall be considered part of the items specified.

Items to be removed and stacked shall be transported and stacked to the Williamstown Water Department at 675 Simonds Road, Williamstown, MA 01267.

Water materials rejected by the Williamstown Water Department shall be disposed of by the Contractor at their own expense.

METHOD OF MEASUREMENT

Items 303.08, 303.12, 315.08, 315.12, 373.08, 373.12 will be measured for payment by the Foot.

Item 309. will be measured for payment by the Pound.

Items 350.08, 350.12, 371.08, 371.12, 372.08, 372.012 will be measured for payment by the Each.

BASIS OF PAYMENT

Items 303.08, 303.12, 315.08, 315.12, 373.08, 373.12 will be paid for at the respective Contract unit prices per Foot, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

Item 309. will be paid for at the Contract unit price per Pound, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

Items 350.08, 350.12, 371.08, 371.12, 372.08, 372.012 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.

ITEM 310.001 WATER SPIGOT REMOVED AND DISCARDED EACH

The work under this Item shall conform to the relevant provisions of Section 100, 300 and the following:

The work to be done under this Item consists of the removal and proper disposal of water spigots, associated water service piping, valving, and spigot attachments as shown on the Plans, and as required by the Engineer.

METHOD OF MEASUREMENT

Item 310.001 will be measured for payment by EACH, Water Spigot Removed & Discarded.

BASIS OF PAYMENT

Item 310.001 will be paid for at the contract unit price per Each, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 376.5**HYDRANT – ADJUSTED****EACH**

The work under this item shall conform to the relevant provisions of Subsection 301 of the Standard Specifications, the Plans and the following:

The work shall include furnishing, installing and testing of hydrant extension kits to adjust the elevation of the hydrant to meet proposed grades at Sta. 93+52 LT and as required by the Engineer.

The Williamstown Water Department and Fire Department shall be given at least 48- hours advance notice before any work commences that will affect their water mains. In no case shall a gate or hydrant be opened or shut without proper authorization.

SUBMITTALS

Submit shop drawings or descriptive literature, or both, for extension kit data. All materials furnished under the Contract shall be manufactured in accordance with the Specifications and the Plans.

MATERIALS**Extension Kits**

Extension kits shall be manufactured in North America and shall be complete with extension barrel, extension stem, stem coupling and hardware, flange, flange gasket, bolts and nuts and hydrant lubricating oil.

Extension kits shall be compatible with existing hydrant.

CONSTRUCTION METHODS

Hydrant shall be set in close conformity with the lines and grades shown on the plans and as directed by the Engineer.

1. Hydrant shall be installed to the proper bury line as indicated on the hydrant barrel. Hydrants set to high or low shall either be replaced with shorter or taller hydrant assemblies, or adjusted with properly sized extensions, as required.

2. The hydrant shall be set in true vertical alignment and shall be properly braced.

All iron work to be set below ground, after being thoroughly cleaned, shall be painted with two coats of asphalt varnish as specified in AWWA C502 and iron work to be left above ground shall be shop painted with two coats of red primer paint.

Hydrants and hydrant branches shall be pressure tested, flushed and chlorinated.

METHOD OF MEASUREMENT

Item 376.5 will be measured for payment by the Each hydrant installed and tested.

ITEM 376.5 (Continued)

BASIS OF PAYMENT

Item 376.5 will be paid for at the contract unit price per Each hydrant, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

No separate payment will be made for submittals, painting the iron work, locating existing utilities, protection of utilities, sawcutting, excavation, excavation support systems, disposal of excess excavated material, dewatering, bedding, drain stone, cleaning and testing, backfill, grading, compaction, dust control, and site clean-up, but all costs in connection therewith shall be included in the contract unit price bid.

ITEM 590.**CURB REMOVED AND STACKED****FOOT**

The work under this Item shall conform to the relevant provisions of Subsection 580 of the Standard Specifications and the following:

Work under this Item shall include the removal, transporting, and stacking of the existing roadside curb as required by the Engineer.

The work shall include removing the curb and any excavation necessary for curb removal.

All curbing shall be removed and transported to the Williamstown DPW. The Contractor is responsible for notifying the Town representative prior to the curbing being removed and transported. If the Town decides to abandon the property, then the Contractor shall dispose of the curbing at his/her expense.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 590. will be measured and paid per Subsections 580.80 and 580.81, respectively.

<u>ITEM 657.</u>	<u>TEMPORARY FENCE</u>	<u>FOOT</u>
<u>ITEM 657.5</u>	<u>TEMPORARY FENCE REMOVED AND RESET</u>	<u>FOOT</u>

The work under these items will conform to the relevant provisions of Subsection 644 supplemented with the following:

Item 657. Shall include furnishing, installing, maintaining, and final removal of Temporary Chain Link Fence and Gates at locations established by the Engineer.

Item 657.5 shall include removal and resetting, and maintaining of Temporary Chain Link Fence and Gates at locations established by the Engineer.

The fence will be at least 72 inches high and can be any type acceptable in Subsection 644. A top tension cable will be required on all portions of the temporary fence. All end, corner, gate and intermediate parts will be supported, so as to maintain the structural integrity of the fence and provide adequate protection and control access to the work area.

METHOD OF MEASUREMENT

Item 657. and Item 657.5 will be measured for payment by the Foot, including gates, complete in place.

BASIS OF PAYMENT

Item 657. and Item 657.1 will be paid for at the respective Contract unit prices per Foot, which price shall include all labor, materials, equipment, tension cable, posts including end, corner, and intermediate brace posts, all gates and gate posts, removing and resetting of temporary fence for the convenience of the Contractor, the replacement and/or restoration of fence damaged due to construction accidents, vandalism and/or any other manner, final removal, and all incidental costs required to complete the work.

ITEM 697.1**SILTSACK****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 catch 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 Subsection 227 of the Standard Specifications.

ITEM 697.1 (Continued)**METHOD OF MEASUREMENT AND BASIS OF PAYMENT**

Silt sacks will be measured and paid at the Contract Bid Price per each, complete in place, which price shall be the full payment for 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 698.4**GEOTEXTILE FABRIC FOR PERMANENT
EROSION CONTROL****SQUARE YARD**

The work under this Item shall consist of furnishing and installing geotextile fabric at the integral abutments below crushed stone as depicted throughout the contract plans.

The Geotextile Fabric for Permanent Erosion Control shall conform to the material specification M9.50.0 Geotextile Fabrics in the Standard Specifications. Geotextile shall be selected from the MassDOT Qualified Construction Materials List.

For seams, which are sewn in the field, the Contractor shall provide at least a 6 foot length of sewn seam for sampling by the Engineer before the geotextile is installed. The seams sewn for sampling shall be sewn using the same equipment and procedures as will be used for the production seams. If seams are sewn in both the machine and cross machine direction, samples of seams from both directions shall be provided. The Contractor shall submit the seam assembly description along with the sample of the seam. This description shall include the seam type, stitch type, sewing thread, and stitch density.

Overlaps of adjacent rolls shall be a minimum of 1 foot in all instances.

METHOD OF MEASUREMENT

Item 698.4 will be measured for payment by the Square Yard, complete in place. The quantity to be paid for shall be the plan area in square yards covered with no allowance for overlapping..

BASIS OF PAYMENT

Item 698.4 will be paid for at the contract unit price per Square Yard, which price shall include all labor, materials, equipment, sewing, overlapping, and incidental costs required to complete the work.

ITEM 707.15**PARK BENCH REMOVED AND RESET****EACH**

Work under this item shall conform to the relevant provisions of Subsections 101, 700, and M4.02.00 of the Standard Specifications and the following:

The existing bench located within the project limits shall carefully be removed, securely stored until final reset, and reset at new location as shown on the plans or as directed by the Engineer. Work shall include the necessary excavation to remove the bench and reset in a cement concrete foundation as detailed on the contract plans.

METHOD OF MEASUREMENT

Item 707.15 will be measured for payment by the Each, park bench removed and reset.

BASIS OF PAYMENT

Item 707.15 will be paid for at the contract unit price per Each, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

Park bench concrete pad will be paid for under items 151. Gravel Borrow and 701. Cement Concrete Sidewalk.

ITEM 734.**SIGN REMOVED AND RESET****EACH**

The work under this Item shall conform to the relevant provisions of Section 800 of the Standards Specifications and the following:

The Contractor shall carefully remove and reset at new locations all existing signs, attachment hardware and sign support posts not included under other sign Items as shown on the drawings and as required by the Engineer. Signs, attachment hardware and sign support posts lost, damaged or otherwise made unsuitable for reuse while being removed, transported, stored or reset shall be replaced with new materials at the Contractor's expense. Incidental to this item, new attachment hardware shall be furnished and installed as necessary to replace any missing or unusable existing hardware. The Contractor shall carefully remove and reset at new locations all existing signs, attachment hardware and sign support posts not included under other sign Items as shown on the drawings and as required by the Engineer.

METHOD OF MEASUREMENT

Item 734. will be measured for payment by the Each, sign removed and reset.

BASIS OF PAYMENT

Item 734. will be paid for at the contract unit price per Each, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

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, printer system, and a digital camera 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
- 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 (RADF) (not including the bypass tray)
- 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, printer and camera 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 765.442**SEEDING – ROADSIDE RIVERBANK
PART SHADE MIX****SQUARE YARD**

The work under this item shall conform to the relevant provisions of Subsection 765 of the Standard Specifications and the following:

The work shall consist of planting and establishing a stand of grass in the areas shown on the plans or as required by the Engineer. For the purposes of these specifications, the term “grass” shall apply to all the forbs, grasses, sedges, and rushes included in the materials.

All seeding shall be done by a company having a minimum of five years of experience with native grass establishment. Prior to beginning work, the seeding Contractor shall furnish proof of qualifications to the Engineer for approval. Proof of qualifications includes, if requested, providing documentation (photos and contacts) to demonstrate knowledge and expertise with native seeding and proof of having completed successful native seeding projects.

Seeding shall be done within 48 hours of placement of loam and final grading. Mulch for seed shall be Compost Topdressing or hydromulch as specified below, and shall be incidental to this item.

SEEDING SEASON

Seeding seasons shall be April 1 through May 15 and October 1 through December 1 for dormant seeding. *Seeding that occurs outside of these periods, shall be increased by 50%.*

MATERIALS**Seed****Samples and Submittals**

- 1) Certificate of Materials. 60 days prior to ordering, the Contractor shall submit to the Engineer the manufacturer or supplier's notarized Certificate of Materials. This document shall not be used as proof of purchase, proof of material delivered, or proof of material seeded, but simply to verify supplier availability of seed listed on the date certified. The species listed shall match those specified on the plans or herein, however, cultivars may vary due to availability. Substantial substitutions or changes in the mix from that specified on the plans or herein shall be approved by MassDOT Landscape Design Section.
- 2) Seed Tag Certification. All seed lots have a seed analysis tag as required by State and Federal law. The Contractor shall submit seed tags for each bag of seed used on the project site or ensure that each tag is photo documented by the Engineer. Number of tags shall match number of bags sent by the supplier to meet rate of Pure Live Seed specified on the plans. Tag must include: kind and variety of seed; lot number; origin of seed; net weight; % purity; germination; dormant seed; germination test date; inert matter; weed, noxious and other crop seed; and name and address of company responsible for the analysis. Seeding may be considered unacceptable for payment if no tags are submitted.

ITEM 765.442 (Continued)

- 3) Certificate of Compliance. Prior to payment, the Contractor shall submit a bill of lading or a signed, dated and notarized Certificate of Compliance from the Supplier that serves as proof of purchase. This document shall include kind and variety of seed, lot number, net weight shipped, date of sale, invoice number under which seed was purchased, and name and address of Supplier or Manufacturer. All information must be included on the notarized form, including lot number and net weight shipped for specified job. This information shall match Seed Tag Certification and quantity of seed applied on the job. Seeding may be considered unacceptable for payment if information is incomplete.
- 4) Seed Sample. Contractor may be asked, prior to seeding, to submit a seed sample for testing.

Quantities specified are Pure Live Seed (PLS). Greater quantities of ordered seed may be required to achieve actual specified seeding rates. Pure Live Seed is defined as the fraction of pure seed species within the mix that, by standard seed testing practices, will germinate. This is determined by multiplying the percent of seed purity by the percent of seed germination.

Seed mix shall be a custom blend as shown on the plans or shall be as specified below. Seed cultivars shall be those that are as regional to New England or the local ecotype as possible.

Any species substitutions shall be with a species having similar characteristics and native to New England. Substantial changes in the mix shall be approved by MassDOT Landscape Design Section.

ITEM 765.442 (Continued)**Item 765.442 Seeding – Roadside Riverbank –Part Shade Mix**

		<u>% PLS By Weight</u>
<u>Botanical Name</u>	<u>Common Name</u>	
Grass		
Elymus virginicus	Virginia Wild Rye	25.00%
Elymus canadensis	Canada Wild Rye	20.00%
Schizachyrium scoparium 'Albany Pine'	Little Bluestem 'Albany Pine'	20.00%
Festuca rubra	Creeping Red Fescue	12.00%
Dichanthelium clandestinum 'Tioga'	Deertongue grass 'Tioga'	8.00%
Agrostis perennans	Upland Bentgrass	6.00%
Carex vulpinoidea	Fox Sedge	2.00%
Juncus tenuis	Path Rush	2.00%
Juncus effusus	Soft Rush	0.10%
		<u>95.10%</u>
Herb/Forb		
Penstemon digitalis	Beard-tongue	2.00%
Aster novae-angliae	New England Aster	1.00%
Solidago caesia	Woodland Goldenrod	0.50%
Aster cordifolius	Blue Wood Aster	0.50%
Eupatorium maculatum	Joe-pye Weed	0.30%
Geum canadense	White Avens	0.30%
Solidago rigida	Rigid Goldenrod	0.20%
Rudbeckia hirta	Black-eyed Susan	0.10%
		<u>4.90%</u>
		100.00%

Seeding Rate:

Apply this mix at 20 lbs PLS/acre on areas of less than 3:1 slope and 25 lbs PLS on areas of greater than 3:1 slope.

Add 30 lbs/acre of a cover crop. For a cover crop use either grain oats (1 Jan to 31 July) or grain rye (1 Aug to 31 Dec). Cover crop shall be incidental to seeding item.

Fertilizer

No fertilizers shall be applied.

ITEM 765.442 (Continued)**Water**

Water, including hose and all other watering equipment required for the work, shall be furnished by the Contractor to the site at no additional cost. Water shall be suitable for irrigation and free from ingredients harmful to plant life. All plants injured or work damaged due to the lack of water or the use of too much water shall be the Contractor's responsibility to correct.

Mulch

Mulch for seeding and topdressing shall be incidental to this item. Mulch shall be:

- Compost Topdressing meeting the material and submittal requirements of Item 751.72, Compost Topdressing and as specified below under Seeding and Mulching.
OR
- Hydromulch per the manufacturer's recommendation. Mulch for hydroseeding shall be wood fiber only.

Photo Documentation

Contractor shall submit photo documentation to the Engineer and Landscape Design Section. Each photo shall be date stamped. Photos shall be submitted after the following stages of construction:

- Soil preparation
- Seed and hydromulch/compost topdressing
- Germination
- Grass establishment after one full growing season (growing season is June-September)

CONSTRUCTION**Surface Preparation**

Soil preparation and seeding shall occur only when the bed is in a friable condition, not muddy or hard. Bare soils shall be raked to remove large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Ruts and depressions shall be filled with additional loam or compost and the soil shall be re-graded to a smooth and even finish corresponding to the required grades.

When seeding over existing or compacted soil, surface will be prepared by raking or tracking to a depth of 2 inches prior to seeding and prior to Compost Topdressing (when applicable).

Surface preparation shall be compensated for under Item 751. Loam Borrow.

Surface preparation shall be approved by the Engineer prior to seeding.

ITEM 765.442 (Continued)**Seeding over Various Substrates**

Loam: Seeding shall occur within 48 hours of site preparation to prevent loss of topsoil. Seeding shall be hydroseeding or broadcast as specified below.

Compost Topdressing: Compost Topdressing shall be applied as specified under that item. Seed should be broadcast at the same time as compost application to ensure a thin cover of compost over seed. *When seeding is done after application of Compost Topsoil the rate shall be increased by 50% and area shall be hydromulched.*

Compost Mulch over Modified Rock: Compost Mulch shall be applied as specified under that item and shall be such that only the voids in the rock are filled so that seed has an organic substrate for germination. Seed shall be broadcast after compost application. No hydromulch is required.

Seeding Methods

No seeding or surface preparation work shall be done if soils are muddy or dry and compacted.

Broadcast Seeding: Seed shall be broadcast spread using a cyclone or whirlwind seeder or hand broadcast. Small or light-seeded species such as bluestem may be mixed with approved filler (e.g., sawdust, rice, kitty litter, or clean damp sand) to achieve an even distribution. Broadcast seeding shall be undertaken in two separate passes at ninety degrees to each other. One-half the seeding rate shall be applied in each direction.

To ensure seed to soil contact with broadcasting of seed, seed shall be tracked or rolled with a weighted roller.

All broadcast seeding shall be followed by hydromulching unless seeding is done as part of Compost Topdressing and as specified above.

Hydroseeding shall include hydromulch.

Hydromulching shall be per the Standard Specifications and per the manufacturer's directions.

After seeding and mulching, water seeded areas to moisten soil to a depth of at least 2 inches.

Seed and Grass Care

During Germination: Contractor shall care for seeded areas as determined necessary by the Engineer and the MassDOT Landscape Architect. Care may include irrigation and weed control as necessary for germination.

ITEM 765.442 (Continued)

During Establishment: Following germination of seeded species, the Contractor shall maintain the stand of grasses to ensure healthy growth. Work shall include mowing or weed-whacking for weed control, irrigation if necessary, and monitoring for invasive plants.

Watering shall provide uniform coverage without eroding soil or grassed surfaces. Treatment of invasive plants shall be per the direction of MassDOT Landscape Architect.

The Contractor shall provide all labor, equipment, materials, and water required for establishment. Contractor shall water all seeded areas as necessary to a depth of 2 inches or greater.

Over-seeding

Areas that are invaded by weeds shall be mowed as low as possible and over-seeded as directed. Soil that is compacted shall be raked or roughened prior to over-seeding. Following over-seeding, soil shall be lightly tamped to ensure seed to soil contact.

Over-seeding and mulch for over-seeding shall be incidental to this item.

ESTABLISHMENT

Native upland grasses and forbs will not look like turf grass. Many of the native grasses are bunch type grasses and will not form a uniform growth or have a sod-type appearance. However, seeded area shall show general uniform growth of the seeded species throughout the area. Areas with significant gaps of bare soil, generally greater than 2-3 feet in diameter, will require over-seeding.

A well-established stand of grasses at the end of one full growing season (June-September), as determined by the Engineer and the MassDOT Landscape Architect, will be required for acceptance. At least 80-90 percent of the grass established shall be the seeded species and any invasive or aggressive weeds (mugwort, ragweed, or knapweed) shall have been cut or otherwise managed.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 765.442 will be measured for payment by the square yard after one full growing season (June-September) has elapsed between seed application and inspection and upon approval of establishment by the Engineer and the MassDOT Landscape Architect.

ITEM 765.442 (Continued)

Item 765.442 will be paid for at the Contract unit price per Square Yard upon receipt of required submittals as specified above and upon approval of established stand of grass as specified above.

This price shall include seeding, rolling to ensure seed-to-soil contact, care during germination and establishment, irrigation, mulching, over-seeding, labor, materials, equipment, photo documentation, and all incidental costs required to complete the work. Site preparation, including raking, tilling, removal of debris and stones, and other work to the prepare site for seeding shall be compensated for under Item 751, Loam Borrow.

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.

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, silt fence shall be used in addition to compost filter tubes and straw bales and shall be incidental to the 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. 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)**Silt Fence**

Materials and Installation shall be per Section 670.40 and 670.60 of the Standard Specifications and the following:

Silt 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 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 silt 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).
- Silt 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.

Silt fence, when used in conjunction with compost filter tubes or straw bales, will be incidental to this item.

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 damaged by construction activities shall be repaired or replaced as directed by the Engineer at the Contractor's expense.

ITEM 767.731**JUTE MESH EROSION CONTROL FABRIC****SQUARE YARD**

The work under this item shall conform to the relevant provisions of Section 700 of the Standard Specifications and the following.

The work under this item consist of furnishing and installing jute mesh fabric to prevent soil erosion. Jute mesh shall be placed over all areas of exposed soil in locations shown on the plans or as required by the Engineer.

MATERIALS

Fabric shall be 100% biodegradeable woven jute mesh with minimum 1/4" openings.

Anchoring devices shall consist of minimum 8" bio-degradable stakes. Longer stakes shall be used where loose soils or other conditions obligate, as required by the Engineer.

CONSTRUCTION METHODS

Contractor shall bury ends of fabric in anchor trenches at top and bottom of slopes.

Installation of jute mesh shall be such as to ensure continuous contact with soil without folds or wrinkles. Jute mesh fabric may be joined by overlapping with a minimum 6 inch overlap. Overlap shall be such that upslope fabric is placed over lower slope fabric. Place staples at 12 inch intervals along the top of the slope and in staggered courses along the face of the slope to achieve a minimum of 3 staples per square yard.

Reseed all trenched and otherwise disturbed areas with specified slope seed mix.

METHOD OF MEASUREMENT

Item 767.731 will be measured for payment by the Square Yard, complete in place as measured across the surface of grade, and does not include buried or overlapped portions.

BASIS OF PAYMENT

Item 767.731 will be paid for at the contract unit price per Square Yard, which price shall include all labor, materials, equipment, trenching, placing and stapling of erosion fabric, reseeding of trenched and disturbed areas, and all incidental costs required to complete the work.

<u>ITEM 853.21</u>	<u>TEMPORARY BARRIER REMOVED AND RESET</u>	<u>FOOT</u>
---------------------------	---	--------------------

Work under this item shall conform to the relevant provisions of Section 850 and shall consist of removing, transporting and resetting temporary barrier systems and limited deflection temporary barrier systems from alignments established along the roadway to new alignments in accordance with the details shown on the plans, as required by the construction and staged construction operations and as required by the Engineer for the channelization of traffic and/or work zone protection.

The work shall also include furnishing and installing all hardware and associated materials per the details and/or manufacturer's specifications. The work shall also include necessary patches and repairs caused by the temporary barrier system to damaged pavement surfaces or any adjacent longitudinal barrier once the system has been removed.

Temporary barrier systems and limited deflection temporary barrier systems shall be removed from existing locations and reset in accordance to the construction methods stated in the respective barrier items.

Damage to the pavement surface or adjacent permanent barriers caused by removing or resetting temporary barrier shall be repaired as directed by the Engineer at the Contractor's expense.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 853.21 will be measured and paid by the foot, in place which shall provide full compensation for removing, relocating, resetting, realigning, and transporting maintaining the temporary barrier system and/or limited deflection temporary barrier system. The Contractor will be paid for this item each time the barrier is relocated either to a new work zone, to off-season storage, or back to the project from storage. The Contractor will not be separately compensated for any work necessary to maintain or re-align units or replace damaged units. No payment will be made for removing and resetting barriers for the purpose of gaining access to the construction work zone. No payment will be made for removing, relocating and resetting any barriers moved for the convenience of the Contractor.

For temporary barrier systems that require anchorage systems, the cost of furnishing, installing and removing the anchorage and hardware and the restoration of pavement surfaces or adjacent permanent barrier systems to facilitate anchorage shall be considered incidental to the cost of this Item.

ITEM 853.23**TEMPORARY BARRIER (TL-3)****FOOT****DESCRIPTION**

Work under this item shall conform to the relevant provisions of Subsection 850 and shall consist of furnishing, installing, maintaining and final removal of TL-3 temporary barrier systems for channelization of traffic and/or work zone protection.

MATERIALS

The Contractor shall use a temporary barrier system that is listed on the Qualified Traffic Control Equipment List that meets the minimum requirements of the AASHTO Manual on Assessing Safety Hardware (MASH) at Test Level (TL) 3 or higher.

The Contractor may submit alternate materials to the Engineer for approval if the temporary barrier system meets the following criteria:

1. The system has been tested by an independent laboratory that is accredited by FHWA to crash test roadside hardware;
2. The system meets the minimum requirements of the AASHTO Manual on Assessing Safety Hardware (MASH) at Test Level (TL) 3 or higher; and
3. The system has a federal-aid eligibility letter from FHWA.

Copies of the testing results and the federal-aid eligibility letter shall be submitted and approved by the Engineer prior to procurement of an alternate temporary barrier system.

The Contractor shall supply shop drawings to confirm the available clear area behind the barrier equals or exceeds the maximum dynamic deflection of MASH Test 3-11 during testing procedures taken at an independent laboratory that is accredited by FHWA to crash test roadside hardware.

Delineators shall be installed on all temporary barrier systems in conformance with the relevant provisions of Subsection 850.69 and shall be incidental to the temporary barrier systems.

Temporary impact attenuators that are listed on the Qualified Traffic Control Equipment List shall be used whenever a blunt end of the temporary barrier system is facing traffic within the clear zone unless it is protected by a second barrier system or secured to a separate barrier system or bridge railing by a method approved by the manufacturer.

CONSTRUCTION METHODS

Temporary barrier systems shall be placed in line with the drawings. Installation shall be per the manufacturer's specifications, details, and the approved shop drawings.

The Contractor shall not place any breaks in the temporary barrier system that will result in sections that are shorter than the stated minimum length-of-need (LON) under MASH Test 3-11. Exceptions shall be allowed for gate systems or changeable length segments placed over expansion joints if those barrier segment types have been tested and meet the minimum requirements of MASH Test 3-11 with the adjoining barrier system.

ITEM 853.23 (Continued)

Within the LON section, temporary barrier systems shall only be placed on paved surfaces unless otherwise tested and certified under MASH TL-3 for those conditions.

Damage to the pavement surface caused by the temporary barrier during installation, while in service, and/or during removal shall be repaired as directed by the Engineer at the Contractor's expense.

Temporary barrier systems that require anchorage systems shall conform with the relevant provisions of Subsection 850.70.

METHOD OF MEASUREMENT

Items 853.23 will be measured by the foot, in place.

BASIS OF PAYMENT

Payment for work under these items will be made at the contract price per foot for temporary barrier installed in place, including all incidental items. This price shall include the cost of furnishing, installing, maintaining and final removal of all temporary barrier systems.

For temporary barrier systems that require anchorage or attachment systems, the cost of furnishing and installing the anchorage/attachment and hardware, and the restoration of pavement surfaces or adjacent permanent barrier systems to facilitate anchorage/attachments shall be considered incidental to the cost of the item.

Payment for temporary barrier removed and reset will be made under Item 853.21. Temporary barrier removed and reset for the purpose of gaining access to the construction workzone, including opening and closing the workzone regularly for access, or for the convenience of the Contractor shall not be measured for payment.

ITEM 853.33 TEMPORARY BARRIER – LIMITED DEFLECTION (TL-3) FOOT**DESCRIPTION**

Work under this item shall conform to the relevant provisions of Subsection 850 and shall consist of furnishing, installing, maintaining and final removal of limited deflection TL-3 temporary barrier systems for channelization of traffic and/or work zone protection. Limited deflection temporary barrier systems shall have a maximum combined working width of 28.5 inches which includes the width of the barrier plus the dynamic deflection; and shall be used in areas where the available clear area behind the barrier systems to obstructions or vertical drop-offs is greater than the anticipated barrier deflection.

MATERIALS

The Contractor shall use a temporary barrier system that is listed on the Qualified Traffic Control Equipment List that meets the specified working width indicated above and the minimum requirements of the AASHTO Manual on Assessing Safety Hardware (MASH) at Test Level (TL) 3 or higher.

The Contractor may submit alternate materials to the Engineer for approval if the limited deflection temporary barrier system meets the following criteria:

1. The system has been tested by an independent laboratory that is accredited by FHWA to crash test roadside hardware;
2. The system meets the minimum requirements of the AASHTO Manual on Assessing Safety Hardware (MASH) at Test Level (TL) 3 or higher; and
3. The system has a federal-aid eligibility letter from FHWA.

Copies of the testing results and the federal-aid eligibility letter shall be submitted and approved by the Engineer prior to procurement of an alternate temporary barrier system.

The Contractor shall supply shop drawings to confirm the available clear area behind the barrier equals or exceeds the maximum dynamic deflection of MASH Test 3-11 during testing procedures taken at an independent laboratory that is accredited by FHWA to crash test roadside hardware.

Delineators shall be installed on all limited deflection temporary barrier systems in conformance with the relevant provisions of Subsection 850.69 and shall be incidental to the temporary barrier systems.

Temporary impact attenuators that are listed on the Qualified Traffic Control Equipment List shall be used whenever a blunt end of the limited deflection temporary barrier system is facing traffic within the clear zone unless it is protected by a second barrier system or secured to a separate barrier system or bridge railing by a method approved by the manufacturer.

ITEM 853.33 (Continued)**CONSTRUCTION METHODS**

Limited deflection temporary barrier systems shall be placed in line with the drawings. Installation shall be per the manufacturer's specifications, details, and the approved shop drawings.

The Contractor shall not place any breaks in the limited deflection temporary barrier system that will result in sections that are shorter than the stated minimum length-of-need (LON) under MASH Test 3-11. Exceptions shall be allowed for gate systems or changeable length segments placed over expansion joints if those barrier segment types have been tested and meet the minimum requirements of MASH Test 3-11 with the adjoining limited deflection barrier system.

Within the LON section, limited deflection temporary barrier systems shall only be placed on paved surfaces unless otherwise tested and certified under MASH TL-3 for those conditions.

Damage to the pavement surface caused by the limited deflection temporary barrier during installation, while in service, and/or during removal shall be repaired as directed by the Engineer at the Contractor's expense

Limited deflection temporary barrier systems that require anchorage systems shall conform with the relevant provisions of Subsection 850.70, including the restoration of roadway surfaces and bridge decks. Where barrier is anchored to the bridge deck, the anchor holes shall be filled with non-shrink grout upon removal of the barrier. Where barrier is pinned to the roadway, the pin holes shall be filled with a sand mortar mix upon removal of the barrier.

METHOD OF MEASUREMENT

Item 853.33 will be measured by the foot, in place.

BASIS OF PAYMENT

Payment for work under this item will be made at the contract price per foot for Temporary Barrier - Limited Deflection (TL-3) installed in place, including all incidental items. This price shall include the cost of furnishing, installing, maintaining and final removal of all limited deflection temporary barrier systems.

For limited deflection temporary barrier systems that require anchorage or attachment systems, the cost of furnishing and installing the anchorage/attachment and hardware and the restoration of bridge deck, pavement surfaces or adjacent permanent barrier systems to facilitate anchorage/attachment shall be considered incidental to the cost of the item.

Payment for limited deflection temporary barrier removed and reset will be made under Item 853.21. Limited deflection temporary barrier removed and reset for the purpose of gaining access to the construction workzone or for the convenience of the Contractor shall not be measured for payment.

<u>ITEM 853.501</u>	<u>TEMPORARY IMPACT ATTENUATOR REMOVED AND RESET</u>	<u>EACH</u>
----------------------------	---	--------------------

<u>ITEM 853.53</u>	<u>TEMPORARY IMPACT ATTENUATOR, UNIDIRECTIONAL, NON-REDIRECTIVE (TL-3)</u>	<u>EACH</u>
---------------------------	---	--------------------

DESCRIPTION

Work under Item 853.501 shall conform to the relevant provisions of Subsection 850 and shall consist of maintaining, removing and reinstalling temporary impact attenuators where indicated on the plans or as directed by the Engineer.

Work under Item 853.53 shall conform to the relevant provisions of Subsection 850 and shall consist of furnishing, installing, maintaining and final removal of temporary impact attenuator systems for protection of the ends of temporary barrier and other roadside hazards in work zones. All work shall be in conformance with the specifications of the manufacturer and in close conformance with the locations, lines, and grades shown on the plans.

MATERIALS

The Contractor shall supply a temporary impact attenuator that meets the same or higher crash Test Level (TL) as the adjacent temporary barrier, unless otherwise shown on the plans. The temporary attenuator shall be listed on the Department's Qualified Traffic Control Equipment List.

The temporary impact attenuator shall be designed to fit within reasonably close tolerance of the dimensions given on the plans.

The Contractor shall supply shop drawings for the temporary attenuator and for any anchorage system and for any transitions or connections between the temporary attenuator and the adjacent barrier or other roadside hazard.

The side of the temporary attenuator that faces traffic shall include a Type 3 Object Marker that conforms to the language found in Sections 2C.64 and 2C.65 of the *Manual on Uniform Traffic Control Devices*.

Unless a separate barrier system protects it from opposing traffic, only temporary impact attenuators that are certified for bi-directional use shall be used in medians.

CONSTRUCTION METHODS

Installation means and methods shall be per the manufacturer's specifications and/or drawings.

Temporary Impact Attenuators Removed and Reset consists of removing temporary impact attenuators, relocating and reinstalling at a new location per the specifications and recommendations of the manufacturer and as shown on the plans or as directed by the Engineer.

Excavation for temporary attenuator foundations and anchorage shall be made to the required depth and to a width that will permit the installation and bracing of forms where necessary. All soft and unsuitable material shall be replaced with compacted gravel borrow.

ITEMS 853.501 & 853.53 (Continued)

The Contractor shall supply the Engineer instructions for installation and the manufacturer's recommended routine inspection and maintenance program. The cost of inspection and maintenance of temporary attenuators shall be considered incidental in nature.

Damaged temporary impact attenuators shall be replaced by the Contractor within 24 hours or as directed by the Engineer, at the Contractor's expense. A truck mounted attenuator that meets the same or higher TL, or other means of protecting the damaged temporary impact attenuator, shall be deployed until the repairs or replacement has been completed, at the Contractor's expense.

METHOD OF MEASUREMENT

Item 853.501 will be measured as a single unit EACH.

Item 853.53 will be measured as a single unit EACH furnished and installed in place.

BASIS OF PAYMENT

Payment for work under these items will be made at the contract unit price EACH. This price shall include the cost of all labor and materials for furnishing, foundations and anchorages, installation, maintenance and final removal, and all incidental work necessary to complete the work as specified.

<u>ITEM 866.206</u>	<u>6 INCH REFLECTORIZED WHITE LINE (POLYUREA) (RECESSED)</u>	<u>FOOT</u>
<u>ITEM 867.206</u>	<u>6 INCH REFLECTORIZED YELLOW LINE (POLYUREA) (RECESSED)</u>	<u>FOOT</u>
<u>ITEM 867.212</u>	<u>12 INCH REFLECTORIZED YELLOW LINE (POLYUREA) (RECESSED)</u>	<u>FOOT</u>

Work to be completed under these items shall conform to the relevant provisions of Subsection 860 of the Standard Specifications and the following:

Work shall consist of grooving a slot in the pavement surface and the furnishing and installation of wet reflective polyurea pavement markings.

MATERIALS

Wet reflective polyurea pavement markings shall consists of a liquid binder, first drop beads or elements to provide dry and wet retroreflectivity, and second drop glass beads to improve the durability of the pavement marking, reduce track-free times, and provide supplementary dry retroreflectivity.

The Contractor shall use one of the following binders and first drop beads or elements, or approved equivalents:

1. 3M™ Liquid Pavement Marking Series 5000 with 3M™ All Weather Series 90 elements;
2. Epoplex GLOMARC® 90 with Potters VISIMAX® Glass Bead System; or
3. SWARCO MFUA-12 with SWARCO MEGALUX-BEADS®.

Combination of other binder and first drop bead or element series may only be used at the approval of the Engineer.

Second drop beads shall be manufactured from glass of a composition that is highly resistant to traffic wear and to the effects of weathering. If coating is required to meet the performance requirements, the second drop beads shall be coated to ensure satisfactory embedment and adhesion. Second drop beads retained on a No. 40 U.S. Standard Mesh Sieve shall have a minimum crush strength of 30 lbs. when tested in accordance with ASTM D1213.

Second drop beads shall have a minimum refractive index of 1.51 when tested in accordance with AASHTO M247.

Second drop beads passing the No. 30 sieve shall have a minimum of 75 percent true spheres when tested in accordance with ASTM D1155. All second drop beads retained on the No. 20 and No. 30 sieves shall have a minimum of 80 percent true spheres as determined by ASTM D1155. Second drop beads shall meet the following gradation requirements when tested in accordance with ASTM D1214:

ITEMS 866.206, 867.206 & 867.212 (Continued)

U.S. Standard Sieve No.	Percent Retained
20	3-10
30	15-35
50	45-75
70	0-10
Pan	0-5

CONSTRUCTION METHODS**Installation of Groove**

Prior to cutting out the grooves for all recessed lines, the Contractor shall use a chalk line or other suitable method to layout the proposed pavement markings on the surface course so that the Engineer can inspect the locations. Once the Engineer has inspected and approved the proposed striping layout, the grooves for the proposed pavement markings may be cut. No pavement grooving shall be done without the prior approval of the Engineer.

Groove position shall be a minimum of 4 inches from the edge of the pavement marking to any longitudinal pavement joints. The groove shall not be installed on bridge joints, on drainage structures, or in other areas identified by the Engineer. The groove shall not be installed continuously for intermittent pavement markings, but only where markings are to be applied.

The use of gang stacked diamond cutting blades to grind a smooth square slot is required for producing all grooves. The spacers between blade cuts shall be such that there will be less than a 10 mil rise in the finished groove between the blades. The acceptability of the surface texture will be determined by the Engineer.

The diamond grinder shall have an articulating head so that the slots are installed correctly on grades and super elevated sections.

Grooves that are ground deeper or wider than the specified allowable limits shall be repaired per the direction of the Engineer at no additional cost. Grooves that are ground too shallow, too narrow, or with unacceptable rises between blade cuts shall be reground to the correct size, depth, and surface finish at no additional cost. Slots ground out of alignment shall be patched using an approved method and materials.

Grooves shall be 1 inch \pm ¼ inch wider than the pavement marking material. Groove depth shall be 100 mils \pm 5 mils, unless otherwise approved by the Engineer. Depth shall be consistent across the full width of the groove. Depth plates shall be provided by the Contractor to the Engineer to assure that desired groove depth is achieved.

Grooves shall be clean, dry and free of laitance, oil, dirt, grease, paint or other foreign contaminants. Shrouds and a vacuum apparatus shall be included as part of the grinder to remove larger pieces of pavement that are ground out. If water is used to clean the groove or the grooving process takes place during rainfall, a minimum of 24 hours of dry time is required prior to the placement of pavement markings.

ITEMS 866.206, 867.206 & 867.212 (Continued)

After the depth, width, length, and surface condition has been approved by the Engineer, an air lance shall be used to remove fine particles from the groove. Air compressors shall initially be blown out away from the application area to prevent compressor condensation build-up from entering the groove. The Contractor shall prevent traffic from traversing the grooves and re-clean grooves, as necessary, prior to application of pavement markings at no additional cost to the Department.

All grooves must be given final approval by the Engineer prior to the placement of pavement markings.

Installation of Wet Reflective Polyurea

Installation of wet reflective polyurea pavement markings shall conform to the Manufacturer's specifications and the following:

Application rate for binder and all beads and elements shall consider final pavement surface composition and smoothness in advance of application to ensure proper wet film thickness and embedment of all beads and elements. The Contractor shall provide the Engineer with documentation from the Manufacturer with all recommended application rates in advance of any pavement marking installation.

The minimum uniform wet thickness for the polyurea binder shall be 25-30 mils. The line thickness shall be met across at least the middle $\frac{2}{3}$ of the pavement marking width. Depth plates shall be provided by the Contractor to the Engineer to assure that desired thickness is achieved.

The finished white color shall be free from tint, with good opacity and visibility under both daylight and artificial light. The finished yellow color shall be defined by Federal Test Standard 595 - Color Chip Number 13538, using Federal Test Standard 141 (Method 4252). The finished lines shall be uniform in color and have clean, well-defined edges.

First and second drop beads and/or elements shall be applied in a manner that does not induce rolling or bouncing, to ensure that exposed portions of beads are free of binder material. Beads and elements should be embedded in the binder to a depth of approximately 50% of their diameter.

Drop rate for first drop bead or element shall be per the Manufacturer's specifications.

Drop rate for second drop glass bead shall be 6.4-10.2 lbs. per gallon.

Newly installed pavement markings shall be protected from tracking during the setting period per Subsection 860.63.

ITEMS 866.206, 867.206 & 867.212 (Continued)

Once the installed pavement markings have been open for traffic for a minimum of 48 hours, the Contractor shall perform retroreflectance readings per the measurement and sampling procedures contained in ASTM D7585 (Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments) using the Referee Evaluation Protocol found in section 6.4. The following tests shall be performed during the measurement and sampling process:

1. ASTM E1710 (*Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer*); and
2. ASTM E2177 (*Standard Test Method for Measuring the Coefficient of Retroreflected Luminance (R_L) of Pavement Markings in a Standard Condition of Wetness*).

The average initial retroreflectance readings shall exceed the following minimum values:

	*White Markings	*Yellow Markings
ASTM E1710 (Dry)	475 mcd/lux/m ²	375 mcd/lux/m ²
ASTM E2177 (Wet Recovery)	375 mcd/lux/m ²	300 mcd/lux/m ²

*Observation Angle = 1.05°, Entrance Angle = 88.8°

Pavement markings with measured average initial retroreflectance readings that do not meet the specified minimum values using the procedures outlined in subsection 6.4.5 of ASTM D7585 shall be removed by a method approved by the Engineer and reapplied at no additional cost.

PAVEMENT MARKING ASSET MANAGEMENT

Upon completion of the pavement marking installation, the following data shall be tabulated by the Contractor:

1. Retroreflectance readings, including date(s), time(s), and location(s) where readings took place;
2. Liquid binder type(s) and application rate;
3. Reflective element type and drop rate;
4. Date of groove installation;
5. Lot, batch number, or any other material identifiers and manufacturing information;
6. Date and time of final liquid marking installation;
7. Highway location (including direction) of installation;
8. Air and pavement temperature during application;
9. Measured material application thickness, depth of groove; and
10. Any other pertinent information that may assist MassDOT with Quality Control.
- 11.

Results for all readings shall be provided within 10 business days of testing to the Engineer, with a second copy sent to:

State Traffic Engineer
Attention: Pavement Marking Installation & Testing
10 Park Plaza, Room 7210
Boston, MA 02116

ITEMS 866.206, 867.206 & 867.212 (Continued)

The cost to prepare and submit this data shall be considered incidental to the cost of the items.

METHOD OF MEASUREMENT

Wet reflective recessed polyurea pavement markings will be measured per FOOT, complete in place, as specified under Section 860.80.

BASIS OF PAYMENT

Wet reflective recessed polyurea pavement markings will be paid at the respective contract unit price per FOOT.

The contract prices shall include all material, labor, and equipment required or incidental to the satisfactory completion of the work.

ITEM 874.4**TRAFFIC SIGN REMOVED AND STACKED****EACH**

Work under this Item shall include the dismantling, removal, transporting and stacking of the existing roadside traffic signs and street signs as directed by the Engineer including the removal and disposal of the sign supports and their foundations.

The work shall include removing the supports, excavating the existing foundation, the disposal of the concrete and supports, the backfilling with compacted gravel of the holes resulting from the excavation and removal of the supports and the replacement, in kind, of any surface material disturbed.

The existing signs shall not be removed until the new signs and structures replacing them are ready for installation or until the Engineer orders their removal.

All signs owned by the Town of Williamstown shall be removed and stacked on-site for pick-up by the Town. The Contractor is responsible for notifying the Town representative when the signs will be available. If the Town decides to abandon the property, then the Contractor shall dispose of the signs at his/her expense.

METHOD OF MEASUREMENT

Item 874.4 will be measured for payment by the Each Traffic Sign, removed and stacked including supports.

BASIS OF PAYMENT

Item 874.4 will be paid for at the contract unit price per Each, which price shall include all labor, materials, equipment, excavation, disposal of the existing foundations and supports, supplying and placing of gravel backfill, compaction, the restoration or replacement in kind of disturbed surfaces, and incidental costs required to complete the work.

ITEM 912.5**DRILLED AND GROUTED #5 DOWELS****EACH**

The work under this Item shall conform to the relevant provisions of Subsection 901 of the Standard Specifications and the following:

The work to be done under this item shall consist of drilling and grouting holes in the existing structure for steel reinforcing dowels for concrete abutment caps, as shown on the Plans.

The dowel embedment must be adequate to fully develop 125% of the yield strength of the bar. The embedment length, the method and equipment used to drill the dowel holes, and the diameter of the drilled hole shall, at a minimum, conform to the recommendations of the manufacturer and be submitted to the Engineer for approval.

MATERIALS

The grout to be used for these dowels shall be a non-shrink, non-metallic composition containing a blend of selected Portland cements, plasticizing/water-reducing admixtures and shrinkage compensating agents, conforming to ASTM C1107. The shrinkage agents shall compensate for shrinkage in both the plastic and hardened states. Grout shall meet the following minimum material properties:

1. Compression strength at 28 days (ASTM C 942): 7500 psi
2. Bond strength - plastic grout to hardened concrete at 28 days (ASTM C 882): 1950 psi

Grout material must be on the MassDOT Qualified Construction Materials list, and be suitable for grouting dowels.

The grout manufacturer shall be ISO 9001 certified and have at least five years experience in the manufacture of cement-based grouts.

All materials shall be delivered in original, unopened containers with the manufacturer's name, labels, product identification and batch numbers. Damaged material must be removed from the site immediately. All materials shall be stored off the ground and protected from rain, freezing or excessive heat until ready for use.

Material shall not be applied if it is raining or snowing, or if such conditions appear to be imminent. Minimum application temperature is 7°C (45°F) and rising.

The Contractor shall submit copies of manufacturer's literature for approval, including: product data sheets and appropriate material safety data sheets.

The grout, drilled hole diameter and embedment depth shall be field tested, as specified below, prior to approval for use on this project. Two test dowel bars of each dowel size shall be installed in the existing concrete and tested by the Contractor for pull-out. The pull-out force shall correspond to 90% of the yield strength of the bar. If any of the tested bars pull out or if the surrounding concrete shows signs of cracking, the Contractor must adjust the hole diameter, embedment, length and/or grouting material to meet this test requirement. All testing of the drilled and grouted dowels shall be performed by the Contractor in the presence of MassDOT personnel and is incidental to the work under this heading. The method of applying the tension test load to the dowels shall conform to ASTM E488.

ITEM 912.5 (Continued)

Details of the testing equipment used and the locations and details of the test dowels shall be submitted to the Engineer for approval. The Contractor shall perform this test as soon as possible in order to eliminate delays in construction due to the approval process. Dowels shall not be ordered until the embedment lengths used in the actual testing and the results of the tests have been submitted to the Engineer for approval.

Reinforcing steel dowels shall meet requirements of AASHTO M31, Grade 60 (ASTM A615 Grade 60). Reinforcing steel dowels shall be incidental to work under Item 912.5.

CONSTRUCTION METHODS

All dowel holes shall be air drilled provided that the minimum edge distance of 6" is observed. Should, in the Engineer's opinion, air drilling be inappropriate due to questionable strength of the existing concrete or insufficient edge distance, the holes shall be diamond core drilled. The inner surfaces of diamond core drilled holes shall be scored to develop sufficient keying action. The method of scoring of the hole's inner surfaces shall be subject to the approval of the Engineer.

The diameter and embedment of the drilled dowel holes shall be in accordance with the recommendations of the grout manufacturer and the following minimum dimensions:

Diameter: minimum 1" larger than the diameter of the rebar, providing a minimum ½" annular spacing.

Embedment: as indicated on Plans and a minimum of fifteen times the rebar's diameter.

Drilled dowel hole diameters and embedments are based on the requirements specified under this item, the strength of the existing concrete, and the layout of dowels on the existing structure.

The holes shall be blown clear of any debris and shall have the approval of the Engineer prior to the placement of any grout material.

The drilling operation shall be performed without damage to any existing reinforcing or portion of the structure that is to remain in place. Any damage to the existing concrete that is to remain in place shall be repaired to a condition equal to or better than that existing prior to the beginning of the Contractor's operations and shall be repaired at the his/her expense.

The Contractor shall strictly follow the recommendations of the manufacturer for mixing and placing the grout material prior to the placement of the dowels. The Contractor shall adhere to the ACI code requirements regarding minimum and maximum temperatures while placing the grout. Any excessive grout around the hole after placement of the dowel shall be struck off smooth while the grout is still fresh.

ITEM 912.5 (Continued)**FIELD REPRESENTATIVE**

The Contractor shall arrange with the materials manufacturer or distributor to have the services of a competent field representative at the work site prior to any drilling of the proposed holes to instruct the work crews in proper dowel installation procedures.

The field representative shall remain at the job site after work commences and continue to instruct until the representative and the Contractor, Inspector and/or Engineer are satisfied that the crew has mastered the technique of installing the dowels successfully.

The representative shall make periodic visits to the project as the work progresses and shall confer on each visit with the Contractor, Inspector and/or Engineer. The manufacturer's field representative must be fully qualified to perform the work and shall be subject to the approval of the Engineer.

The Contractor shall be completely responsible for the expense of the services of the required field representative and the bid contract price shall be full compensation for all costs in connection therewith.

The Contractor shall have no claim for any variations in the diameter of the hole, the embedment length, the method of drilling the hole, or the type of grout used in anchoring the proposed dowels.

METHOD OF MEASUREMENT

Item 912.5 will be measured for payment by the Each, complete in place.

BASIS OF PAYMENT

Item 912.5 will be paid for at the contract unit price per Each, which price shall include all labor, materials, equipment, and incidental costs required to complete the work.

ITEM 945.3**OBSTRUCTION EXCAVATION****FOOT**

The work under this item shall conform to the relevant provisions of Subsection 940 of the Standard Specifications and the following:

The work under this item shall consist of removal of impenetrable objects that prevent the advancement of proposed piles. The work to be done under this item includes furnishing all labor and equipment necessary to facilitate pile driving to the limits shown on the plans. If the Contractor determines removing existing timber piles is necessary, then that work shall be paid under Item 945.4 – Timber Pile Removal.

Prior to the start of work, the Contractor shall locate all utilities and shall submit to the Engineer and the utility companies his proposed method of protecting them during the demolition operations. Procedure submittal shall not serve to relieve the Contractor of his responsibility to protect all utilities from damage at all times. Any damage done to utilities by the Contractor shall be immediately repaired at his expense.

The Contractor shall also prepare and submit a plan indicating his/her proposed demolition procedures and methods to be used including equipment, tools, devices, and schedule of operations to the Engineer for review. Work under this item may not commence until the Engineer has given written approval.

Any equipment, debris or excavated material that falls into the river due to the Contractor's activities shall be promptly removed by him at his expense and as directed by the Engineer.

All materials removed under Item 945.3 shall become the property of the Contractor and be properly disposed of away from the job site. Care shall be taken during removal operations so as not to damage those portions of the structure designated to remain. Any removal beyond the designated limits, or damage to those portions of the structures designated to remain which ensue due to the Contractor's operations, shall be repaired or replaced to the satisfaction of the Engineer at the sole expense of the Contractor.

METHOD OF MEASUREMENT

Item 945.3 will be measured for payment by the Foot after designation as obstruction excavation by the Engineer. Obstruction will be measured for payment on a length basis by the foot of completed obstruction excavation.

BASIS OF PAYMENT

Item 945.3 will be paid for at the Contract unit price per Foot, which price shall include all labor, materials, equipment, removal from the site and disposal of excavated materials, drilling equipment, procedures to excavate the obstruction to the required depths, and all incidental costs required to complete the work.

Pay limit for this item shall be the length of obstructions removed between the bottom of existing foundations and bedrock.

ITEM 945.4**TIMBER PILE REMOVAL****EACH**

The work to be done under this item includes furnishing all labor and equipment necessary to remove existing timber piles. The Contractor shall attempt to shift proposed steel pile locations within the tolerances provided in the contract plans if existing timber piles are encountered during obstruction excavation. Any additional widening of the cored hole through existing foundation shall be considered as incidental to Item 127.1 – Reinforced Concrete Excavation. If a timber pile cannot be avoided or is anticipated to interfere with driving a proposed pile, then the Contractor may remove the timber pile to facilitate installation of a steel pile.

Any equipment, debris or excavated material that falls into the river due to the Contractor's activities shall be promptly removed by him at his expense and as required by the Engineer.

All materials removed under Item 945.4 shall become the property of the Contractor and be properly disposed of away from the job site. Care shall be taken during removal operations so as not to damage those portions of the structure designated to remain. Any removal beyond the designated limits, or damage to those portions of the structures designated to remain which ensue due to the Contractor's operations, shall be repaired or replaced to the satisfaction of the Engineer at the sole expense of the Contractor.

METHOD OF MEASUREMENT

Item 945.4 will be measured for payment by the Each, timber pile removed.

BASIS OF PAYMENT

Item 945.4 will be paid for at the contract unit price per Each, which price shall include all labor, tools, materials, equipment, and incidental costs required to complete the work.

ITEM 949.**GEOTECHNICAL MONITORING****LUMP SUM**

The work under this Item shall conform to the relevant provisions of Subsection 940 Driven Piles and Subsection 950 of the Standard Specifications and the following:

The work under this Item shall provide for geotechnical monitoring during the construction of this project.

The Contractor's registered Surveyor shall monitor the performance of the existing structures, in particular the nearby power substation and the sewer siphon chambers. The Contractor shall perform a baseline survey of each monitoring point consisting of two sets of independent readings prior to the beginning of excavation, demolition, temporary earth support system installation, temporary pedestrian bridge construction, and pile installation. During these construction activities, monitoring points shall be monitored one time daily until excavation and pile installation is complete. The Contractor shall provide survey data to the Engineer for review within 24 hours of collection of data. The number of points to be monitored on a daily basis and the frequency of monitoring may be increased or decreased in agreement with the Engineer based on the results of the monitoring. Survey data shall be reported to an accuracy of 0.01 feet.

The following Threshold and Limiting Values for monitoring points shall be used:

Monitoring Target Threshold Value and Limiting Value

Structure Monitoring Point (horizontal and vertical): 0.25 inch and 0.5 inch

Utility Monitoring Point (vertical): 0.25 inch and 0.5 inch

These movement criteria are intended only to establish a guideline, and in no way relieve the Contractor of his responsibility for preventing detrimental movements or damage causing structural distress in the various structures, roadways, or embankment. The Contractor shall provide all measures necessary, including installing contractor design cutoff sheeting in front of the power substation, to control movements to within the established performance criteria, or to lesser amounts as required to prevent damage. The Engineer may require the Contractor to take steps to control movements to levels which are lower, at no additional cost to the Owner, if in the Engineer's opinion the measured or observed movements are detrimental or damaging.

The work shall be executed in such a manner as to prevent damage to existing structures and other public and private property and existing improvements. The Contractor shall protect existing improvements from damage caused by settlement, lateral movement, loss of ground, undermining, washout, and other potential hazards which may be initiated by pile driving. Damage to existing facilities shall be repaired by the Contractor at his own expense.

If a Threshold Value is reached, the Contractor shall increase the instrument monitoring frequency as directed by the Engineer and implement remedial measures, so the Limiting Value is not reached.

If a Limiting Value is reached, the Contractor shall stop work immediately and notify the Engineer and take immediate remedial action. Even if the limiting values are not reached but cracks are observed on the structure, the Contractor shall also stop work immediately and notify the Engineer.

ITEM 949. (Continued)**BASIS OF PAYMENT**

Item 949 will be paid for at the Contract unit price per Lump Sum, which price shall include all labor, materials, equipment, report submittals, and all incidental costs required to complete the work.

Payment of 10% of the Lump Sum price of this item will be made upon completion of Phase 1 earth support system installation.

Payment of 40% of the Lump Sum price of this item will be made upon completion of Phase 1 substructure construction.

Payment of 10% of the Lump Sum price of this item will be made upon completion of Phase 2 earth support system installation.

Payment of 40% of the Lump Sum price of this item will be made upon completion of Phase 2 substructure construction.

ITEM 950.1**TEMPORARY SHORING****LUMP SUM**

The work to be done under this Item shall conform to the applicable provisions of Subsections 140 and 950 of the Standard Specifications except where specifically amended herein.

Temporary shoring systems, supplied by the Contractor, shall be installed to support the excavation required to remove portions of the existing structure and construct the proposed structure. The exact layout and location of the systems may be altered as necessary, within the provided easements, to accommodate specific site conditions and contractor operations.

The Contractor shall accurately locate all utilities lines and structures to ensure that the proposed temporary shoring systems will not interfere with any existing or proposed utilities and structures.

The design of the temporary shoring systems shall adequately resist all loads applied to the systems for the duration of construction until the excavation is safely backfilled. Loads acting on the systems include, but are not limited to, earth and/or water pressure, construction live loads, live loads from staged traffic, and adjacent bridge structure loads. The design shall be in accordance with the latest LRFD bridge design specifications, of the American Association of State Highway and Transportation Officials (AASHTO) and the AASHTO Guide Design Specification for Bridge Temporary Works, 1995, and all interims published as of bid opening.

The Contractor shall submit calculations and detailed drawings of the proposed temporary shoring systems to the Engineer for approval. These calculations and drawings shall be stamped by a Professional Engineer registered in the Commonwealth of Massachusetts.

BASIS OF PAYMENT

Item 950.1, Temporary Shoring will be paid for at the Contract Lump Sum; which price shall include all labor, materials, equipment, engineering service, final removal of temporary shoring and incidental costs required to complete the work. No additional payment will be made for any shoring left in place.

ITEM 991.1**CONTROL OF WATER –
STRUCTURE NO. W-37-015****LUMP SUM**

The work to be performed under this Item shall include all pumping, and cofferdams, and other measures necessary for sufficient water control to accomplish demolition and construction of the proposed substructure in the dry. Furthermore, all water control or dewatering operations shall be in compliance with the approved environmental permits included in these bid documents.

Cofferdam type and location shall be determined by the Contractor or as directed by the Engineer. **The cofferdams shall only be installed and removed during the period from April 16 thru October 31, in accordance with permits obtained for this project.** All work areas shall be within the existing right of way and acquired easements. Dewatering shall be conducted to ensure that all concrete is placed and satisfactorily cured in the dry.

It is the responsibility of the Contractor to determine the need and extent of dewatering required based on his/her proposed construction methods. Furthermore, the Contractor shall submit methods and materials he proposes to use for the Engineer's approval.

CONSTRUCTION METHODS

Plans and calculations (if applicable) for all cofferdams, and other water control measures shall be developed by the Contractor for this Item. These plans and calculations shall be prepared and stamped by a Professional Engineer registered in the Commonwealth of Massachusetts and shall be submitted for the approval of the Engineer prior to the start of construction.

The Contractor shall use such equipment and shall perform his operations in such a manner that disturbances of the soil in the foundation area will be prevented. He shall keep the area being excavated dry by such means that water will be prevented from entering from the adjacent soils and adversely affecting the stability of the adjacent existing structures or its supporting soils.

All dewatering and related earthwork shall be conducted in such a manner as to prevent siltation or contamination of the waterway. The pumping discharge shall not be allowed to enter directly into the waterway. The water from the work areas shall be pumped to a dewatering basin. This basin shall be constructed so as to allow for the pumped water to pass through the basin with sediments settling out before outletting. At a minimum, the basin shall be constructed of an earthen berm lined with geotextile fabric and surrounded by staked straw bales. The basin shall meet or exceed the following criteria:

- A. The size and location of the basin shall be determined based on the size of the Contractors pump and the anticipated flows for the construction of the substructures in the dry.
- B. The outlet/weir of the dewatering basin 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 of the basin.

The Contractor shall maintain the dewatering operations in working condition, including periodic removal of accumulated sediment within the basin, to the satisfaction of the Engineer. The water pump and hoses for dewatering shall be in good working condition and of adequate power and size for the operation

ITEM 991.1 (continued)

The Contractor shall inspect straw bales that surround the outlet daily and shall immediately replace any that are damaged.

Placement of the basin will be as directed by the Engineer due to specific site conditions and staging operations of the Contractor.

Pumping shall be conducted in a manner, which will not adversely affect the freshly placed concrete within the excavation. The cofferdam may be flooded provided the concrete has reached initial set and the flooding of the cofferdam does not produce a water velocity that damages the work.

The cofferdam shall be cut to the elevation of the top of proposed pier footing following the completion of the proposed pier. The portion of the cofferdam below that elevation shall remain in-place and the portion above that elevation shall become the property of the Contractor and be properly disposed of away from the job site.

BASIS OF PAYMENT

Item 991.1 will be paid for at the Contract unit price per Lump Sum, which price shall include all labor, materials, equipment, submitalls, cofferdams installation and removal, removal and disposal of the sediment material collected from the dewatering system, and all incidental costs required to complete the work.

ITEM 993.1**TEMPORARY BRIDGE NO. W-37-015T****LUMP SUM**

Work under this Item shall conform to the general provisions of Subsection 995 of the Standard Specifications and to the specific requirements stipulated for component parts of the items. Where no specific requirement is directed for a component part of an item, the Standard Specification shall apply, except for payment. Payment for components shall be included under the Lump Sum price for this Item 993.1.

The primary use of the Temporary Pedestrian Bridge shall be for pedestrians. This bridge is not intended for trucks or motor vehicles for any purpose including snow removal operations. Lighter motor operated snow removal equipment such as tractor type equipment with plows and gross weight less than a ton is acceptable for snow removal.

The work under this Item shall consist of constructing the Temporary Pedestrian Bridge adjacent to Bridge No. W-37-015 to the lines and grades shown on the plans, and in accordance with guidelines of the manufacturer's requirements and recommendations. The work includes concrete and steel reinforcement for the abutments, fencing, and the acquisition, assembly and erection of the temporary panel bridge and associated hardware. Dimensions for temporary abutments presented in the plans are only conceptual and shall be modified to accommodate the temporary panelized bridge with approval from the Designer.

Also, work under this Item shall include the following: Completely dismantling the panelized temporary superstructure, transporting the temporary superstructure off site, demolition and total removal of the concrete substructure and all related excavations and restoring the area to its original condition or proposed end state condition after completion of the permanent structure. Side slopes shall be protected from erosion until such time as the riprap is placed or final proposed grades are provided.

Work beyond the temporary bridge shall be paid for under Highway Item 101.01 Clearing and Grubbing, Item 120. Earth Excavation, Item 151. Gravel Borrow, Item 170. Fine Grading and Compacting – Subgrade Area, Item 702 Hot Mix Asphalt Sidewalk or Driveway, Item 751. Loam Borrow, and Item 765. Seeding.

4000 PSI, 1-1/2", 565 Cement Concrete

The work to be done hereunder shall include construction of the temporary reinforced concrete abutments for the bridge and shall conform to the relevant provisions of the Standard Specifications, Subsection 901, and the following:

All materials complete in place and all other work considered incidental to the work involved in furnishing and placing the concrete, including work not covered in the schedule of basis for partial payments or for which payments are not provided elsewhere in the Contract, shall be considered as included in the unit price per cubic yard of concrete, as stated by the Contractor and approved by the Engineer, in the respective "Basis for Partial Payments".

All concrete shall be placed in the dry. Bearing seat elevations shown on the abutments including base plate configuration and installation shall be verified by the Contractor prior to forming concrete.

ITEM 993.1 (Continued)**Chain Link Fence**

Chain Link Fence shall be placed along the bridge to the height shown on the plans. The purpose of the fence is to completely secure the pedestrian path and eliminate pedestrian access to the river. The work to be done under this header shall conform to the applicable provisions of Subsection 644 of the Standard Specifications. The fence shall incorporate a pedestrian hand rail on both sides of the bridge. Contractor shall be responsible for the design of the connection of the fence to the panel bridge. The panel bridge manufacturer shall approve the design. All design work shall be submitted to the Engineer for approval prior to commencing any work.

Bridge Hand Rail

Pedestrian hand rail shall be placed on both sides of the bridge inside of the chain link fence. The rail shall comply with Subsection 660 and the ADA requirements. Contractor shall be responsible for the design of the connection of the rail to the panel bridge. The panel bridge manufacturer shall approve the rail connection design. All design work shall be submitted to the Engineer for approval prior to commencing any work.

Timber Decking

The plywood decking and framing shall be treated and comply with Subsection 955 Treated Timber. Plywood decking shall have an antiskid exposed surface.

Lease, Assemble And Erection of Temporary Panelized Bridge

Work under this heading shall consist of the Lease of required parts from the supplier and the assembly and erection of the new panelized bridge components and accessories, including expansion bearing assemblies as shown on the plans or approved equal.

The pre-engineered panelized temporary bridge system shall be as manufactured by the following or approved equal:

Acrow Corporation of America, 181 New Road, Parsippany, NJ 07054
Telephone: (201) 933-0450, www.acrowusa.com

Bailey Bridges, Inc., 119 40th Street N.E., Fort Payne, Alabama 35967
Telephone: (800) 477-7320, www.baileybridge.com

CONTECH Bridge Solutions Inc., 8301 State Highway 29 North, Alexandria, MN 56038
Telephone: (800) 328-2047, www.conteches.com

MABEY Bridge & Shore, Inc. 6770 Dorsey Rd, Elkridge, MD 21075
Telephone: (410) 379-2800, www.mabey.com

ITEM 993.1 (Continued)

All components of the Temporary Panelized Bridge shall be galvanized in accordance with ASTM 123. Each component of the Temporary Panelized Bridge (except pins, threaded components, and other fastener parts) shall individually bear a marking that includes the part identification number, name of manufacturer and model number of the panelized bridge. The markings are intended as a method for the Department to easily and readily identify all components of the panelized bridge.

Technical Advisor

The Contractor shall hire a technical representative to advise and assist the Contractor during the transport, assembly, erection, and dismantling phases of the temporary panel bridge.

The Contractor shall be completely responsible for the expense of the services of the required technical advisor and the bid Contract price shall include full compensation for all costs in connection therewith. The services of the technical representative are in addition to the Contractor's staff.

The technical advisor shall be present during the erection and dismantling of the temporary panel bridge.

Inspection and Maintenance

The Contractor shall be responsible for the inspection and maintenance of the bridge for the duration of the project use ensuring its safe serviceability.

Submittals

The structural plans and details are presented for illustrative purposes only to indicate the concept and to define the bridge geometry. Other temporary bridges are acceptable and alternate designs, including modifications to substructure details, shall be submitted to the Design Engineer for approval.

Prior to commencing the erection, the Contractor shall prepare and submit to the Engineer for review a complete set of design calculations, complete assembly and erection plans, elevations, proposed profile of temporary pedestrian access, details, part lists, erection sequence and installation procedures. All submittals shall be stamped by a Professional Structural Engineer registered in the Commonwealth of Massachusetts. Erection may not commence until assembly and erection plans have been approved by the Engineer.

The bridge shall be designed for a live load of 90 psf and comply with the latest AASHTO Guide Specifications For Design of Pedestrian Bridges and the 2017 AASHTO LRFD Bridge Design Specifications.

Launching the bridge using conventional methods may not be possible due to site conditions. The Contractor should visit the site prior to submitting his bid and include in his bid his proposed method of installing the bridge that is acceptable with the supplier. The Contractor shall submit his/her proposed erection procedures and methods to be used including crane capacity and location, equipment, tools, devices etc. to the Engineer for approval.

ITEM 993.1 (Continued)

The requirements for equipment and all procedures utilized shall be in conformance with the intent of Subsection 960.61D, Steel Erection of the Standard Specifications for Highways and Bridges. Erection 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 erection process. Work under this item may not commence until Engineer has given written approval.

Any material that accidentally falls into the river shall be removed immediately at the Contractor's expense. The Contractor shall ensure the stability of the structure during placement operations.

Dismantling And Removal of The Superstructure

The work to be done under this heading shall conform to the relevant provisions of Subsection 112 of the Standard Specifications, and the following:

The Contractor may remove the temporary bridge when approved by the Engineer.

It is expected that the Contractor shall proceed in accordance with the recommendations of the manufacturer's representative. All components of the temporary bridge shall be completely disassembled and removed off site.

Submittals

Before any dismantling work of the temporary bridge is started, the Contractor shall provide the Engineer, with a written description of the procedures and methods to be used, including a time schedule. The procedure shall be submitted as stamped by a Professional Structural Engineer registered in the Commonwealth of Massachusetts. The Engineer will either approve, give appropriate recommendations, or may disapprove entirely these procedures. Only with the Engineer's written approval will the Contractor be permitted to proceed with the dismantling process.

Removal of Panelized Bridge Components

All parts shall become the property of the Contractor, and shall be removed off site to the satisfaction of the Engineer.

Payment for this work will not be made until the bridge site is restored to its original condition.

Removal of Substructure

The work under this heading includes the removal and satisfactory disposal of the concrete abutments. If piles are installed, they may be pulled or shall be left in place and cut to a minimum of 5'-0" below final ground elevation. Care shall be taken when excavating around the abutments such that damage to utilities located near the abutments does not occur. Any damage to the utilities shall be repaired at the Contractor's expense.

ITEM 993.1 (Continued)

All material shall become the property of the Contractor and shall be disposed of away from the work site. No payment will be made for materials removed beyond that which is directed by the Engineer.

The Temporary Bridge site shall be restored to its original or proposed end state condition.

BASIS OF PAYMENT

Item 993.1 will be paid for at the Contract unit price per Lump Sum, which price shall include all labor, materials, equipment, installation and removal of temporary bridge, including all substructure components, restoring the site to its original condition, and all incidental costs required to complete the work.

SCHEDULE OF BASIS FOR PARTIAL PAYMENTS

Within ten (10) days after the Notice to Proceed, the Contractor shall submit, in duplicate, for the approval of the Engineer, a schedule of quantities and unit prices for the major components of the temporary bridge structure as listed below. The temporary bridge structure Lump Sum quantities provided below 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 993.1 and no further compensation will be allowed. All excavation and backfill will be paid for separately.

TEMPORARY BRIDGE NO. W-37-015T

Sub-UNIT Item	Description	QTY	UNIT	PRICE	UNIT TOTAL
644.060	60 INCH CHAIN LINK FENCE (STW) (LINE POST OPTION)	340	FT		
901.	4000 PSI, 1.5 INCH, 565 CEMENT CONCRETE	20	CY		
910	STEEL REINFORCEMENT FOR STRUCTURES	2600	LB		
955.	TREATED TIMBER	1	LS		
993.01	LEASE, ASSEMBLY, ERECTION, AND REMOVAL OF TEMPORARY BRIDGE	1	LS		
TOTAL LUMP SUM FOR ITEM 993.1 =					

The above schedule applies only to the Temporary Bridge No. W-37-015T. Payment for similar materials and construction at locations other than this Temporary Bridge shall not be included under this Item. Sub-Item numbering is presented for information only in coordination with the MassDOT Standard Nomenclature.

ITEM 994.01**TEMPORARY PROTECTIVE SHIELDING**
BRIDGE NO. W-37-015 (0AL)**LUMP SUM****GENERAL**

Work done under this Item consists of designing, furnishing, installing, maintaining, and removing of a temporary protective shielding system on, adjacent to and under the bridge. The work shall include removing and disposing of the protective shield after work is completed.

This Item covers the shielding required for the proposed demolition of portions or all of the existing superstructure as applicable. The proposed shielding system shall prevent debris from falling into the water during the demolition process.

Work platforms, containment systems and debris shields for construction activities other than superstructure demolition are not included under this Temporary Protective Shielding item and shall be considered incidental to the work unless specifically stated otherwise within the contract documents.

The Contractor shall submit calculations and detailed drawings of the proposed shielding to the Engineer for approval. These calculations and drawings shall be stamped by a Professional Engineer registered in the Commonwealth of Massachusetts. Acceptance of the shielding design by the Engineer is required prior to installation of the shielding system.

MATERIALS

All materials used to construct the temporary protective shielding shall be new.

All materials used in the shielding system shall become the property of the Contractor and shall be removed from the site at the completion of the Project.

DESIGN

The shielding shall conform to the following:

1. The intent is for the Contractor to shield all existing spans of the existing bridge prior to any demolition.
2. The protective shield may be constructed of tongue and groove or ship lap timbers with 6 mil polyethylene overlaid to seal the shielding or the Contractor may propose an alternate shielding system approved by the Engineer and accepted by the Department.
3. Shielding shall have all spaces along the perimeter and at the seams sealed to prevent dust and debris from escaping and falling below the bridge. The protective shield shall be sufficiently tight to prevent leakage of slurry from cutting tools, dust, chips or other small debris to the surface below.
4. Shielding used at or adjacent to demolition and shall be designed to safely withstand all loads that it will be subjected to, including all construction and dead loads, but not less than 100 pounds per square foot; to be stiff enough to limit deflection to 1/2 inch under maximum loads; and to be sealed tightly at all joints. The allowable design stresses shall be in accordance with AASHTO Standard Specifications for Highway Bridges.

ITEM 994.01 (Continued)

- The Contractor shall be responsible for developing the loads to which the shielding is anticipated to be subject to based on the Contractor's means and methods of construction.
5. The shielding shall be positively attached to the existing and/or proposed bridge such that it cannot be dislodged or shifted during construction. The attachment methods shall be designed for all intended and errant loads anticipated by the Contractor based on the Contractor's means and methods of construction, and shall be included in the design submittal.
 6. The Design of the shielding shall also include a complete description of the equipment and construction methods proposed for the superstructure demolition, including deck removal and the maximum size of debris anticipated during excavation of the deck area (i.e. 1 ft. x 1 ft. hammered sections or 2 ft. x 4 ft. wet sawcut sections). Shielding beneath areas to be excavated or beneath the path used to remove demolition debris shall be designed to withstand the maximum size of debris that could fall during excavation or removal.
 7. Shielding shall be installed or removed only upon approval of the Engineer.

The Contractor may utilize the bottom flanges of the existing steel beams and of the proposed steel beams as supports for the temporary protective shielding where feasible. However, the Contractor will not be permitted to weld onto, drill into, or cut any existing or proposed structural members without receiving approval of the Engineer.

For any proposed shielding systems that include installation of brackets along the lengths of the substructure units, the Contractor may drill and anchor into the existing substructure units as approved by the Engineer. However, the Contractor will not be permitted to drill into any proposed concrete. Inserts for anchors into proposed concrete must be installed prior to concrete placement. Once the anchors are removed, all inserts must be filled in accordance with the contract documents.

SUBMITTALS

A minimum of thirty (30) days prior to the start of any demolition and/or installation of protective shielding, the Contractor shall submit for review and approval a detailed temporary protective shield plan which shall include, a description of demolition and erection equipment, methods of operation, locations and sequence of sections to be removed, as well as data relative to the protective shield. The plan shall also indicate the type, size and dimensions of the materials to be used for the protective shield and the proposed methods for installation of the protective shield including connections, fasteners, erection procedures and maintenance in accordance with the information provided in this specification.

CONSTRUCTION METHODS

Special care shall be taken to avoid damage to any existing bridge components schedule to remain. Any damage due to the Contractor's operations shall be repaired or replaced to the satisfaction of the Engineer at no additional cost to the Department.

ITEM 994.01 (Continued)

The Contractor shall note that utilities are located on some of the bridge structure. The Contractor shall determine the exact location of the utilities and their impact upon the Contractor's work. Plans showing the approximate location of the utilities are included in contract documents. The use of shielding to protect these utilities shall be incidental to this Item. Any costs incurred to the existing utilities which are caused by the Contractor's operations or negligence, shall be the responsibility of the Contractor, and shall be repaired or replaced at no additional costs to the Department.

The Contractor shall periodically remove all accumulations of concrete and/or debris on the protective shielding so as not to exceed the design loads in the assumptions used for the design of the temporary protective shielding, or as required by the Department.

BASIS OF PAYMENT

Temporary Protective Shielding Bridge No. W-37-015 (0AL) will be paid for at the contract lump sum price; which shall include full compensation for the Contractor's design and plans as approved submittals; for all material, labor, equipment and incidentals necessary to furnish, install, remove, and reinstall the temporary shielding if applicable, and all other work necessary for the proper completion of the work specified.

ITEM 995.01 BRIDGE STRUCTURE, BRIDGE NO. W-37-015 (C4R) 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 component parts of the subject Item. For those component parts where no specific requirement is stipulated, the Standard Specifications shall apply, except for payment.

Work shall include all materials, equipment and labor needed to construct the following:

- Prestressed concrete NEXT F beams
- Concrete abutment/wingwall pile caps and diaphragms
- Concrete pier
- Concrete bridge deck slab
- Concrete approach slabs
- Concrete sidewalks with S3-TL4 bridge rails
- Concrete existing abutment caps
- Precast highway guardrail transitions

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.

Structural steel includes utility support angles for all proposed utilities, except electrical conduits. National Grid will be responsible for all work and hardware associated with installing the electrical conduits except installation of utility sleeves and supplying beam inserts, which will be considered as incidental work to be completed by the Contractor. The cost for all other utility hangers and connections shall be considered incidental to Sub-Item 960. Installation of telecommunication conduits provided for the Contractor by Verizon shall be considered incidental to Item 995.01.

The following Special Provisions shall apply to Sub-Items included under Item 995.01:

The work to be done under the following Sub-Items shall conform to the relevant provisions of Subsection 901 of the Standard Specifications:

4000 psi, 1½ IN., 565 CEMENT CONCRETE

This material shall be used for the cast-in-place integral abutment/wingwall pile caps, pier footing, approach slabs, and existing abutment caps.

4000 PSI, ¾ IN., 610 CEMENT CONCRETE

This material shall be used for the cast-in-place beam pedestals at integral abutments and the conduit concrete encasements behind abutments.

5000 PSI, ¾ IN., 685 HP CEMENT CONCRETE

This material shall be used for the cast-in-place sidewalks located on the bridge deck, wingwall copings, and precast highway guardrail transitions.

4000 PSI, ¾ IN., 585 HP CEMENT CONCRETE

This material shall be used for the cast-in-place deck slab, integral abutment/wingwall diaphragms, pier stem, and pier diaphragm.

ITEM 995.01 (Continued)**PRECAST HIGHWAY GUARDRAIL TRANSITIONS****A. General.**

The work under this Heading consists of fabricating, transporting and installing the 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:

- (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.

ITEM 995.01 (Continued)**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
- (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 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:

ITEM 995.01 (Continued)

- (a) Prior to placement of concrete to verify that $T_i \geq 50^\circ\text{F}$.
- (b) Immediately after placement to verify that $T_i \geq 50^\circ\text{F}$ is maintained.
- (c) 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.

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.

ITEM 995.01 (Continued)**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	$5\% \leq \% \leq 8\%$				
Temperature (°F)	AASHTO T 309	Per AASHTO	$50^{\circ}\text{F} \leq ^{\circ}\text{F} \leq 90^{\circ}\text{F}$				
Compressive Strength (psi)	AASHTO T 22	Stripping Cylinders: One (1) set of Three (3) 4 x 8 in.	$\geq 80\% f'_c$ 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.	$\geq 100\% f'_c$ at 28 days				
		56-day Cylinders: One (1) set of Three (3) 4 x 8 in.	$\geq 100\% f'_c$ 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.

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.

ITEM 995.01 (Continued)**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 subplot 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.

1. Inspection.

A MassDOT 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 activities 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).

ITEM 995.01 (Continued)

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.

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).

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.

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
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.

ITEM 995.01 (Continued)

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.

Failure to perform all 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	$5\% \leq AC \leq 8\%$	Quality Control
Temperature (°F)	AASHTO T 309	Per AASHTO	$50^{\circ}\text{F} \leq ^{\circ}\text{F} \leq 90^{\circ}\text{F}$	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 $\geq 21 \text{ k}\Omega\text{-cm}$ at 28 days	MassDOT
Freeze/Thaw Durability ^(c)	AASHTO T 161 (Procedure A)	Per AASHTO	Relative Dynamic Modulus of Elasticity after 300 cycles $\geq 80\%$	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.

ITEM 995.01 (Continued)

- (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. 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.

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:

ITEM 995.01 (Continued)

- (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 (7th 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.)
- (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

ITEM 995.01 (Continued)**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.

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.

ITEM 995.01 (Continued)

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.

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 sandpaper. 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 sandpaper.

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.

ITEM 995.01 (Continued)**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.

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

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.

ITEM 995.01 (Continued)**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.

(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.

ITEM 995.01 (Continued)

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*).

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.

ITEM 995.01 (Continued)

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 ft²/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.

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:

- 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

ITEM 995.01 (Continued)**(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*).

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 1/4-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:

- (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

ITEM 995.01 (Continued)

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.
- (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.

ITEM 995.01 (Continued)**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.

Prior to installation, the following documentation shall be reviewed and confirmed by 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 subplot.
- (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 Resident Engineer has accepted all Precast Concrete Bridge Elements prior to installation.

B. Erection Procedure.

Prior to the erection, the Contractor shall submit an Erection Procedure 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 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 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.

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.

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.

E. Erection.

The elements shall be placed in the sequence and according to the methods outlined in the Erection Procedure. 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)**MECHANICAL REINFORCING BAR SPLICER**

The work under this heading shall conform to the applicable provisions of Subsection 901, and the following:

Mechanical Reinforcing Bar Splicers shall be used where indicated on the Contract Plans and generally is required where lap splicing is not practical or possible.

Mechanical Reinforcing Bar Splicers shall conform to the material requirements contained in Subsection M8.01.9 of the Standard Specifications. The mechanical reinforcing bar splicers shall be epoxy coated.

ITEM 995.01 (Continued)**PRESTRESSED CONCRETE NEXT 32F BEAMS****A. General.**

The work under this Heading consists of fabricating, transporting and installing Prestressed Concrete NEXT 32F Beams, 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.

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.

ITEM 995.01 (Continued)**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.

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:

ITEM 995.01 (Continued)

- (a) Prior to placement of concrete to verify that $T_i \geq 50^\circ\text{F}$.
- (b) Immediately after placement to verify that $T_i \geq 50^\circ\text{F}$ is maintained.
- (c) 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.

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.

ITEM 995.01 (Continued)**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	$5\% \leq \% \leq 8\%$				
Temperature (°F)	AASHTO T 309	Per AASHTO	$50^{\circ}\text{F} \leq ^{\circ}\text{F} \leq 90^{\circ}\text{F}$				
Compressive Strength (psi)	AASHTO T 22	Stripping Cylinders: One (1) set of Three (3) 4 x 8 in.	$\geq 80\% f'_c$ 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.	$\geq 100\% f'_c$ at 28 days				
		56-day Cylinders: One (1) set of Three (3) 4 x 8 in.	$\geq 100\% f'_c$ 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.

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.

ITEM 995.01 (Continued)**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 subplot 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 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 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 activities 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).

ITEM 995.01 (Continued)

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.

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.

ITEM 995.01 (Continued)

- (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
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.

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.

ITEM 995.01 (Continued)

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).

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	$50^{\circ}\text{F} \leq ^{\circ}\text{F} \leq 90^{\circ}\text{F}$	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 $\geq 21 \text{ k}\Omega\text{-cm}$ at 28 days	MassDOT
Freeze/Thaw Durability ^(c)	AASHTO T 161 (Procedure A)	Per AASHTO	Relative Dynamic Modulus of Elasticity after 300 cycles $\geq 80\%$	Quality Control

Notes:

- (a) Self-consolidating concrete (SCC) shall meet the requirements of M4.02.17.

ITEM 995.01 (Continued)

- (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.

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 steel and 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 precast concrete bridge decks 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:

- (a) Number and type of Prestressed Concrete Beams including overall length, width and height.
- (b) Skew angle.
- (c) 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.
- (d) Location, size and geometry of all steel reinforcement, and mechanical reinforcing bar splicers if called for on the plans.

ITEM 995.01 (Continued)

- (e) 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.
- (f) 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 (7th edition).
- (g) The minimum compressive strength required prior to release of prestressing and prior to handling the Prestressed Concrete Beam.

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:

- (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.)
- (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 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

ITEM 995.01 (Continued)**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.

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.

ITEM 995.01 (Continued)**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 rake finish with a ¼" amplitude applied transversely across 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.

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.

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.

ITEM 995.01 (Continued)**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 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.

ITEM 995.01 (Continued)

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
$50^{\circ}\text{F} \leq ^{\circ}\text{F} \leq 90^{\circ}\text{F}$	\geq Three (3) days	$\geq 80\% f'_c$

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.

(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.

ITEM 995.01 (Continued)**(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.

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.

ITEM 995.01 (Continued)

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 ft²/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.

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.

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
$120^{\circ}\text{F} \leq ^{\circ}\text{F} \leq 158^{\circ}\text{F}$	$6 \text{ hrs} \leq \text{Time} \leq 48 \text{ hrs}$	$\geq 80\% f_c$

(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. 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.

S. 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.

ITEM 995.01 (Continued)**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 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 1/4-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
- (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.

ITEM 995.01 (Continued)**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) 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 subplot 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.

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 Prestressed Concrete Beam's representative subplot.
- (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.

ITEM 995.01 (Continued)**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 MassDOT Resident Engineer or designee:

- (a) QC Compressive Strength Test Report Forms attaining Design Strength, f'_c for the Prestressed Concrete Beam's representative subplot.
- (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 Resident 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:

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 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.

ITEM 995.01 (Continued)

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.

Prestressed NEXT F Beams.**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, 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. Concrete Deck Slab Placement.

Prior to casting the deck, the abutments and piers shall be prepared for the placement of the deck concrete as called for on the plans and the Contractor shall cut the lifting devices off below the top of the beam.

The top of the beam shall be clean and free of all laitance. Deck concrete shall be placed against the beam concrete without the use of any bonding agents.

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.

ITEM 995.01 (Continued)**PLACEMENT, FINISHING AND CURING OF CAST IN PLACE CONCRETE DECKS**

The construction of the cast in place concrete deck shall be in accordance with Subsection 901.66 of the Supplemental Specifications and as modified by the following.

These procedures shall be followed only when the concrete bridge deck shall be cast entirely in the field. These procedures do not apply to any precast deck components, including precast full depth concrete deck panels and decks cast as part of a prefabricated bridge unit (PBU), or closure pours used to connect precast decks in the field.

Subsection 901.66 A

The entire existing Subsection 901.66 A shall be replaced by the following:

At least 30 calendar days prior to the proposed start of placing the concrete bridge deck, the Contractor shall submit to the Engineer for approval a Placement and Curing Plan that will specify all of the steps, methods, equipment and personnel that Contractor shall use to construct the concrete deck in compliance with these specifications. Approval of this plan will not relieve the Contractor of the responsibility for the satisfactory performance of his/her methods and equipment. The Placement and Curing Plan shall, at a minimum, specify:

1. The method that will be used to convey the concrete from the truck to all locations on the deck where it will be placed. This will also include the conveyance equipment, rate of concrete placement and the estimated time for the completion of all concrete placement, consolidation and finishing operations up to the start of curing.
2. The type and number of finishing machines and work bridges including the plan for erecting the rails and operating the finishing machine. This will include proof of the following minimum operator qualifications for the bridge deck finishing machine:
 - a) Five years experience operating machines or similar type and manufacturer as that proposed.
 - b) Proof of no less than five bridge decks of similar size, placed using a machine of the same manufacturer as that proposed.Or, as a substitute for a. and b.:
 - c) A representative of the manufacturer of the bridge deck finishing machine shall be present on the site a minimum of 24 hours in advance of the proposed deck placement to approve the setup of the machine and rail system, and the representative shall be present for the entire duration of the placement of the deck concrete using the bridge deck finishing machine.

ITEM 995.01 (Continued)

3. The sequence of concrete pours, including any retarders or other concrete admixtures and dosage rates required to complete the placement, consolidation and finishing operations prior to curing in accordance with the Contractor's intended sequence of operations.
4. The provisions for consolidating the concrete including the number of vibrators and number of personnel that will be dedicated exclusively for this operation.
5. The method for curing the concrete deck. This will include the number of personnel that will be exclusively dedicated for this operation, the means for pre-wetting the burlap, the location of the wet burlap at the work site, the means for conveying the wet burlap to the work bridges and the amount of wet burlap that will be required to completely cover the deck. It shall also include a letter certifying that the fogging equipment attached to the finishing machine produces atomized water droplets with an average droplet diameter of 0.003 inches (76 μ m) or less that are uniformly distributed at a rate of at least 0.10 gallons/square foot/hour (4 liters/square meter/hour)
6. Consideration of weather conditions that can be anticipated at the time of placement of the deck concrete. When cold weather can be reasonably expected either within 7 days before the anticipated concrete placement, or during the 14 day wet curing period, the Contractor shall include detailed procedures for the production, transportation, and placement of the concrete, including: provisions for enclosures to protect the placed concrete, including a plan of heating devices, types and locations around structure and the means for holding the enclosure securely in place; cold weather curing procedures; and the means for monitoring the temperature of concrete during cold weather.
7. Equipment that will be used to measure ambient air temperature, concrete temperature and relative humidity of the air at the construction site.
8. The number of all other personnel, in addition to the ones already identified in bullets 4 and 5, who will be engaged in the concrete placement operation and their assigned tasks. All personnel, including the ones already identified in bullets 4 and 5, shall have the experience and skills appropriate to their working assignment
9. A contingency and backup plan in case of equipment failure.

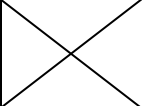
A pre-placement meeting shall be held between the Contractor and the Engineer at least 2 weeks prior to the start of any concrete placement for the deck slab. The Contractor and the Engineer shall review all aspects of the approved Placement and Curing Plan.

Twenty-four (24) hours before the scheduled start of concrete placement, the Engineer shall verify that all equipment and materials identified in the Placement and Curing Plan are onsite and have been tested to ensure that they are in working order and are functioning as required. Upon the successful completion of this verification, the Engineer shall allow the concrete placement to proceed. If any equipment or material such as burlap is missing or equipment is malfunctioning, the concrete placement operations shall be canceled and shall not be rescheduled until such time as the missing equipment or material is delivered to the site or the equipment has been repaired and is demonstrated to be in working order and functioning as required. The Contractor shall be responsible for any costs associated with the cancellation and rescheduling of the concrete placement operation that is due to missing equipment or material or malfunctioning equipment.

ITEM 995.01 (Continued)**Subsection 901.66 B**

The following shall be added to the requirements of the existing Subsection 901.66 B:

Cement concrete for bridge decks shall not be placed when the ambient air temperature exceeds 85°F (29°C) or is expected to exceed 85°F (29°C) during the placement of the deck. The Contractor shall measure the ambient air temperature, relative humidity of the air at the construction site and concrete temperature. Concrete temperature will be taken from the same sample used for slump and air content tests. These measurements will be taken prior to the commencement of concrete placement to determine the evaporation rate using Figure 1 and every hour thereafter until the end of the concrete placement, consolidation and finishing operation to check the evaporation rate in order to determine if it remains within the limits specified. To document the readings, the Bridge Deck Placement Environment form shown below shall be filled out by the Contractor and submitted to the Engineer.

Bridge Deck Placement Environment						
City/Town:				Date:		
Bridge Number:				Contract Number:		
Start Station:				End Station:		
	Time Measured	Air Temp.	Relative Humidity (%)	Concrete Temp.	Wind Velocity	Evaporation Rate
Prior to Casting						
Hourly						
After Casting						
Signature - Contractor's Authorized Representative:				Printed Name:		
Signature - MassDOT Resident Engineer:				Printed Name:		

ITEM 995.01 (Continued)

The existing Subsection 901.66 B 1 shall be replaced by the following:

1. Misting the surface of the concrete with pressurized equipment attached to the finishing machine until the curing cover is applied. The water mist shall be distributed at a rate of at least 0.10 gallons/square foot/hour (4 liters/square meter/hour). For example, on a deck that is 30 feet (9.1 meters) wide, the system must be able to apply at least 3.0 gallons of water per linear foot per hour (36.4 liters/meter-hour). The nozzles must produce an atomized fog mist that will maintain a sheen of moisture on the concrete surface without ponding. The atomized water droplets shall have an average droplet diameter of 0.003 inches (76 μ m) or less. The area of coverage from each nozzle shall overlap all adjacent coverage areas by at least 12 inches (305 millimeters). Water that drips from the nozzles shall not be allowed to fall onto the concrete that is being cured.

The following shall be added to the requirements of the existing Subsection 901.66 B:

4. Reschedule the placement until such time as the environmental conditions are acceptable, such as at night or during early morning hours.

Subsection 901.66 D

The entire existing Subsection 901.66 D shall be replaced by the following:

The concrete shall be consolidated by means of approved high frequency internal vibrators (9000 – 12,500 vibrations per minute in concrete) that shall be applied in a manner to ensure the consolidation of the concrete throughout the full depth of the deck in advance of the finishing machine. The Contractor shall take preventive measures to insure that the vibrators during operation shall not damage the epoxy coated reinforcement. The Contractor shall have no less than 2 approved vibrators in service at all times during the placement of the first 30 cubic yards (27 cubic meters) per hour of cement concrete placed and shall have additional vibrators in service at all times at the rate of one vibrator per each additional 30 cubic yards (27 cubic meters) per hour of cement concrete placed. These vibrators shall be in operation in addition to the surface vibratory action from the vibrating pan(s) of the finishing machine. Consolidation by the vibrators shall leave the concrete free from voids and insure a dense surface texture, but the vibration of the concrete shall not be continued so long as to cause segregation or bleeding. A small uniform quantity of concrete shall be maintained ahead of the screed on each pass. At no time shall the quantity of concrete carried ahead of the screed be so great as to cause slipping or lifting.

ITEM 995.01 (Continued)**ELASTOMERIC BRIDGE BEARING PAD****DESCRIPTION OF WORK**

The work to be performed under this item shall conform to the relevant provisions of Section M9.14.5 and the following:

SUBMITTALS

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

1. Prior to fabrication:
 - a. Written notification in accordance with M9.14.5
 - b. Shop drawings for approval in accordance with Section 5.02 of MassDOT's Supplemental Specifications to the Standard Specifications for Highways and Bridges.
 - i. Fabrication shall not begin until the Contractor receives written approval from the Department that the submitted shop drawings have been received.
2. Upon delivery of the bearing pads:
 - a. A Certificate of Compliance certifying that the elastomeric bearing pads meet the requirements of the contract specifications.
 - i. A Mill certificate and certificate of compliance for the steel laminates shall accompany the bearing pads.
 - b. Independent testing results as required below.
 - c. Additional elastomeric bearing pads for MassDOT Acceptance testing as required below.

MATERIALS

Elastomer: The elastomeric compound shall be composed of 100% low temperature Grade 3 virgin crystallization resistant polychloroprene (neoprene).

Steel Laminates: The steel laminates shall meet the requirements of AASHTO M 251.

Internal Load Plates: The internal load plates shall conform to AASHTO M 270 Grade 36.

FABRICATORS

The National Transportation Product Evaluation Program (NTPEP) shall find the bearing pad fabrication plant to be in compliance with the Elastomeric Bridge Bearing Pad Technical Committee Work Plan. Approved fabricators are listed on the MassDOT QCML.

FABRICATION

Bearing pads shall be fabricated in conformance with the "Method B" design method outlined in the AASHTO LRFD Bridge Design Specifications.

ITEM 995.01 (Continued)

The bearing dimensions, including elastomer thickness and edge cover, number and thickness of steel reinforcing laminates, dimensions of load plates (if any), and the design shear modulus of the elastomer shall be as shown on the Plans.

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.

SAMPLING

Sampling of bearing pads for testing shall be random and performed on a lot basis. Lots shall be divided into sublots of 10 bearings. Acceptance samples shall be independently tested as outlined below. For Verification samples taken by the Engineer at the project, the sampling rate shall be one randomly selected full size bearing per lot in accordance with Subsection M9.14.5. A lot shall be defined as the smallest number of bearings determined by the following criteria:

1. A lot shall not exceed a single contract quantity.
2. A lot shall consist of bearings of the same size and configuration.
3. A lot shall consist of bearings produced in a continuous manner from the same batch of elastomer and cured under the same conditions.

All pads required for testing purposes in accordance with Subsection M9.14.5 of the Standard Specifications shall be considered as incidental to this item. The quantities listed in the Schedule of Basis for Partial Payment only include the number of bearings required for construction and do not include the additional bearings required for conformance and destructive testing as outlined herein.

INDEPENDENT TESTING

Independent testing shall be performed by a nationally recognized testing laboratory approved by the Engineer which shall provide certified test results. Each Lot of bearings as defined above shall be randomly sampled and tested at the frequency specified under Section 8.5 of AASHTO M 251. The minimum testing shall be in conformance with Sections 8 and 9 of M 251 as specified below:

1. Materials shall meet Section 4 of M 251.
2. Dimensions per Section 8.4 of M 251.
3. Elastomer per Section 8.6 of M 251.
4. Compressive Strain at maximum dead and live load (service) per Section 8.8.1 of M 251.
 - a. The compressive deflection of each bearing shall not exceed 10% of the design effective rubber thickness at a compressive load equal to the maximum design load.
5. Short Duration Compression Test per Section 8.8.2 of M 251.
6. Shear Modulus of the Elastomer per Section 8.9.1 of M 251.
 - a. The shear modulus shall be between 0.136 and 0.184 ksi.
7. Tensile Strength, Ultimate Elongation per ASTM D412.

ITEM 995.01 (Continued)

8. Shear Bond Strength per ASTM D429.
9. Heat Resistance per ASTM D573.
10. Compression Set per ASTM D395.
11. Low Temperature Brittleness per ASTM D746 for Elastomer Grades 3.

PACKAGING, HANDLING, AND STORAGE

The bearing pads shall be packaged, handled and stored in accordance with Section 18.1.3 of the AASHTO LRFD Bridge Construction Specifications. On the top of each completed bearing it shall be clearly identified and marked in accordance with M 251 Section 7. In addition, 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.

INSTALLATION

The bearing pads and bridge seat bearing areas shall conform to Section 901.65A(3).

ACCEPTANCE

Requirements for providing notification to the Department prior to the start of bearing pad production as well as the provisions for random sampling of the bearings by the Department at the job site for additional destructive testing shall be in accordance with M9.14.5 and this specification. The Department shall use the results of the Independent testing as well as their own testing in the Acceptance of the bearing pads.

BASIS OF PAYMENT

Item 995.01 will be paid for at the Contract unit price per Lump Sum, which price shall include all labor, materials, equipment, installation and removal of temporary bridge, including all substructure components, restoring the site to its original condition, and all incidental costs required to complete the work.

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. W-37-015 (C4R). 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 of 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.

ITEM 995.01 (Continued)

The schedule on the proposal form applies only to Bridge Structure No. W-37-015 (C4R). Payment for similar materials and construction at locations other than at this bridge structure shall not be included under this Item. Sub-Item numbering is presented for information only in coordination with MassDOT Standard Nomenclature.

BRIDGE STRUCTURE NO. W-37-015 (C4R)

Sub. Item	Description	QTY	UNIT	PRICE	UNIT TOTAL
901.	4000 PSI, 1½ IN., 565 CEMENT CONCRETE	360	CY		
904.	4000 PSI, ¾ IN., 610 CEMENT CONCRETE	4	CY		
904.3	5000 PSI, ¾ IN., 685 HP CEMENT CONCRETE	65	CY		
904.31	PRECAST HIGHWAY GUARDRAIL TRANSITIONS	3	EA		
904.4	4000 PSI, ¾ IN., 585 HP CEMENT CONCRETE	450	CY		
910.	STEEL REINFORCEMENT FOR STRUCTURES	7,900	LB		
910.1	STEEL REINFORCEMENT FOR STRUCTURES – EPOXY COATED	121,000	LB		
910.4	MECHANICAL REINFORCING BAR SPLICER	1,200	EA		
930.6	PRESTRESSED CONCRETE NEXT 32F BEAMS	880	FT		
933.	ELASTOMERIC BRIDGE BEARING PAD	28	EA		
960.	STRUCTURAL STEEL	2,800	LB		
965.	MEMBRANE WATERPROOFING FOR BRIDGE DECKS	5,800	SF		
970.	BITUMINOUS DAMP-PROOFING	390	SY		
971.	ASPHALTIC BRIDGE JOINT SYSTEM	90	FT		
975.1	METAL BRIDGE RAILING (3 RAIL), STEEL(TYPE S3-TL4)	300	FT		
TOTAL LUMP SUM FOR ITEM 995.01 =					

END OF DOCUMENT

****THIS PAGE LEFT INTENTIONALLY BLANK****

DOCUMENT A00802

DETAIL SHEETS

THIS PAGE INTENTIONALLY LEFT BLANK

THE COMMONWEALTH OF MASSACHUSETTS
MassDOT HIGHWAY DIVISION
10 PARK PLAZA – BOSTON, MA

-- PRELIMINARY ESTIMATE OF QUANTITIES -- DETAIL SHEET --

CITY/TOWN	Williamstown	ROAD:	Route 2/Main Street over Green River
:			
STA:	<u>87+83.00 to 95+15.00</u>	YEAR:	<u>2020</u>
		CLASS:	<u>Urban Principal Arterial, Non-NHS Route</u>
PROJECT:	<u>Bridge Replacement</u>	DATE:	<u>December 19, 2020</u>

Earth Excavation:	470 CY	Gravel Borrow:	360 CY
Class A Trench Excavation:	65 CY	Gravel Borrow for Bridge Foundation:	500 CY
Class B Rock Excavation:	55 CY	Crushed Stone:	170 TON
Bridge Excavation:	1300 CY		

PROPOSED FULL DEPTH PAVEMENT – APPROACH SLAB **AREA = 207 SY**

<u>Surface:</u>	1 ¾"	Superpave Surface Course 12.5 (SSC-12.5) Over Asphalt Emulsion for Tack Coat Over
<u>Intermediate:</u>	1 ¾"	Superpave Intermediate Course 12.5 (SIC-12.5) Over Asphalt Emulsion for Tack Coat Over
<u>Base:</u>	6"	Superpave Base Course 37.5 (SBC-37.5) Over
<u>Subbase:</u>	8"	Gravel Borrow – Type b (Compacted)

PROPOSED FULL DEPTH PAVEMENT – BOX WIDENING **AREA = 240 SY**

<u>Surface:</u>	1 ¾"	Superpave Surface Course 12.5 (SSC-12.5) Over Asphalt Emulsion for Tack Coat Over
<u>Intermediate:</u>	1 ¾"	Superpave Intermediate Course 12.5 (SIC-12.5) Over Asphalt Emulsion for Tack Coat Over
<u>Base:</u>	6"	Cement Concrete Base Course Over
<u>Subbase:</u>	8"	Gravel Borrow – Type b (Compacted)

PROPOSED TEMPORARY FULL DEPTH PAVEMENT **AREA = 232 SY**

<u>Surface:</u>	1 ¾"	Superpave Surface Course 12.5 (SSC-12.5) Over
<u>Intermediate:</u>	1 ¾"	Superpave Intermediate Course 12.5 (SIC-12.5) Over
<u>Base:</u>	8"	Gravel Borrow – Type b

ITEM 120. **EARTH EXCAVATION**

Full Depth: Sta. 87+83 thru Sta. 95+15
Temporary Sidewalk: Sta. 89+00 LT to Sta. 93+50 LT
Removal of Temporary Sidewalk: Sta. 89+00 LT to Sta. 93+50 LT
Temporary Box Widening: Sta. 88+75 to Sta. 93+85
Temporary WCR's: Sta. 86+74 LT to Sta. 86+93 LT
Temporary WCR's: Sta. 86+81 RT to Sta. 86+86 RT
Removal of Temporary WCR's: Sta. 86+74 LT to Sta. 86+93 LT
Removal of Temporary WCR's: Sta. 86+81 RT to Sta. 86+86 RT
And as shown on the Plans

ITEM 127.1 **REINFORCED CONCRETE EXCAVATION**

East and West Abutments, East and West Wingwalls, Pier Wall, and Pile Holes

ITEM 140. **BRIDGE EXCAVATION**

East and West Abutments, Wingwalls, and Borrow for Wingwalls and Pier

ITEM 140.1 **BRIDGE EXCAVATION WITHIN COFFERDAM**

For construction of the Pier

ITEM 141. **CLASS A TRENCH EXCAVATION**

To remove pipe at Sta. 92+15
For Abutment Pile Trenches

ITEM 141.1 **TEST PIT FOR EXPLORATION**

For locating utilities: Telephone/Communications, Water, Gas, Sewer, and Electric

ITEM 144. **CLASS B ROCK EXCAVATION**

Bridge excavation at Abutments and Pier

ITEM 146. **DRAINAGE STRUCTURE REMOVED**

Sta. 92+10 20.00' RT

Sta. 92+20 20.10' LT

ITEM 151. GRAVEL BORROW

Full Depth Pavement:	Temporary Sidewalk:
Sta. 90+55 to Sta. 90+70	Sta. 88+70 to Sta. 90+47 LT
Sta. 91+99 to Sta. 92+25	Sta. 92+20 to Sta. 93+75 LT
Box Widening:	Temporary Box Widening:
Sta. 87+83 to 90+55	Sta. 88+75 to Sta. 90+70 LT
Sta. 92+25 to 95+15	Sta. 91+99 to Sta. 93+85 LT
Perm. Sidewalk (Incl. Companion Seating):	Temporary Wheelchair Ramps:
Sta. 87+83 to Sta. 90+70 LT	Sta. 86+74 to 86+93 LT
Sta. 90+00 to Sta. 90+70 RT	Sta. 86+81 to 86+86 RT
Sta. 91+99 to Sta. 94+42 LT	
Sta. 91+99 to Sta. 92+50 RT	

ITEM 151.1 GRAVEL BORROW FOR BRIDGE FOUNDATION

East and West Abutments, East and West Wingwalls, East and West
Temporary Abutments

ITEM 152. PROCESSED GRAVEL

Driveway: Sta. 92+57 to Sta. 92+73 LT

ITEM 170. FINE GRADING AND COMPACTING – SUBGRADE AREA

Permanent Sidewalk:	Driveway:
Sta. 87+83 to Sta. 90+70 LT	Sta. 89+58 to Sta. 89+75 LT
Sta. 90+00 to Sta. 90+70 RT	Sta. 92+59 to Sta. 92+74 LT
Sta. 91+99 to Sta. 94+42 LT	Temporary Box Widening:
Sta. 91+99 to Sta. 92+50 RT	Sta. 88+75 to Sta. 90+70 LT
Full Depth Pavement:	Sta. 91+99 to Sta. 93+85 LT
Sta. 90+55 to Sta. 90+70	Temporary Sidewalk:
Sta. 91+99 to Sta. 92+25	Sta. 88+70 to Sta. 90+47 LT
Permanent Box Widening:	Sta. 92+20 to Sta. 93+75 LT
Sta. 87+83 to Sta. 90+55 LT	Temporary Wheelchair Ramps:
Sta. 90+00 to Sta. 90+55 RT	Sta. 86+74 to Sta. 86+93 LT
Sta. 92+25 to Sta. 95+15 LT	Sta. 86+81 to Sta. 86+86 LT
Sta. 92+25 to Sta. 92+50 RT	

ITEM 182.1 INSPECTION AND TESTING FOR ASBESTOS

For inspecting and testing existing utility pipes and conduits to be disturbed
during construction

ITEM 182.2 **REMOVAL OF ASBESTOS**

Sta. 90+33 to Sta. 92+44 RT

ITEM 184.1 **DISPOSAL OF TREATED WOOD PRODUCTS**

Sta. 92+06 to Sta. 92+52 LT

ITEM 201. **CATCH BASIN**

Sta. 92+17, 20.00' RT

Sta. 92+20, 25.03' LT

ITEM 202. **MANHOLE**

Sta. 92+11, 18.08' RT

ITEM 204. **GUTTER INLET**

Sta. 92+17, 20.00' RT

Sta. 92+20, 25.03' LT

ITEM 220.0 **DRAINAGE STRUCTURE ADJUSTED**

Sta. 92+17, 14.14' LT

Sta. 92+11, 18.08' LT

ITEM 220.2 **DRAINAGE STRUCTURE REBUILT**

Sta. 90+67, 37.96' LT

ITEM 221. **FRAME AND COVER**

Sta. 92+11, 18.08' RT

ITEM 222.1 **FRAME AND GRATE – MASSDOT CASCADE TYPE**

Sta. 92+17, 20.00' RT

Sta. 92+20, 25.03' LT

ITEM 223.2 **FRAME AND GRATE (OR COVER) REMOVED AND DISCARDED**

Sta. 92+10, 17.88' RT

Sta. 92+20, 18.09' LT

ITEM 227.3 **REMOVAL OF DRAINAGE STRUCTURE SEDIMENT**

Sta. 87+63.08, 7.54' LT

Sta. 88+9.64, 7.88' LT

Sta. 90+22.37, 7.60' LT

Sta. 90+33.79, 15.21' LT

Sta. 90+67.50, 38.12' LT

Sta. 92+2.00, 33.07' RT

Sta. 92+7.73, 14.14' LT

Sta. 92+10.68, 25.50' RT

Sta. 94+36.76, 1.85' RT

Sta. 94+44.77, 18.20' LT

Sta. 94+64.15, 24.90' RT

Sta. 95+55.57, 27.22' RT

ITEM 227.31 **REMOVAL OF DRAINAGE PIPE SEDIMENT**

Sta. 87+63.08 to Sta. 88+9.64 LT

Sta. 88+9.64 to 90+22.37 LT

Sta. 90+22.37 to Sta. 90+33.79 LT

Sta. 90+33.79 to Sta. 90+67.50 LT

Sta. 92+7.73 to Sta. 94+36.76 LT

Sta. 94+36.76 to Sta. 94+44.77 LT

Sta. 94+36.76 to Sta. 94+65.16 RT

Sta. 94+36.76 to Sta. 95+55.57 RT

ITEM 241.12 **12 INCH REINFORCED CONCRETE PIPE**

Sta. 92+17, 21' RT

Sta. 92+18, 16' LT

ITEM 241.18 **18 INCH REINFORCED CONCRETE PIPE**

Sta. 92+10.50, 21' RT

ITEM 241.24 **24 INCH REINFORCED CONCRETE PIPE**

Sta. 90+70, 37' LT

ITEM 250.031 **3 INCH POLYVINYL CHLORIDE DRAIN PIPE**

Sta. 92+15 LT

Sta. 92+18 LT

ITEM 250.061 **SEWER VENT PIPE RELOCATION**

See utility plans for locations along southwest wingwall.

ITEM 303.08 **8 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT)**

Sta. 90+48 to Sta. 92+38

ITEM 303.12 **12 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT)**

Sta. 90+52 to Sta. 92+04

ITEM 309. **DUCTILE IRON FITTINGS FOR WATER PIPE**

Sta. 90+48, 20' LT

Sta. 90+52, 23' RT

Sta. 90+50, 19' LT

Sta. 90+54, 21' RT

Sta. 92+35, 19' LT

Sta. 92+03, 23' RT

Sta. 92+38, 20' LT

Sta. 92+04, 21' RT

ITEM 310.001 **WATER SPIGOT REMOVED AND DISCARDED**

Sta. 92+37.20, 30.81' RT

ITEM 315.08 **8 INCH WATER MAIN REMOVED AND STACKED**

Sta. 90+48 to Sta. 92+38 LT

ITEM 315.12 **12 INCH WATER MAIN REMOVED AND STACKED**

Sta. 90+52 to Sta. 92+04 RT

ITEM 350.08 **8 INCH GATE AND BOX**

Sta. 90+50, 20' LT

Sta. 92+38, 22' LT

ITEM 350.12 **12 INCH GATE AND BOX**

Sta. 90+52, 23' RT

Sta. 92+06, 22' RT

ITEM 358. **GATE BOX ADJUSTED**Sta. 89+68.21, 33.13' LT
Sta. 89+75.00, 20.24' LTSta. 90+38.22, 22.63' LT
Sta. 93+52.17, 22.73' LT**ITEM 371.08** **8 INCH COUPLING**

Sta. 90+48, 20' LT

Sta. 92+38, 22' LT

ITEM 371.12 **12 INCH COUPLING**

Sta. 90+50, 23' RT

Sta. 92+04, 22' RT

ITEM 372.08 **8 INCH FLEXIBLE EXPANSION JOINT**

Sta. 90+80, 18.25' LT

Sta. 91+85, 18.25' LT

ITEM 372.012 **12 INCH FLEXIBLE EXPANSION JOINT**

Sta. 90+80, 23.50' RT

Sta. 91+85, 22.70' RT

ITEM 373.08 **8 INCH WATER PIPE INSULATION**

Sta. 90+74 to Sta. 91+95

ITEM 373.12 **12 INCH WATER PIPE INSULATION**

Sta. 90+74 to Sta. 91+95

ITEM 376.5 **HYDRANT - ADJUSTED**

Sta. 93+52, 26.91 LT

ITEM 415.3 **PAVEMENT MICRO MILLING**

Sta. 87+83 to Sta. 90+55

Sta. 92+25 to Sta. 95+15

ITEM 430. **CEMENT CONCRETE BASE COURSE**

Sta. 87+83 to Sta. 90+55 LT

ITEM 440. CALCIUM CHLORIDE FOR ROADWAY DUST CONTROL

Full Depth Pavement:	Temporary Box Widening:
Sta. 90+55 to Sta. 90+70	Sta. 88+75 to Sta. 90+70 LT
Sta. 91+99 to Sta. 92+25	Sta. 91+99 to Sta. 93+85 LT
Permanent Box Widening:	
Sta. 87+83 to Sta. 90+55 LT	
Sta. 92+25 to Sta. 95+15 LT	

ITEM 450.23 SUPERPAVE SURFACE COURSE – 12.5 (SSC-12.5)

Full Depth Pavement:	Mill and Overlay:
Sta. 90+55 to Sta. 90+70	Sta. 88+00 to Sta. 90+55
Sta. 91+99 to Sta. 92+25	Sta. 92+25 to Sta. 95+00
Permanent Box Widening:	Mill and Overlay at Limit:
Sta. 87+83 to Sta. 90+55 LT	Sta. 87+83 to Sta. 88+00
Sta. 92+25 to Sta. 95+15 LT	Sta. 95+00 to Sta. 95+15
Temporary Box Widening:	
Sta. 88+75 to Sta. 90+70 LT	
Sta. 91+99 to Sta. 93+85 LT	

ITEM 450.31 SUPERPAVE INTERMEDIATE COURSE – 12.5 (SIC – 12.5)

Full Depth Pavement:	Permanent Box Widening:
Sta. 90+55 to Sta. 90+70	Sta. 87+83 to Sta. 90+55 LT
Sta. 91+99 to Sta. 92+25	Sta. 92+25 to Sta. 95+15 LT
Mill and Overlay:	Temporary Box Widening:
Sta. 88+00 to Sta. 90+55	Sta. 88+75 to Sta. 90+70 LT
Sta. 92+25 to Sta. 95+00	Sta. 91+99 to Sta. 93+85 LT

ITEM 450.42 SUPERPAVE BASE COURSE – 37.5 (SBC – 37.5)

Sta. 90+55 to Sta. 90+70
Sta. 91+99 to Sta. 92+25

ITEM 450.61 SUPERPAVE BRIDGE SURFACE COURSE – 12.5 (SSC-B – 12.5)

Pavement between Bridge Joints

ITEM 450.71 SUPERPAVE BRIDGE PROTECTIVE COURSE – 12.5 (SPC-B – 12.5)

Pavement between Bridge Joints

ITEM 453. **HMA JOINT SEALANT**

Sta. 87+83 to Sta. 95+15 LT	Sta. 90+55
Sta. 87+83 to Sta. 95+15	Sta. 92+25
Sta. 87+83 to Sta. 95+15 RT	Sta. 92+25 to Sta. 95+15 LT
Sta. 87+83	Sta. 92+25 to Sta. 92+50 RT
Sta. 87+83 to Sta. 90+55 LT	Sta. 95+00
Sta. 88+00	Sta. 95+15
Sta. 90+00 to Sta. 90+55 RT	

ITEM 472. **TEMPORARY ASPHALT PATCHING**

For Drainage Structures:

Sta. 88+10 LT	Sta. 92+18 LT
Sta. 90+22 LT	Sta. 92+20 LT (x2)
Sta. 90+34 LT	Sta. 94+37 RT
Sta. 90+38 LT	Sta. 94+45 LT
Sta. 92+10 RT	Sta. 94+82 RT
Sta. 92+18 RT	Sta. 94+89 LT

For Longitudinal Dropoff:

Sta. 87+83	Sta. 92+55 to Sta. 92+82 RT
Sta. 88+10 to Sta. 88+35 LT	Sta. 92+60 to Sta. 92+75 LT
Sta. 88+34 to Sta. 88+95 RT	Sta. 93+67 to Sta. 93+93 RT
Sta. 89+42 to Sta. 89+96 RT	Sta. 94+08 to Sta. 94+42 LT
Sta. 89+54 to Sta. 89+77 LT	Sta. 95+15

ITEM 482.4 **SAWCUTTING PORTLAND CEMENT CONCRETE**

Sta. 87+83 LT	Temporary Wheelchair Ramp:
Sta. 90+00 RT	Sta. 86+74 LT
Sta. 92+50 RT	Sta. 86+93 LT
Sta. 94+36 LT	Sta. 86+74 RT

ITEM 482.5 **SAWCUTTING ASPHALT PAVEMENT FOR BOX WIDENING**

Permanent Box Widening:

Sta. 87+83 to Sta. 90+55 LT
Sta. 92+25 to Sta. 95+15 LT

Temporary Box Widening:

Sta. 88+75 to Sta. 90+70 LT
Sta. 91+99 to Sta. 93+85 LT

ITEM 505. **GRANITE CURB TYPE VA5 – STRAIGHT**

Sta. 86+74 to Sta. 86+93 LT	Sta. 91+99 to Sta. 92+14 RT
Sta. 86+70 to Sta. 86+95 RT	Sta. 92+20 to Sta. 92+44 RT
Sta. 87+83 to Sta. 88+02 LT	Sta. 92+23 to Sta. 92+52 LT
Sta. 88+43 to Sta. 89+47 LT	Sta. 92+85 to Sta. 94+05 LT
Sta. 89+85 to Sta. 90+70 LT	Temporary Wheelchair Ramp:
Sta. 90+00 to Sta. 90+70 RT	Sta. 86+70 to Sta. 86+81 RT
Sta. 91+99 to Sta. 92+17 LT	Sta. 86+86 to Sta. 86+95 RT

ITEM 509. **GRANITE TRANSITION CURB FOR WHEELCHAIR RAMPS – STRAIGHT**

Sta. 88+02 to Sta. 88+10 LT	Temporary Wheelchair Ramp:
Sta. 88+35 to Sta. 88+43 LT	Sta. 86+74 to Sta. 86+81 LT
Sta. 89+47 to Sta. 89+55 LT	Sta. 86+86 to Sta. 86+93 LT
Sta. 89+77 to Sta. 89+85 LT	Sta. 86+81 RT
Sta. 92+52 to Sta. 92+59 LT	Sta. 86+86 RT
Sta. 92+75 to Sta. 92+83 LT	
Sta. 94+04 to Sta. 94+11 LT	
Sta. 92+44 to Sta. 92+50 RT	

ITEM 514. **GRANITE CURB INLET – STRAIGHT**

Sta. 92+14 to Sta. 92+20, 20' RT
Sta. 92+17 to Sta. 92+23, 25' LT

ITEM 590. **CURB REMOVED AND STACKED**

Sta. 87+83 to Sta. 88+00 LT	Temporary Wheelchair Ramp:
Sta. 88+45 to Sta. 89+52 LT	Sta. 86+74 to Sta. 86+93 LT
Sta. 89+83 to Sta. 90+70 LT	Sta. 86+70 to Sta. 86+76 RT
Sta. 90+00 to Sta. 90+70 RT	Sta. 86+90 to Sta. 86+95 RT
Sta. 91+99 to Sta. 92+54 LT	Sta. 86+74 to Sta. 86+80 LT
Sta. 92+82 to Sta. 94+11 LT	Sta. 86+86 to Sta. 86+93 LT
Sta. 91+99 to Sta. 92+45 RT	Sta. 86+70 to Sta. 86+81 RT
	Sta. 86+86 to Sta. 86+95 RT

ITEM 620.12 **GUARDRAIL, TL-2 (SINGLE FACED)**

Sta. 90+00 to Sta. 90+25 RT

ITEM 627.82 **GUARDRAIL TANGENT END TREATMENT, TL-2**

Sta. 89+95 to Sta. 90+00 RT

ITEM 628.24 **TRANSITION TO BRIDGE RAIL**

Sta. 90+25 to Sta. 90+59 RT

ITEM 630.2 **HIGHWAY GUARD REMOVED AND DISCARDED**

Sta. 92+06 to Sta. 92+52 LT

ITEM 657. **TEMPORARY FENCE**

Stage 1: Sta. 89+95 to Sta. 92+45 LT

Stage 2: Sta. 90+21 to Sta. 92+52 LT

ITEM 697.1 **SILT SACK**

Sta. 86+98 RT

Sta. 86+99 LT

Sta. 92+10 RT

Sta. 92+20 LT

Sta. 94+45 LT

ITEM 698.4 **GEOTEXTILE FABRIC FOR PERMANENT EROSION CONTROL**

Under Riprap at East and West Abutments

ITEM 701. **CEMENT CONCRETE SIDEWALK**

Sta. 86+74 to Sta. 86+93 LT

Sta. 86+80 to Sta. 86+86 RT

Sta. 87+83 to Sta. 88+10 LT

Sta. 88+35 to Sta. 89+55 LT

Sta. 89+77 to Sta. 90+70 LT (Incl. Companion Seating)

Sta. 90+00 to Sta. 90+70 RT

Sta. 91+99 to Sta. 92+59 LT

Sta. 92+75 to Sta. 94+11 LT

Sta. 91+99 to Sta. 92+50 RT

ITEM 701.1 **CEMENT CONCRETE SIDEWALK AT DRIVEWAYS**

Sta. 88+10 to Sta. 88+35 LT

Sta. 89+55 to Sta. 89+77 LT

Sta. 92+59 to Sta. 92+75 LT

Sta. 94+11 to Sta. 94+42 LT

ITEM 701.2 **CEMENT CONCRETE PEDESTRIAN CURB RAMP**

Temporary Wheelchair Ramps:

Sta. 86+74 to Sta. 86+93 LT

Sta. 86+81 to Sta. 86+86 RT

ITEM 702. HOT MIX ASPHALT SIDEWALK OR DRIVEWAY

Temporary Ped. Sidewalk:

Sta. 88+70 to Sta. 90+47 LT

Sta. 92+20 to Sta. 93+75 LT

Driveways:

Sta. 89+58 to Sta. 89+75 LT

Sta. 92+58 to Sta. 92+74 LT

ITEM 707.15 PARK BENCH REMOVED AND RESET

From Sta. 89+94 to Sta. 90+28 LT

ITEM 734. SIGN REMOVED AND RESET

Sta. 90+20, 31' RT

Sta. 93+75, 27' LT

ITEM 751. LOAM BORROW

Sta. 86+80 to Sta. 86+86 RT

Sta. 87+83 to Sta. 88+12 LT

Sta. 88+34 to Sta. 89+58 LT

Sta. 89+73 to Sta. 90+70 LT

Sta. 89+94 to Sta. 90+70 RT

Sta. 91+95 to Sta. 92+58 LT

Sta. 92+73 to Sta. 94+13 LT

Sta. 91+88 to Sta. 92+50 RT

Installation of Temporary Sidewalk:

Sta. 88+69 to Sta. 89+58 LT

Sta. 89+73 to Sta. 90+47 LT

Sta. 89+80 to Sta. 90+47 LT

Sta. 92+22 to Sta. 92+58 LT

Sta. 92+22 to Sta. 92+59 LT

Sta. 92+73 to Sta. 93+75 LT

Sta. 92+74 to Sta. 93+70 LT

Installation of Temporary Wheelchair Ramp:

Sta. 86+76 to Sta. 86+80 RT

Sta. 86+86 to Sta. 86+90 RT

ITEM 765.442 SEEDING – ROADSIDE RIVERBANK – PART SHADE MIX

Sta. 90+70 to Sta. 91+02 LT

Sta. 91+46 to Sta. 91+95 LT

ITEM 767.121 SEDIMENT CONTROL BARRIER

Sta. 87+83 to Sta. 88+12 LT

Sta. 88+34 to Sta. 89+58 LT

Sta. 89+74 to Sta. 90+87 LT

Sta. 91+55 to Sta. 92+59 LT

Sta. 92+74 to Sta. 94+13 LT

Sta. 89+99 to Sta. 90+85 RT

Sta. 91+77 to Sta. 91+87 RT

Sta. 91+89 to Sta. 92+50 RT

ITEM 767.731 JUTE MESH EROSION CONTROL FABRIC

Sta. 90+70 to Sta. 90+97
Sta. 94+46 to Sta. 91+95

ITEM 769. PAVEMENT MILLING MULCH UNDER GUARD RAIL

Sta. 89+95 to Sta. 90+55 RT

ITEM 832. WARNING-REGULATORY AND ROUTE MARKER – ALUMINUM PANEL (TYPE A)

Sta. 90+33, 34' LT	Sta. 90+57, 34' LT (x2)
Sta. 90+52, 32' LT	Sta. 92+10, 27' RT

ITEM 833.7 DELINEATION FOR GUARD RAIL TERMINI

Sta. 89+95, 25.5' RT

ITEM 847.1 SIGN SUP (N/GUIDE) + RTE MKR W/1 BRKWAY POST ASSEMBLY – STEEL

See Item 832. for locations

ITEM 850.41 ROADWAY FLAGGER

For gas main installation, temporary barrier placement and removal, and final paving

ITEM 853.23 TEMPORARY BARRIER (TL-3)

Stage 1:	Stage 2:
Sta. 92+25 to Sta. 92+28 LT	Sta. 90+18 to Sta. 90+20 RT
Post-Stage 2:	Sta. 92+25 to Sta. 92+53 RT
Sta. 89+40 to Sta. 92+35 LT	

ITEM 853.33 **TEMPORARY BARRIER – LIMITED DEFLECTION (TL-3)**

Stage 1:

Sta. 89+95 to Sta. 92+45 LT

Stage 2:

Sta. 90+15 to Sta. 92+25 RT

Sta. 90+23 to Sta. 90+53 LT

Sta. 92+17 to Sta. 92+37 LT

ITEM 853.53 **TEMPORARY IMPACT ATTENUATOR UNIDIRECTIONAL, NON-REDIRECTIVE (TL-3)**

Stage 1:

Sta. 89+95 LT

Sta. 92+45 LT

Post-Stage 2:

Sta. 89+40 LT

Sta. 92+35 LT

Stage 2:

Sta. 90+15 LT

Sta. 90+23 LT

Sta. 92+37 LT

ITEM 864.04 **PAVEMENT ARROWS AND LEGEND REFLECTORIZED WHITE (THERMOPLASTIC)**

Bike Lane Biker:

Sta. 89+16 RT

Sta. 93+85 LT

Bike Lane Arrow:

Sta. 89+27 RT

Sta. 93+74 LT

ITEM 866.206 **6 INCH REFLECTORIZED WHITE LINE (POLYUREA) (RECESSED)**

Sta. 87+83 to Sta. 95+15 LT

Sta. 87+83 to Sta. 95+15 RT

Sta. 89+00 to Sta. 94+00 LT

Sta. 89+00 to Sta. 94+50 RT

Sta. 89+00 to Sta. 94+00 LT

Sta. 89+00 to Sta. 94+50 RT

ITEM 867.206 **6 INCH REFLECTORIZED YELLOW LINE (POLYUREA) (RECESSED)**

Sta. 87+83 to Sta. 95+15 LT

Sta. 87+83 to Sta. 95+15 RT

Sta. 94+00 to Sta. 95+15 LT

Sta. 94+00 to Sta. 95+15 RT

ITEM 867.212 **12 INCH REFLECTORIZED YELLOW LINE (POLYUREA) (RECESSED)**

Sta. 94+79 to Sta. 95+09 RT

ITEM 874.4 **TRAFFIC SIGN REMOVED AND STACKED**

Sta. 90+30, 28' LT

Sta. 90+57, 30' LT

Sta. 90+54, 28' LT

Sta. 92+03, 29' RT

ITEM 912.5 **DRILLED AND GROUTED #5 DOWELS**

For Concrete Caps at East and West Abutments

ITEM 942.124 **STEEL PILE HP 12 X 84**

For Piles at East and West Integral Abutments, Pier, and East and West Temporary Abutments

ITEM 945.3 **OBSTRUCTION EXCAVATION**

For Piles at East and West Integral Abutments, Pier, and East and West Temporary Abutments

ITEM 945.4 **TIMBER PILE REMOVAL**

Pile foundations at East and West Abutments and Pier

ITEM 948.41 **DYNAMIC LOAD TEST BY CONTRACTOR**

Pile foundations at East and West Abutments and Bridge Pier

ITEM 948.5 **PILE SHOES**

Pile foundations at East, West, and Temporary Abutments, and Bridge Pier

ITEM 950.1 **TEMPORARY SHORING**

For Temporary Steel Sheet piling and Excavation Support System

ITEM 983. **DUMPED RIPRAP**

For Scour Protection at East and West Abutments and Bridge Pier

DOCUMENT A00803

DRAWINGS AND SKETCHES

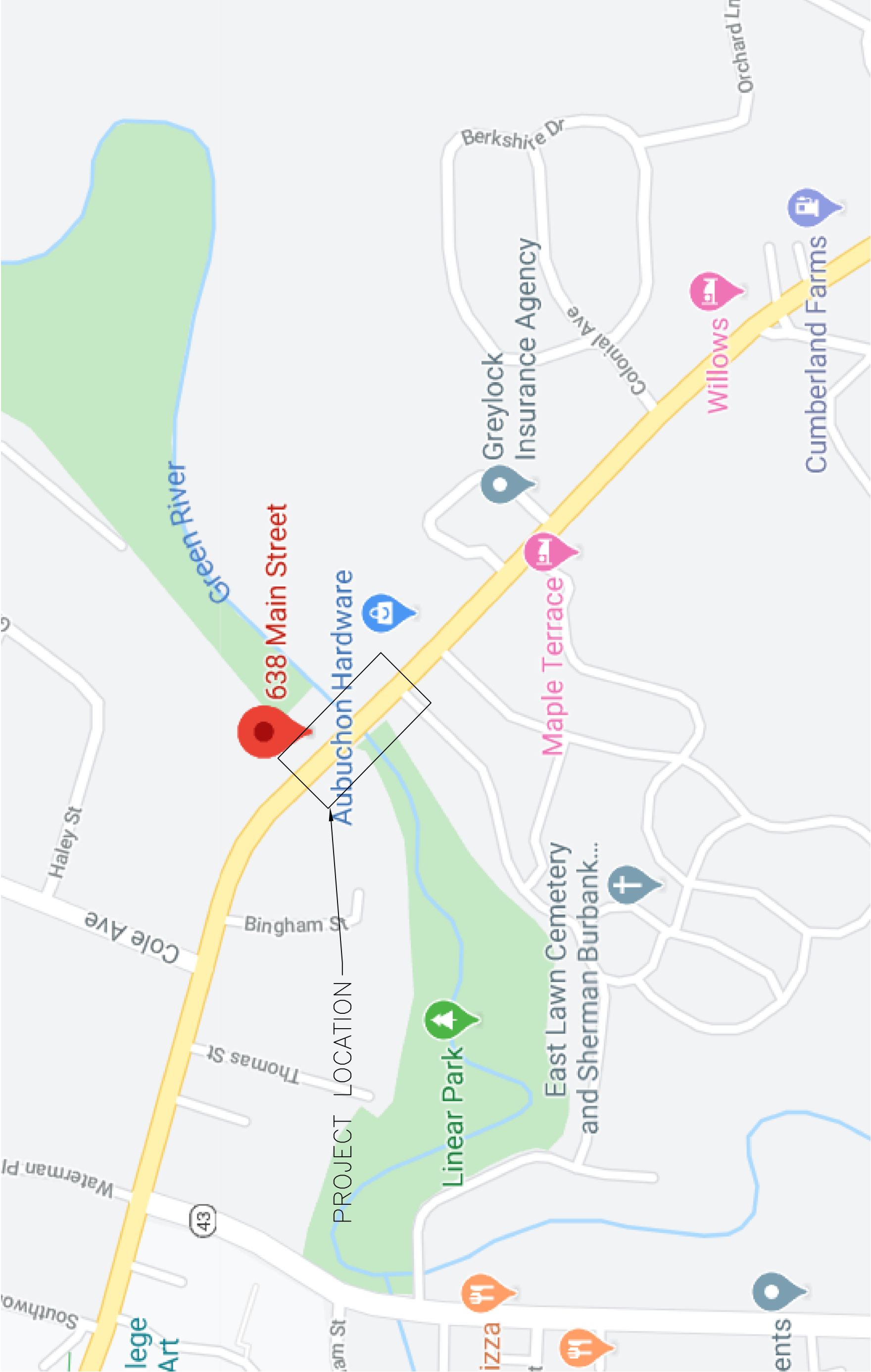
THIS PAGE INTENTIONALLY LEFT BLANK

DISTRIBUTION CIVIL DRAWINGS


MAIN ST

WILLIAMSTOWN, MA

DRAWING LIST	
DRAWING NO.	CONTENT
G-0	COVER
PP-1	PLAN VIEW
PP-2	PROFILE VIEW
PP-3	PROFILE VIEW
DET-1	MANHOLE/CONDUIT DETAILS
DET-2	HANGER/TRANSITION/ABUTMENT DETAILS




KEY MAP
SCALE: N.T.S.



124 Grove St.
Franklin, MA 02038

PROJECT NO:390638

REV	DESCRIPTION	DATE	DES	CHK	APP




AC
DESIGNED

AS
DRAWN


AC
CHECKED

DB
APPROVED



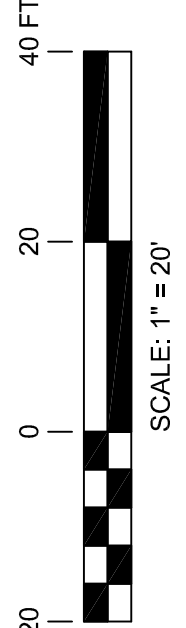
WILLIAMSTOWN MADOT
LAYOUT PLAN

5/29/2020
AS NOTED
SCALE





G-0

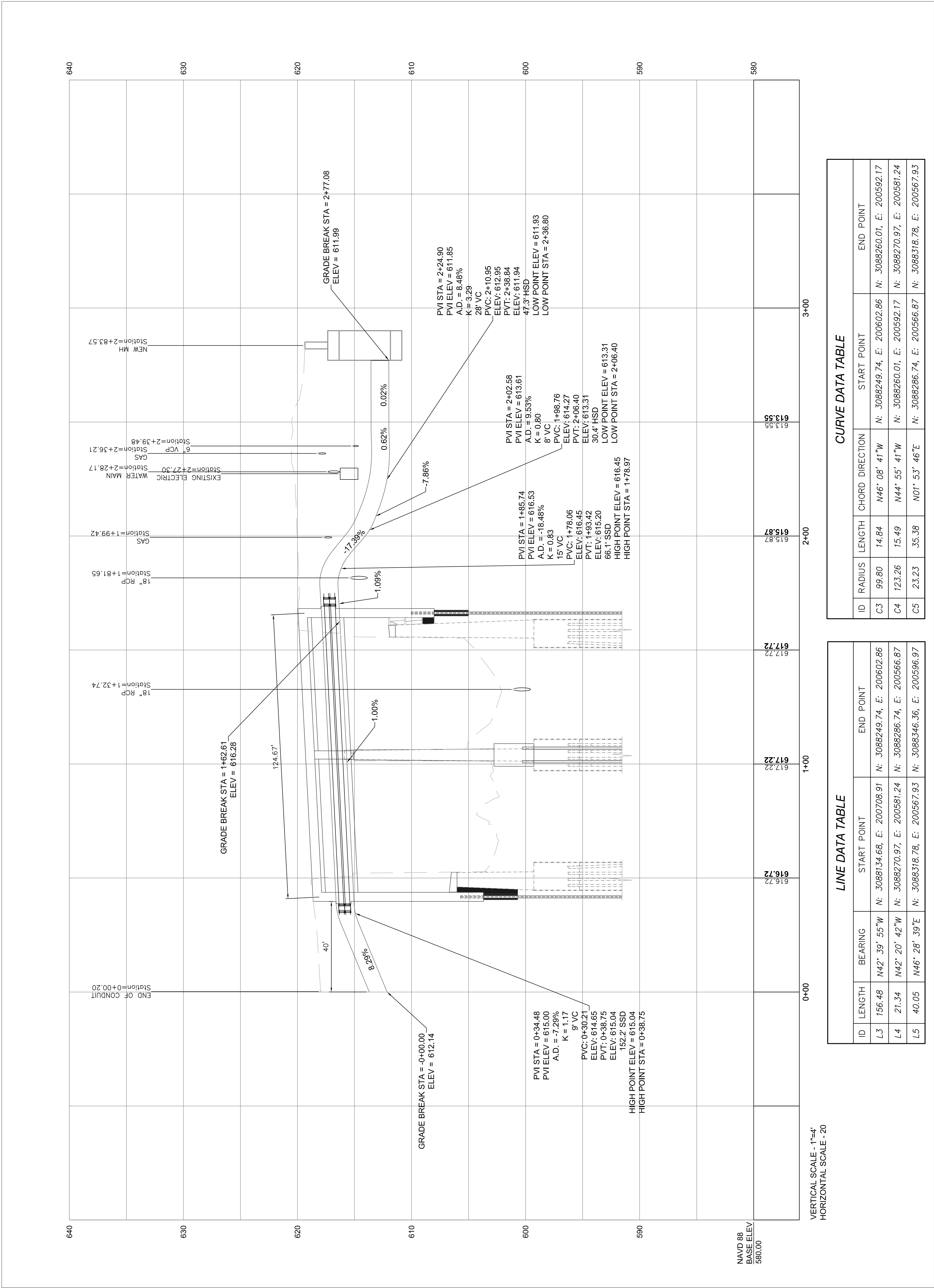
REV
0



1. BOUNDARY INFORMATION SHOWN HEREON WAS COMPILED FROM AN ACTUAL FIELD SURVEY CONDUCTED ON OCTOBER 23, 2017 THROUGH JANUARY 24, 2018 BY CME ASSOCIATES, INC. FIELD NOTES ARE RECORDED IN MASSDOT FIELD BOOK 41070.
2. THE LOCATION OF UNDERGROUND IMPROVEMENTS OR ENCROACHMENTS, IF ANY EXIST, OR AS SHOWN HEREON, ARE NOT CERTIFIED. THERE MAY BE OTHER UNDERGROUND UTILITIES. THE EXISTENCE OF WHICH ARE UNKNOWN. SIZE AND LOCATION OF ALL UNDERGROUND UTILITIES MUST BE VERIFIED BY THE APPROPRIATE AUTHORITIES. THE UNDERGROUND FACILITIES PROTECTIVE ORGANIZATION MUST BE NOTIFIED PRIOR TO CONDUCTING TEST BORINGS, EXCAVATION AND CONSTRUCTION. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A UTILITY MARK OUT SERVICE.
3. HORIZONTAL COORDINATES, NORTH ORIENTATION AND BEARING RELATIVE TO THE MASSACHUSETTS STATE PLACE COORDINATE SYSTEM, MASSACHUSETTS MAINLAND ZONE, BASED ON THE NORTH AMERICAN DATUM OF 14983, NAD83 (2011) EPOCH 2010.00.
4. ELEVATIONS RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988, NAVD 1988, GEOID 12A.
5. HORIZONTAL AND VERTICAL CONTROL WERE ESTABLISHED BY THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION IN DEC. OF 2014 UTILIZING GPS AND CONVENTIONAL LEVELING METHODS.
6. HORIZONTAL COORDINATE AND ELEVATION UNITS ARE U.S. SURVEY FEET.
7. CONCRETE SIDEWALK REPLACEMENT SHALL BE TO THE NEAREST EXISTING JOINT.
8. THE CONTRACTOR IS RESPONSIBLE FOR REPLACING AND MASSACHUSETTS HIGHWAY BOUND, OR PRIVATE PROPERTY PIN THAT IS DAMAGED OR DESTROYED DURING CONSTRUCTION, TO ITS LOCATION JUST PRIOR TO CONSTRUCTION.


AC DESIGNED		WILLIAMSTOWN MADOT LAYOUT PLAN		REV. 1	PP-1	REV. 0
AS DRAWN				DATE AS SHOWN		
AC CHECKED				DATE AS SHOWN		
DB APPROVED				DATE AS SHOWN		





CURVE DATA TABLE				
ID	RADIUS	LENGTH	CHORD DIRECTION	START POINT END POINT
C3	99.80	14.84	N46° 08' 41"W	N: 3088249.74, E: 200602.86 N: 3088260.01, E: 200592.17
C4	123.26	15.49	N44° 55' 41"W	N: 3088260.01, E: 200592.17 N: 3088270.97, E: 200581.24
C5	23.23	35.38	N01° 53' 46"E	N: 3088286.74, E: 200566.87 N: 3088318.78, E: 200567.93

LINE DATA TABLE			
ID	LENGTH	BEARING	START POINT END POINT
L3	156.48	N42° 39' 55"W	N: 3088134.68, E: 200708.91 N: 3088249.74, E: 200602.86
L4	21.34	N42° 20' 42"W	N: 3088270.97, E: 200581.24 N: 3088286.74, E: 200566.87
L5	40.05	N46° 28' 39"E	N: 3088318.78, E: 200567.93 N: 3088346.36, E: 200566.97



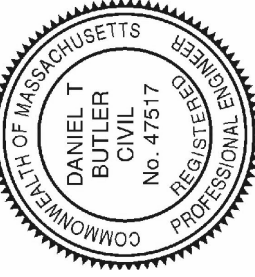
124 Grove St.
Franklin, MA 02038

PROJECT NO:390638

REV	DESCRIPTION	DATE	DES	CHK	APP

PROPOSED CONDUIT RUN ALONG GREEN RIVER BRIDGE

5/29/20 AS AC DB




DESIGNED
AS
DRAWN
CHECKED
DB
APPROVED

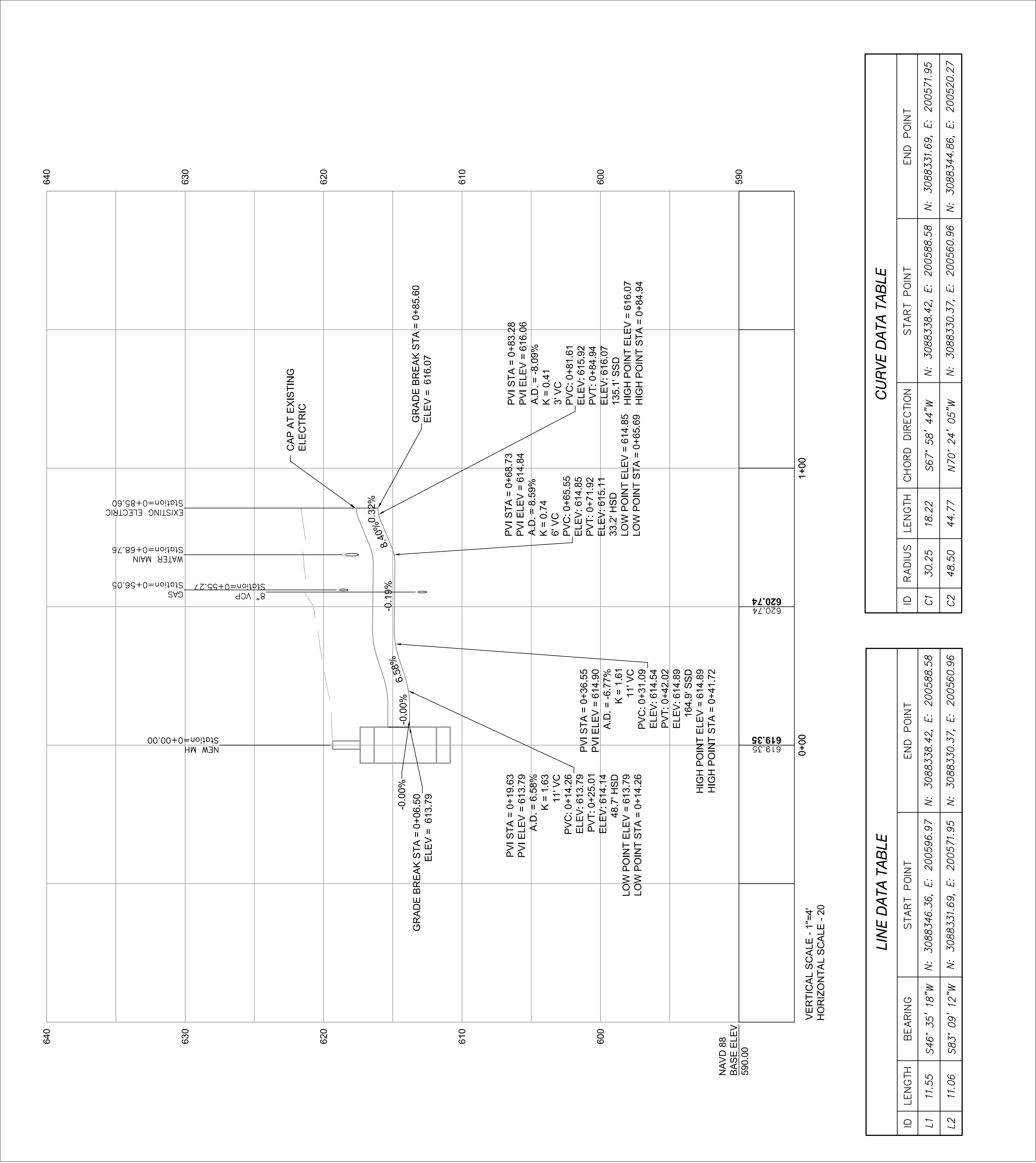
nationalgrid

WILLIAMSTOWN MADOT
LAYOUT PLAN

5/29/2020
AS NOTED
SCALE


PP-2

REV
0



LINE DATA TABLE			
ID	LENGTH	BEARING	START POINT END POINT
L1	11.55	S46° 35' 18"W	N: 3088346.36, E: 200596.97 N: 3088338.42, E: 200588.58
L2	11.06	S83° 09' 12"W	N: 3088331.69, E: 200571.95 N: 3088330.37, E: 200560.96

CURVE DATA TABLE			
ID	RADIUS	LENGTH	CHORD DIRECTION START POINT END POINT
C1	30.25	18.22	S67° 58' 44"W N: 3088338.42, E: 200588.58 N: 3088331.69, E: 200571.95
C2	48.50	44.77	N70° 24' 05"W N: 3088330.37, E: 200560.96 N: 3088344.86, E: 200520.27



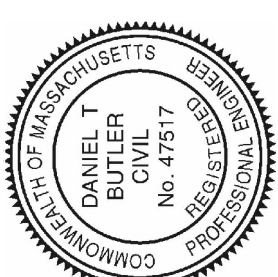
124 Grove St.
Franklin, MA 02038

PROJECT NO:390638

REV	DESCRIPTION	DATE	DES	CHK	APP


PROPOSED CONDUIT RUN ALONG GREEN RIVER BRIDGE

5/29/20 AS DB




DESIGNED
AS
DRAWN
CHECKED
APPROVED

REVIEW 1
REVIEW 2

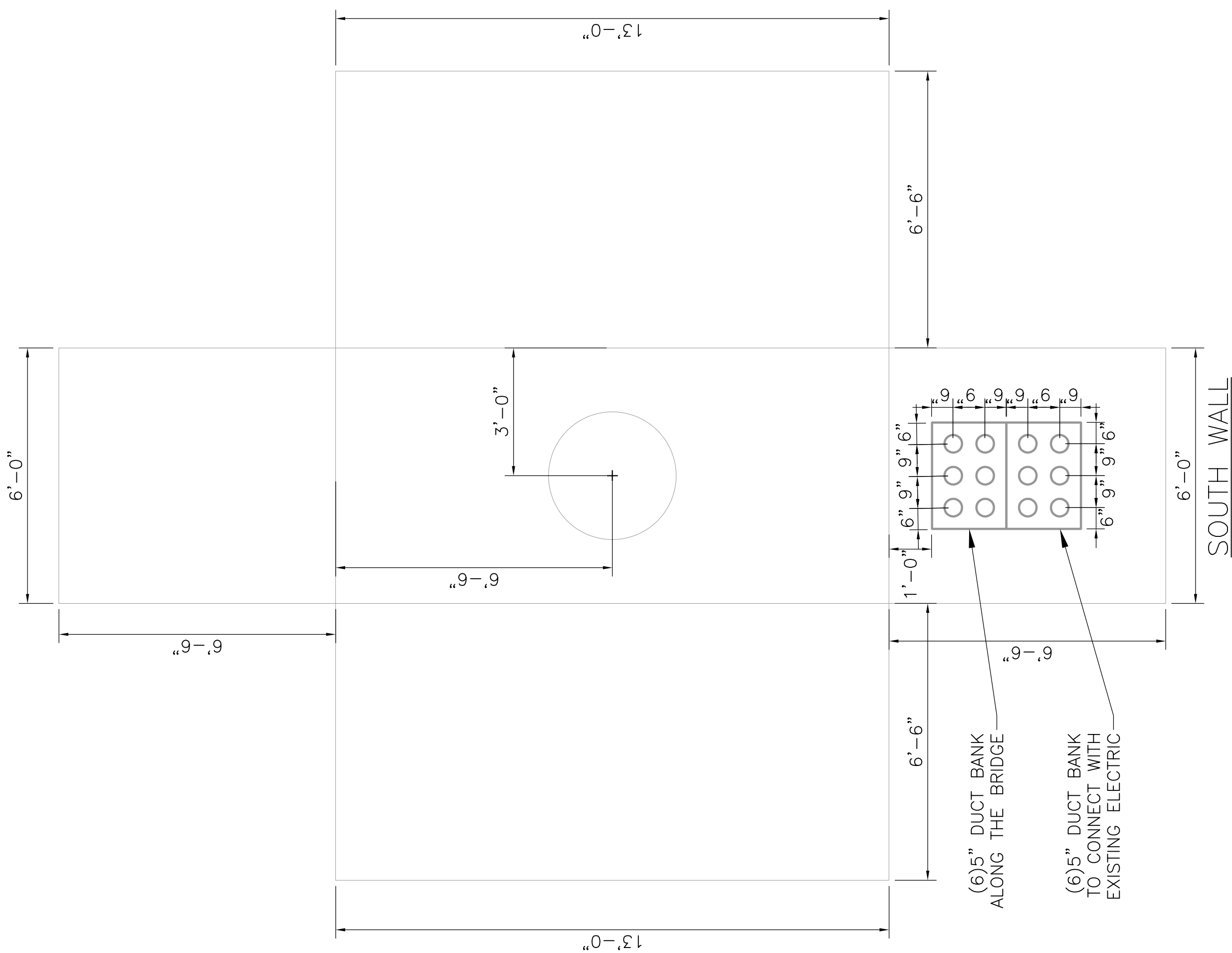


WILLIAMSTOWN MADOT
LAYOUT PLAN



PP-3

REV
0



MANHOLE NUMBER: XXXX

SIZE: L=13' W=6' H=6'-6"

MANHOLE RING SIZE: 36"

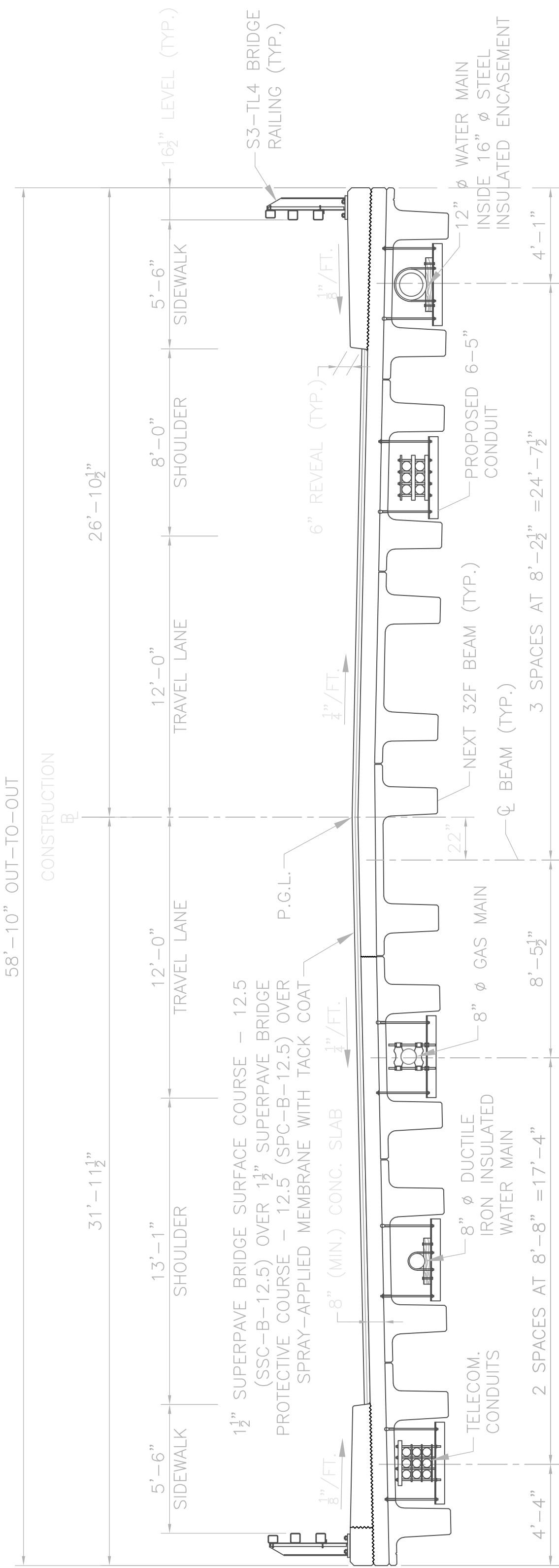
MANHOLE COVER SIZE: 26"

CHIMNEY HEIGHT: 2'-0"

NOTES:

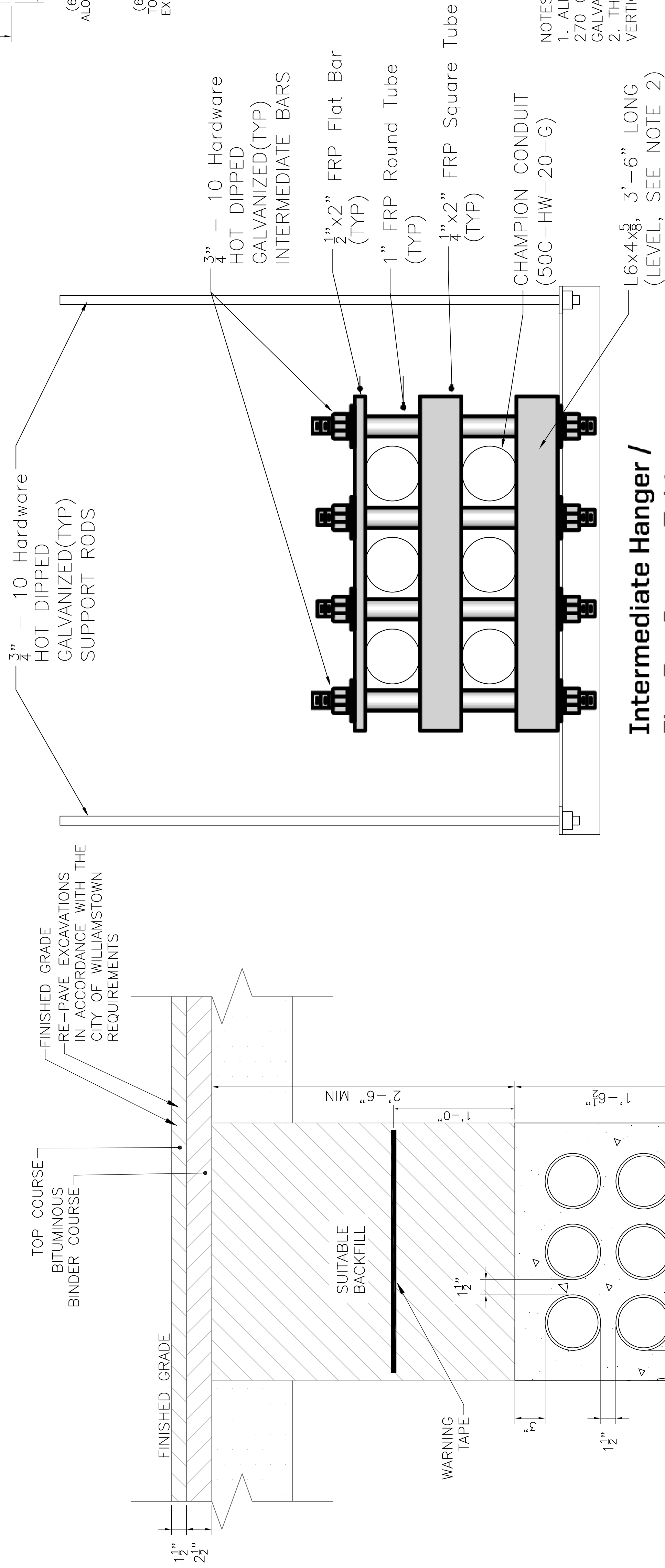
1. ALL STRUCTURAL STEEL FOR UTILITY SUPPORTS SHALL CONFORM TO AASHTO M 270 GRADE 36. ALL STRUCTURAL STEEL AND FASTENERS SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M 111 AND M 232.

2. THE UTILITY SUPPORT ANGLE SHALL BE ERCTED WITH THE LONG LEG



PROPOSED CROSS SECTION

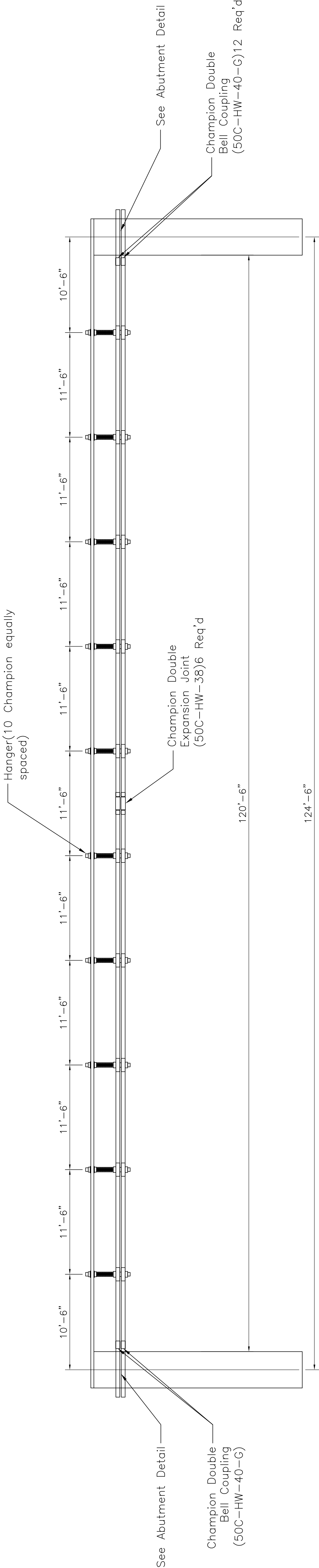
SCALE: $\frac{1"}{4} = 1'-0"$



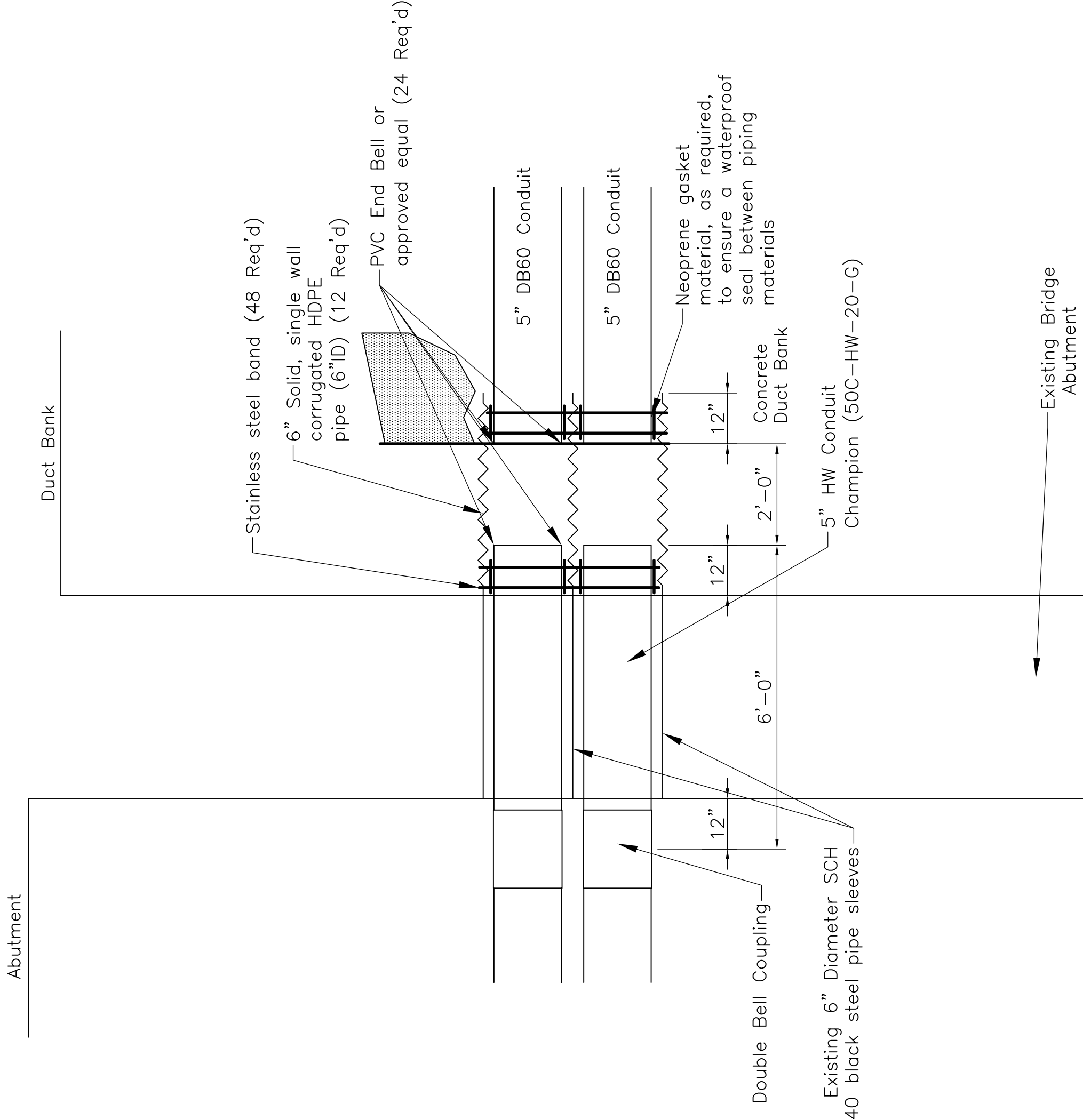
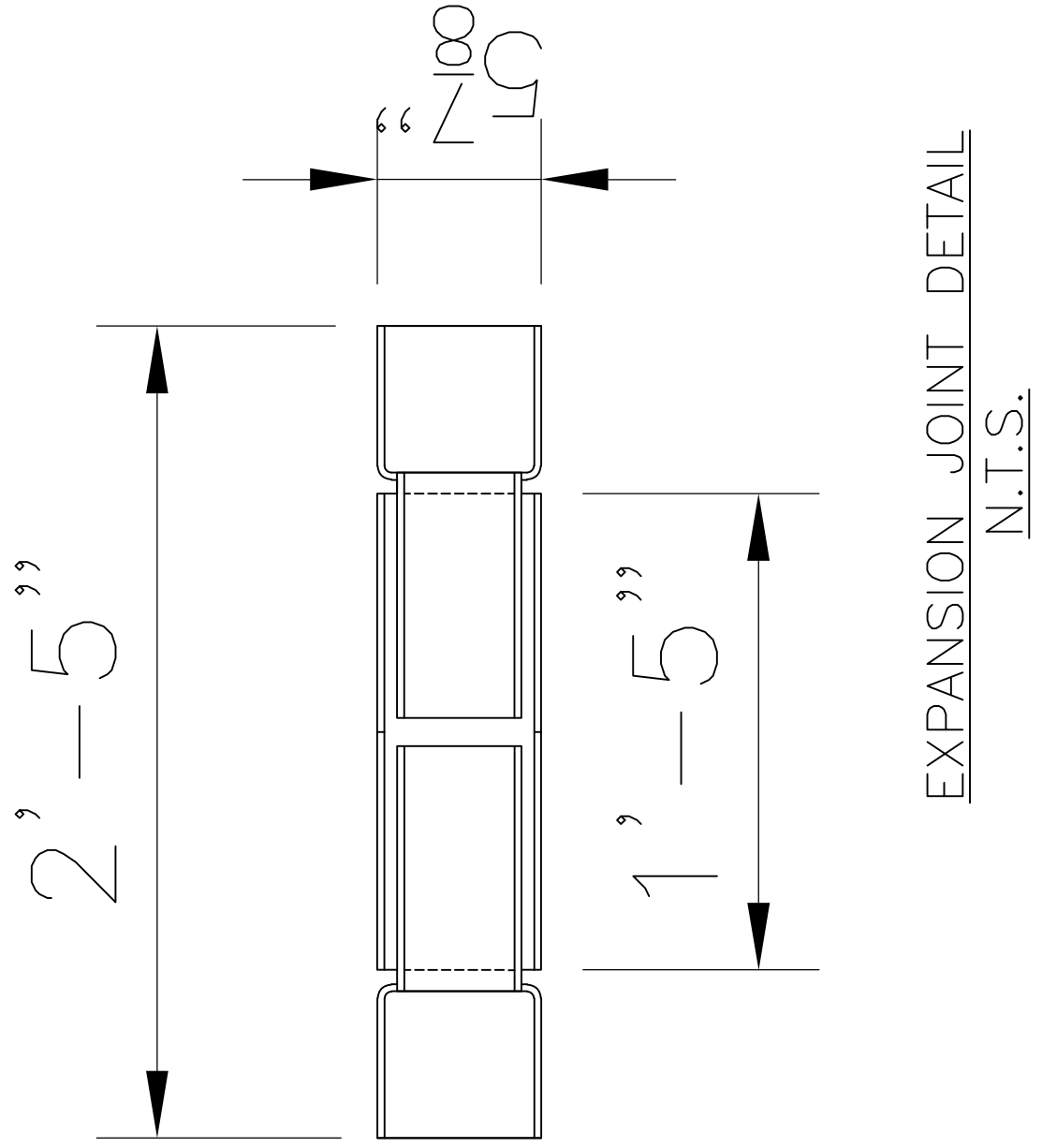
Intermediate Hanger / Flat Bar-Square Tubing

DETAIL A
6-5" DUCTS
SCALE: N.T.S

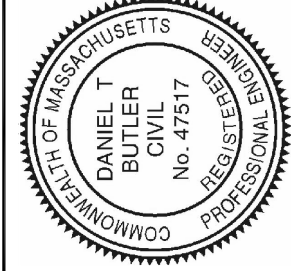
[illegible]



TYPICAL BRIDGE AND OVERPASS
CONDUIT SUPPORT SYSTEM
SCALE: $\frac{1}{2}" = 1'$



ABUTMENT DETAIL
SCALE: $\frac{1}{2}" = 1'$
Note: Right Abutment Detail shown. Left Abutment Detail is similar



TRC 124 Grove St.
Franklin, MA 02038

REV	DESCRIPTION	PROJECT NO.390638			
		DATE	DES	CHK	APP
0	PROPOSED CONDUIT RUN ALONG GREEN RIVER BRIDGE	5/29/20	AS	AG	DB

nationalgrid

WILLIAMSTOWN MADOT
LAYOUT PLAN



DESIGNED BB	DRAWN AS	CHECKED AG	APPROVED DB
REVIEW 1	REVIEW 2		

DET-2

REV. 0

DOCUMENT A00808

PROJECT UTILITY COORDINATION FORM

THIS PAGE INTENTIONALLY LEFT BLANK



Project Utilities Coordination (PUC) Form

CONTACTS AND GENERAL UTILITY INFORMATION

12/17/2020
Revision
Date

City/Town: Williamstown	Project File #: 605356	Utility Pole Set: National Grid
Route/Street: Route 2	Resident Engineer: TBD	Scheduled Ad Date: 1/23/2021
	Mass DOT PM: Harry Adolphe	Total Poles Relocated: 4

Consultant: Utility Company	Contact	Office #	Cell #	Contact: Carol Rogers, P.E.	Email	Scope, Budget, Duration Submitted	Cell #	Office #	Reimbursement	Notes	Email			
											Agreement	Non-Reimb	YES	NO
National Grid	Sandra Annis	(413) 582-7424	(413) 531-8982	Sandra.Annis@nationalgrid.com		X		(860) 595-3383			X		X	
MBI	Jason Wing	(403) 538-4545	(603) 812-1090	jason.wing@axia.com		X					X		X	
FirstLight	Mark Tessier	(802) 770-4617		mwtessier@vermontel.net		X					X		X	
Charter Communications	John Leone	(518) 242-8800 ext 3437		john.leone@charter.com		X					X		X	
Verizon	Paul Davis	(413) 397-3625 ext 202	(413) 325-7764	pdavis@ucseng.com		X					X		X	
Berkshire Gas	Paul Scarpa	(413) 445-0383	(413) 822-4230	pscarpa@BerkshireGas.com		X					X		X	
Crown Castle	Bob Powers	(978) 264 6020		bob.powers@crowncastle.com		X					X		X	
Verizon	Paul Shyspeck	(413) 787-1845		paul.m.shyspeck@verizon.com										
FirstLight	Paulie Polacke		(781) 526-3027	ppolacke@firstlight.net										
Crown Castle	Mark Bonanno	(508) 616 7818	(617) 828 1415	mark.bonanno@crowncastle.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 DBB 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:

Verizon contract work to place the telephone manhole and conduit should be scheduled as early as possible. Confirm with Verizon if they want Stage 1 traffic controls set prior to beginning of TMH work.

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 Williamstown. The information provided is the best available information prior to project advertisement.

PUC FORM - CONTINUED

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

12/17/2020
PRINTED



RESPONSIBLE PARTY	DESCRIPTION - Utility Relocation Phases, Tasks and Activities	Estimated Duration (Work Days) by Utilities (Lead time not included)	Concurrent / Exclusive Utility Work				Access Restraint & Limitations of Operations Notes	
			Exclusive Utility on site	Concurrent Utilities	Contractor Off-Site	Contractor Concurrent	(Yes/No)	Should an AR be considered for the Contractor?
Phase 1a:	Enabling work by the Contractor - Contractor to set up erosion control and construction signage. Prior to Verizon work beginning, face of curb needs to be laid out by survey and test pits need to be dug. Contractor may also need to do a water main relocation at proposed TMH prior to TMH being set. (Contractor to coordinate test pits with Verizon to have representative on site to evaluate need for water relocation).		Utility working with no other utilities in vicinity	Utility working with other utilities on site	No Contractor physical construction on-site	Contractor and Utility are working on-site - but NOT in the same vicinity	Potential Access Restraint	Reason/Note (optional)
Task 1a:	UTILITY OPERATIONS - Pole Set Utility Co. - National Grid Set 1 temporary pole, guys, and anchors for replacement pole at station 89+08 LT	1	X		X		Yes	
	UTILITY OPERATIONS - Aerial Relocation of Underground/Bridge Supported Cables Utility Co. - Verizon Verizon contract work to place manhole and conduit Verizon line place anchors and pole guys where necessary Verizon line place strand on pole line Verizon line place copper stubs/cables & fiber cable UG to aerial back to UG via existing manhole, poles, and new manhole Verizon splice trimout underground copper stubs/cables & fiber cable in existing and new manhole Verizon splice trimout underground cables in existing and new manholes Verizon line remove underground cables in existing conduit underneath Green River Bridge Verizon line remove pole guys and anchors where necessary Verizon line remove poles where necessary	10 2 1 8 28 6 5 1 2	X X X X X X X X X		X X X X X X X X X		Yes Yes Yes Yes Yes Yes Yes Yes Yes	
	Sub-Total	63						
Phase 1b:	Enabling work by the Contractor - Once contractor completes construction of bridge deck, but prior to the installation of approach slabs, Berkshire Gas can relocate their gas lines permanently to the south side of the bridge.							
Task 1b:	UTILITY OPERATIONS - Gas Relocation Utility Co. - Berkshire Gas Install 250 LF of 8-inch IP coated steel gas main Install 130 LF of 2-inch IP HD plastic gas main Retire 220 LF of 8-inch coated steel gas main Retire 170 LF of 5/8-inch gas main Tie-over (3) 5/8" services to new 2-inch gas main	20 5 3 2 3	X X X X X		X X X X X		No No No No No	
	Sub-Total	33						
Phase 1c:	Enabling work by the Contractor - Once contractor completes installation of conduit under bridge and beyond approach slabs, Verizon can come in and complete their permanent relocation underground on the south side of the bridge.							
Task 1c:	UTILITY OPERATIONS - Pole Set & Overhead Relocation Utility Co. - Verizon Verizon contract work to place conduit Verizon line place copper cable & fiber cable UG via existing and new manholes Verizon line place copper cable aerial to UG back to aerial via existing and new manholes to poles Verizon splice aerial copper stubs/cable at poles 116 & 120 Verizon splice aerial copper stubs/cable at poles 119 & 117 Verizon splice aerial copper terminals, place dropwire at poles 119 & 117 Verizon splice trimout underground cables in existing and new manholes Verizon splice trimout aerial cables at poles 120, 119, & 116 Verizon line remove copper cables aerial from pole 120 & pole 119 to 116 Verizon line remove copper cable & fiber cable aerial to UG via existing poles and manholes Verizon line transfer/remove strands, terminals, and drops from pole line Verizon line place pole guys and anchors where necessary Verizon line remove pole guys and anchors where necessary Verizon line remove poles where necessary	5 3 5 8 13 2 4 3 2 2 2 1 1 2	X X X X X X X X X X X X X X		X X X X X X X X X X X X X		No No No No No No No No No No No No No No	
	Sub-Total	53						

RESPONSIBLE PARTY	DESCRIPTION - Utility Relocation Phases, Tasks and Activities	Estimated Duration (Work Days) by Utilities (Lead time not included)	Concurrent / Exclusive Utility Work					Access Restraint & Limitations of Operations Notes	
			Exclusive Utility on site	Concurrent Utilities	Contractor Off-Site	Contractor Concurrent	Potential Access Restraint	Should an AR be considered for the Contractor?	
Phase 2:			Utility working with no other utilities in vicinity	Utility working with other utilities on site	No Contractor physical operations on-site (while Utility is Contractor and Utility are working on-site - but NOT in the same vicinity)				
	Enabling work by the Contractor - Once paving of the south side of the bridge is complete and temporary pedestrian bridge is set, National Grid can come back in to complete their work for the full temporary relocation. Site clearing and pole locations surveyed. (DOT will stake pole locations within 10 days of being notified clearing has been completed. Ngrid will need 5 days after the staking of poles to clear their DIG-SAFE)								
	UTILITY OPERATIONS - Pole Set & Temporary Overhead Relocation								
Task 1	Utility Co. - National Grid								
	Replace 4 poles, install 3 poles, remove 2 poles, install 6 anchors, replace 4 anchors	9	X		X		No		
	Remove primary spacer, install primary spacer cable, build/transfer pole hardware	5	X		X		No		
	Remove secondary conductors, remove P-P guy, install neutral conductor	2	X		X		No		
	Equipment: Remove LB SW @ P-1, install LB SW @ P4, remove 25KVA XFMR @P-3	4	X		X		No		
	Coordinate services outages	2	X		X		No		
	Sub-Total	22							
	UTILITY OPERATIONS - Temporary Overhead Relocation								
Task 2	Utility Co. - Crown Castle								
	Transfer overhead cable on 4 utility poles	4	X		X		No		
	Sub-Total	4							
Task 3	Utility Co. - First Light								
	Build strand approximately 2000' +/-	2	X		X		No		
	Build fiber from splice point to point 3000' +/-	2	X		X		No		
	Splice - Cut over to temp	6	X		X		No		
	Test	2	X		X		No		
	Wreck out old fiber and strand	2	X		X		No		
	Sub-Total	14							
Task 4	Utility Co. - Axia								
	Run 1000' of new fiber attaching to 4 new UP, install two splice points	2	X		X		No		
	Sub-Total	2							
Task 5	Utility Co. - Charter Communications								
	Put up new strand and coax on the south side of the bridge	1	X		X		No		
	De-re lash 6 separate fibers from loops to the temp location	2	X		X		No		
	Splice new coax into plant	1	X		X		No		
	Wreckout 428 plant on the north side of the bridge	1	X		X		No		
	Sub-Total	5							

RESPONSIBLE PARTY		DESCRIPTION - Utility Relocation Phases, Tasks and Activities	Estimated Duration (Work Days) by Utilities (Lead time not included)	Concurrent / Exclusive Utility Work					Access Restraint & Limitations of Operations Notes	
				Exclusive Utility on site	Concurrent Utilities	Contractor Off-Site	Contractor Concurrent	Potential Access Restraint (Yes/No)	Reason/Note (optional)	
Phase 3:	C = Contractor	U = Utility Co.	Enabling work by the Contractor - Contractor to complete bridge construction. Site clearing and pole locations surveyed. (DOT will stake pole locations within 10 days of being notified that work has been completed. Ngrid will need 5 days after the staking of poles to clear their DIG-SAFE)	Utility working with no other utilities in vicinity	Utility working with other utilities on site	No Contractor physical construction on-site (while Utility is Contractor and Utility are working on-site - but NOT in the same vicinity				
			UTILITY OPERATIONS - Pole Set & Overhead Relocation							
Task 1			Utility Co. - National Grid							
			Replace one pole, install one pole	X		X			No	
			Install new overhead conductors across bridge, remove temporary conductors	X		X			No	
			Coordinate Service outages	X		X			No	
			Sub-Total							
Task 2			UTILITY OPERATIONS - Overhead Relocation							
			Utility Co. - Crown castle							
			Transfer overhead cable on 4 utility poles	X		X			No	
			Sub-Total							
Task 3			Utility Co. - First Light							
			Build strand approximately 2000' +/-	X		X			No	
			Build fiber from splice point to point 3000' +/-	X		X			No	
			Splice - Cut over to temp	X		X			No	
			Test	X		X			No	
			Wreck out old fiber and strand	X		X			No	
			Sub-Total							
Task 4			Utility Co. - Axia							
			Move cable off temp poles back to permanent poles	X		X			No	
			Sub-Total							
Task 5			Utility Co. - Charter Communications							
			Restoring catv plant - building new plant on the north side with strand and coax	X		X			No	
			Splicing the new plant	X		X			No	
			De-re lashing fiber from the south side of the bridge to the north side of the bridge	X		X			No	
			Sub-Total							
			Total							
				230						

IMPORTANT BASIS NOTES - FOR CONTRACTOR

- 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).
- "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.
- "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).
- 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 however, typically has 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 note).
- 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.
- 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 #).
- Prior to starting any and all enabling work for Utilities, the Contractor is to plan in advance with submittals and approved durations.
- * 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.



WORK ZONE SAFETY

Temporary Traffic Control

*Typical Details and
Massachusetts Guidelines
for MassDOT, Municipalities,
Utilities, and Contractors*

SHEET INDEX (1 OF 3)**GENERAL****PAGE**

NOTES AND GUIDELINES.....	1-9
FIG. 1: TYPICAL TRAFFIC CONTROL DEVICES.....	10
FIG. 2: PAVEMENT EDGE DROP-OFF GUIDANCE.....	11
FIG. 3: TYPICAL DEVICE SPACING; (AT 30 MPH).....	12-13
FLAGGING GUIDANCE.....	14-15
FIG. 4-5: TYPICAL PEDESTRIAN DEVICES.....	16-17

STATIONARY OPERATIONS

FIG. 6: TWO LANE UNDIVIDED ROADWAY; HALF OF ROADWAY CLOSED; WORK NEAR CURVE.....	18-19
FIG. 7: TWO LANE UNDIVIDED ROADWAY; HALF OF ROADWAY CLOSED.....	20-21
FIG. 8: TWO LANE UNDIVIDED ROADWAY; SHOULDER CLOSED.....	22-23
FIG. 9: TWO LANE UNDIVIDED ROADWAY WITH TRAVERSABLE SHOULDER; HALF OF ROADWAY CLOSED; MAINTAIN TWO-WAY TRAFFIC.....	24-25
FIG. 10: FOUR LANE UNDIVIDED ROADWAY; RIGHT LANE CLOSED.....	26-27
FIG. 11: FOUR LANE UNDIVIDED ROADWAY; LEFT LANE CLOSED.....	28-29
FIG. 12: FOUR LANE UNDIVIDED ROADWAY; HALF OF ROADWAY CLOSED.....	30-31
FIG. 13: MULTILANE DIVIDED ROADWAY; RIGHT LANE CLOSED.....	32-33
FIG. 14: MULTILANE DIVIDED ROADWAY; LEFT LANE CLOSED.....	34-35
FIG. 15: MULTILANE DIVIDED ROADWAY; CENTER LANE OR RIGHT/CENTER LANES CLOSED.....	36-37
FIG. 16: MULTILANE DIVIDED ROADWAY; CENTER LANE OR LEFT/CENTER LANES CLOSED.....	38-39

SHEET INDEX (2 OF 3)

<u>STATIONARY OPERATIONS (CONT.)</u>	<u>PAGE</u>
FIG. 17: MULTILANE DIVIDED ROADWAY; RIGHT SIDE OF OFF RAMP CLOSED.....	40-41
FIG. 18: MULTILANE DIVIDED ROADWAY; LEFT SIDE OF OFF RAMP CLOSED.....	42-43
FIG. 19: MULTILANE DIVIDED ROADWAY; ROADWORK BEYOND ON RAMP.....	44-45
FIG. 20: MULTILANE DIVIDED ROADWAY; ROADWORK BEYOND OFF RAMP.....	46-47
FIG. 21: MULTILANE DIVIDED ROADWAY; TYPICAL RAMP CLOSURE.....	48-49
FIG. 22: MULTILANE DIVIDED ROADWAY; TYPICAL CLOVERLEAF RAMP CLOSURE.....	50-51
FIG. 23: MULTILANE DIVIDED ROADWAY; TYPICAL RAMP CLOSURE; ADVANCE SIGNING.....	52-53
FIG. 24: FOR MULTILANE DIVIDED ROADWAY; PLACEMENT OF TEMPORARY PORTABLE RUMBLE STRIPS.....	54-55
<u>MOBILE OPERATIONS</u>	
NOTES FOR MOBILE OPERATIONS.....	56
FIG. 25: ANY ROADWAY; BEYOND RIGHT SHOULDER.....	57
FIG. 26: ANY ROADWAY; SHOULDER.....	58
FIG. 27: DIVIDED ROADWAY; MEDIAN WORK.....	59
FIG. 28: UNDIVIDED TWO LANE ROADWAY; HALF OF ROADWAY CLOSED.....	60
FIG. 29: MULTILANE DIVIDED ROADWAY; LEFT LANE.....	61
FIG. 30: MULTILANE DIVIDED ROADWAY; RIGHT LANE.....	62
FIG. 31: MULTILANE DIVIDED ROADWAY; CENTER LANE.....	63
FIG. 32: POST-STORM CLEANUP OPERATION.....	64

SHEET INDEX (3 OF 3)**EMERGENCY RESPONSE****PAGE**

NOTES FOR TRAFFIC EMERGENCY/INCIDENT OPERATIONS... 65

FIG. 33: ANY ROADWAY; SHOULDER ENCROACHMENT..... 66

FIG. 34: TWO LANE ROADWAY; NO SHOULDER; TRAVEL
LANE ENCROACHMENT.....67FIG. 35: TWO LANE ROADWAY; TRAVERSABLE SHOULDER;
SINGLE LANE ENCROACHMENT..... 68FIG. 36: TWO LANE ROADWAY; TRAVERSABLE SHOULDER;
CENTER OF ROADWAY..... 69

FIG. 37: MULTILANE DIVIDED ROADWAY; RIGHT LANE..... 70

FIG. 38: MULTILANE DIVIDED ROADWAY; LEFT LANE.....71

FIG. 39: MULTILANE UNDIVIDED ROADWAY; LEFT LANE..... 72

FIG. 40: MULTILANE DIVIDED ROADWAY; MIDDLE LANE;
APPROACH FROM LEFT.....73FIG. 41: MULTILANE DIVIDED ROADWAY; MIDDLE LANE;
APPROACH FROM RIGHT.....74**TRAFFIC SIGNAL REPAIR WORK AT INTERSECTION**FIG. 42: MULTILANE UNDIVIDED ROADWAY; LEFTMOST OR
LEFT TURN LANE.....75FIG. 43: TWO LANE UNDIVIDED ROADWAY; ONE LEG OF
INTERSECTION..... 76FIG. 44: MULTILANE UNDIVIDED ROADWAY; CENTER OF
INTERSECTION..... 77**PEDESTRIAN DETAILS**

FIG. 45: PEDESTRIAN BYPASS.....78

FIG. 46: TEMPORARY SIDEWALK CLOSURE..... 79

BIKE LANE DETAILS

FIG. 47: BIKE LANE CLOSURE.....80-81

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-requesting, 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.

PAGE 2

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.

PAGE 4

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.



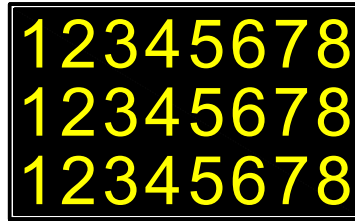
PAGE 10

Work Zone Safety
Standard Details
and Drawings

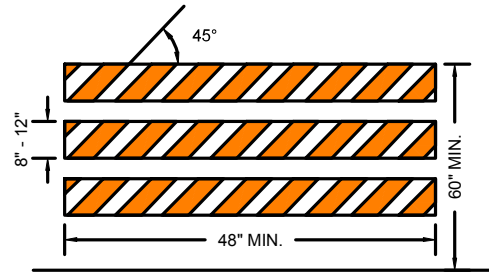
FIGURE 1
TYPICAL TRAFFIC CONTROL DEVICES
NOT TO SCALE



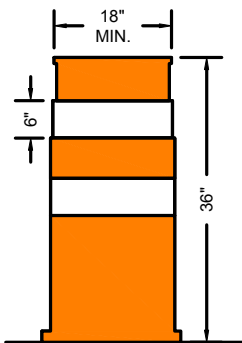
SIGN



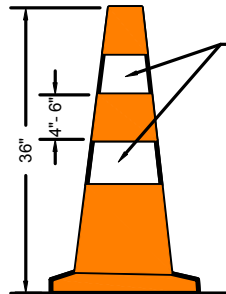
**PORTABLE CHANGEABLE
MESSAGE SIGN (PCMS)**



TYPE III BARRICADE

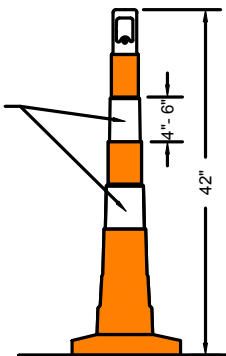


DRUM

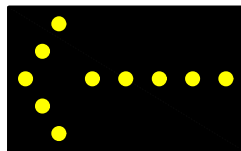


RETROFLECTIVE
BANDS

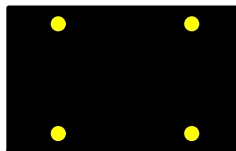
CONES



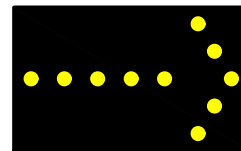
Cones may be used for all daytime operations. For night work, drums should be used to form the taper(s) and cones can be used along the tangent section of the work setup.



LEFT

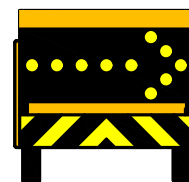


CAUTION



RIGHT

ARROW BOARD (WITH MODE)



TRUCK MOUNTED ATTENUATORS

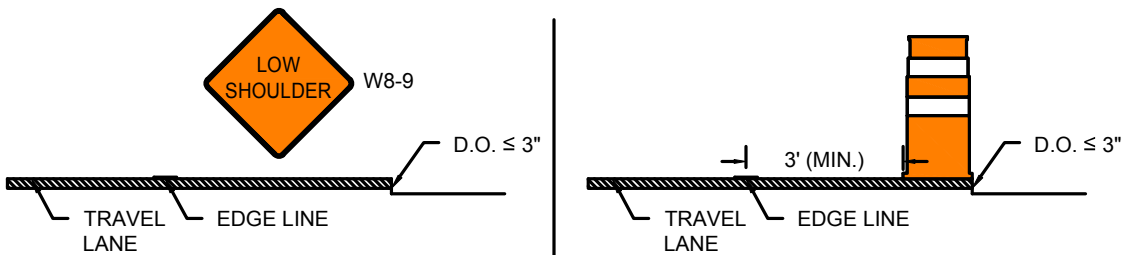
Truck Mounted Attenuators (TMA) shall be positioned between the start of the work area and the end of the designated buffer zone. The TMAs are to be positioned in each temporarily closed lane. This includes shoulders (≥ 8 feet) whether combined with a travel lane closure or being closed alone. These 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

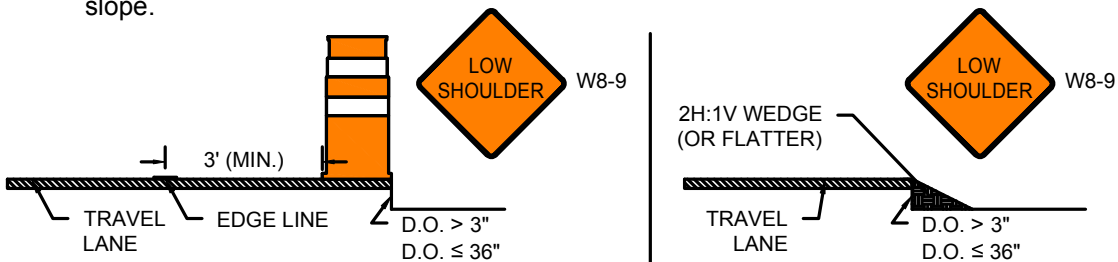
Note that this guidance is adopted from the Roadside Design Guide, 4th Edition.

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.

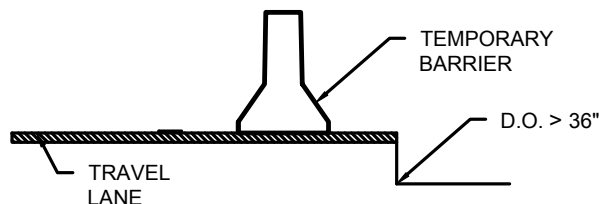
- Shoulder drop-offs 3" or less adjacent to a shoulder or active travel lane should be mitigated by:
 - ✓ A W8-9 (LOW SHOULDER) sign in advance of and at regular intervals throughout the treatment; or
 - ✓ The placement of drums on the traffic side of the drop-off.



- 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.





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

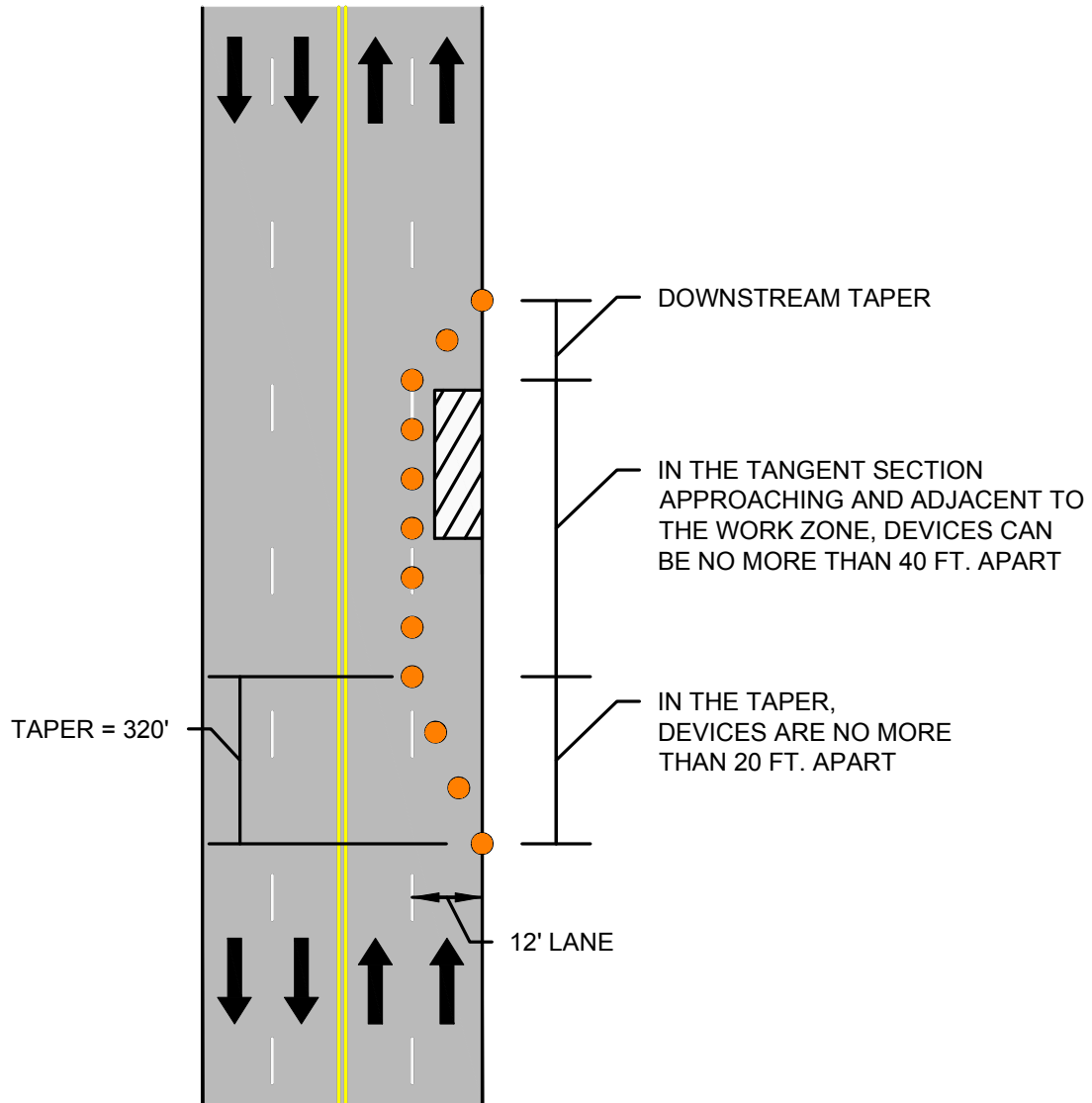


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





PAGE 14

Work Zone Safety
Standard Details
and Drawings

FLAGGING GUIDANCE

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.

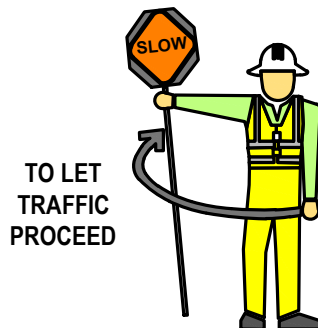


Properly Trained Flaggers

- 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.



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.



Proper Advance Warning Signs

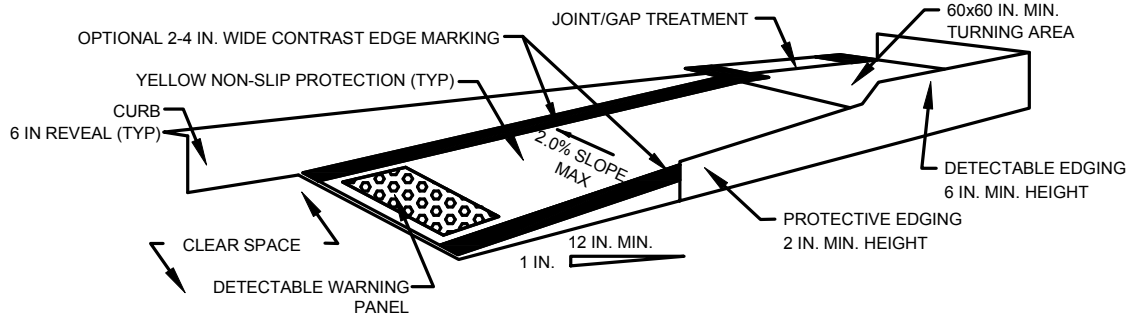
- Always use warning signs.
- Allow for reaction distance from signs.
- Remove signs if no longer necessary or not flagging.
- Use free hand in up-and-down motion to help slow traffic.



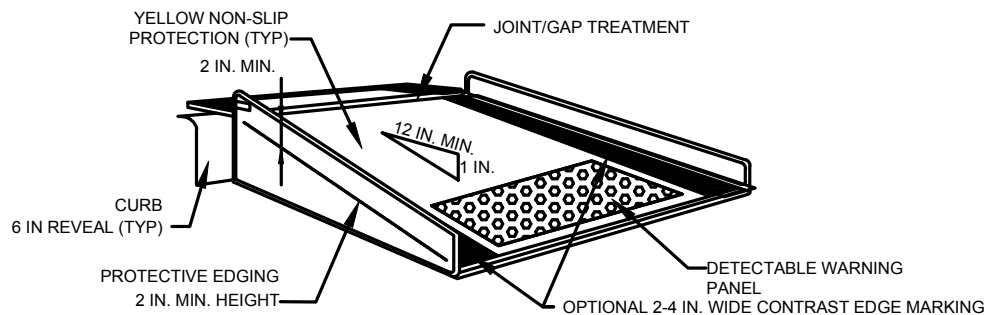
PAGE 16

Work Zone Safety Standard Details and Drawings

FIGURE 4
TYPICAL PEDESTRIAN DEVICES
(1 OF 2)
NOT TO SCALE



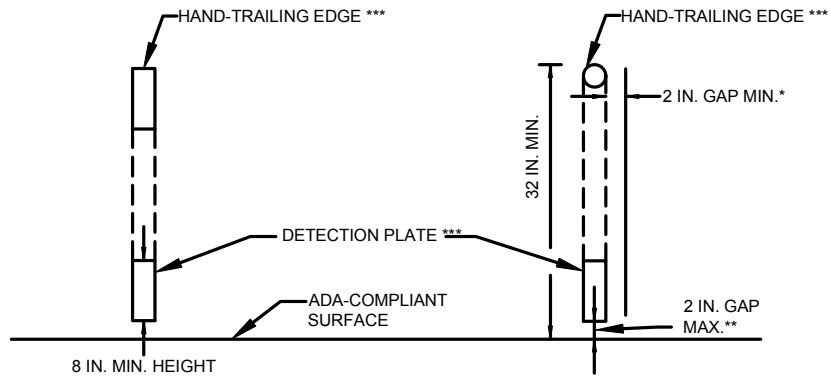
TEMPORARY CURB RAMP-PARALLEL TO CURB



TEMPORARY CURB RAMP-PERPENDICULAR TO CURB

NOTES:

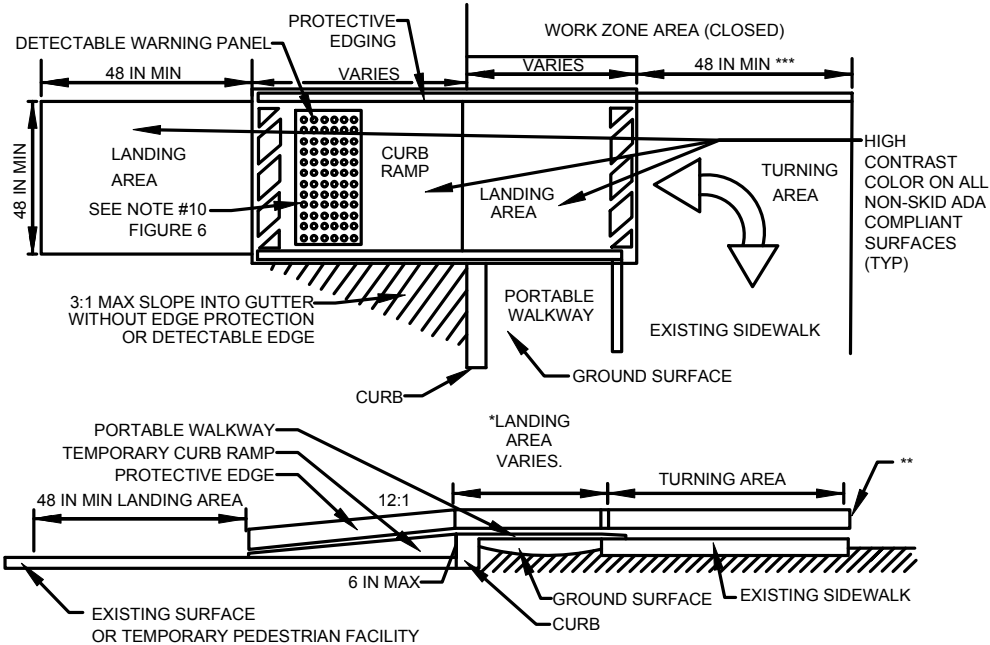
1. CURB RAMPS SHALL BE 60 IN. MINIMUM WIDTH WITH A FIRM, STABLE, AND NON-SLIP SURFACE.
2. PROTECTIVE EDGING WITH A 2 IN. MINIMUM HEIGHT SHALL BE INSTALLED WHEN THE CURB RAMP OR LANDING PLATFORM HAS A VERTICAL DROP OF 6 IN. OR GREATER OR HAS A SIDE APRON SLOPE STEEPER THAN 1:3 (33%). PROTECTIVE EDGING 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.



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



WORK ZONE



CHANNELIZATION DEVICE



FLASHING ARROW BOARD



PORTABLE CHANGEABLE MESSAGE SIGN



TRUCK MOUNTED ATTENUATOR



RADAR SPEED FEEDBACK BOARD



POLICE DETAIL OR UNIFORMED FLAGGER

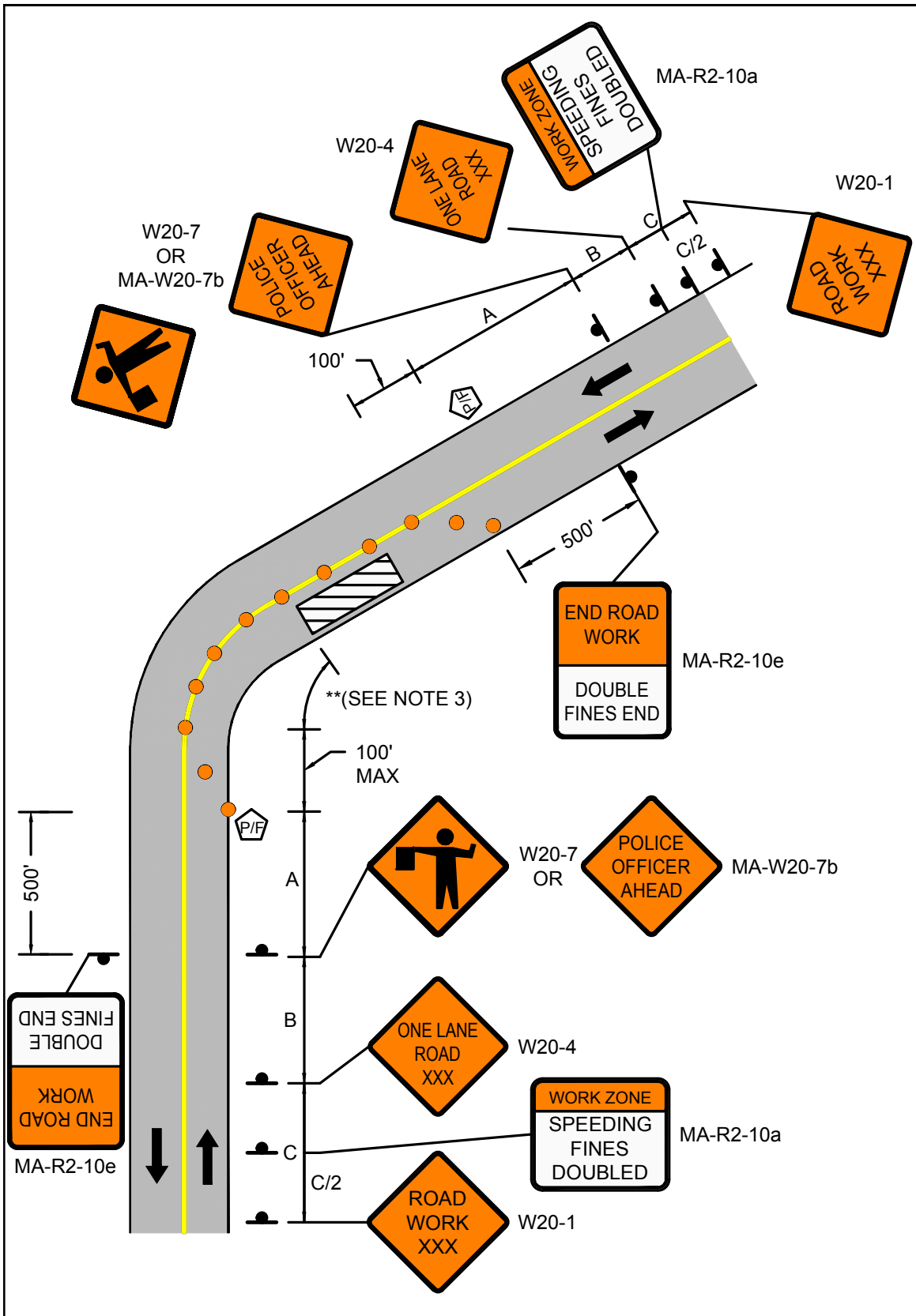


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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

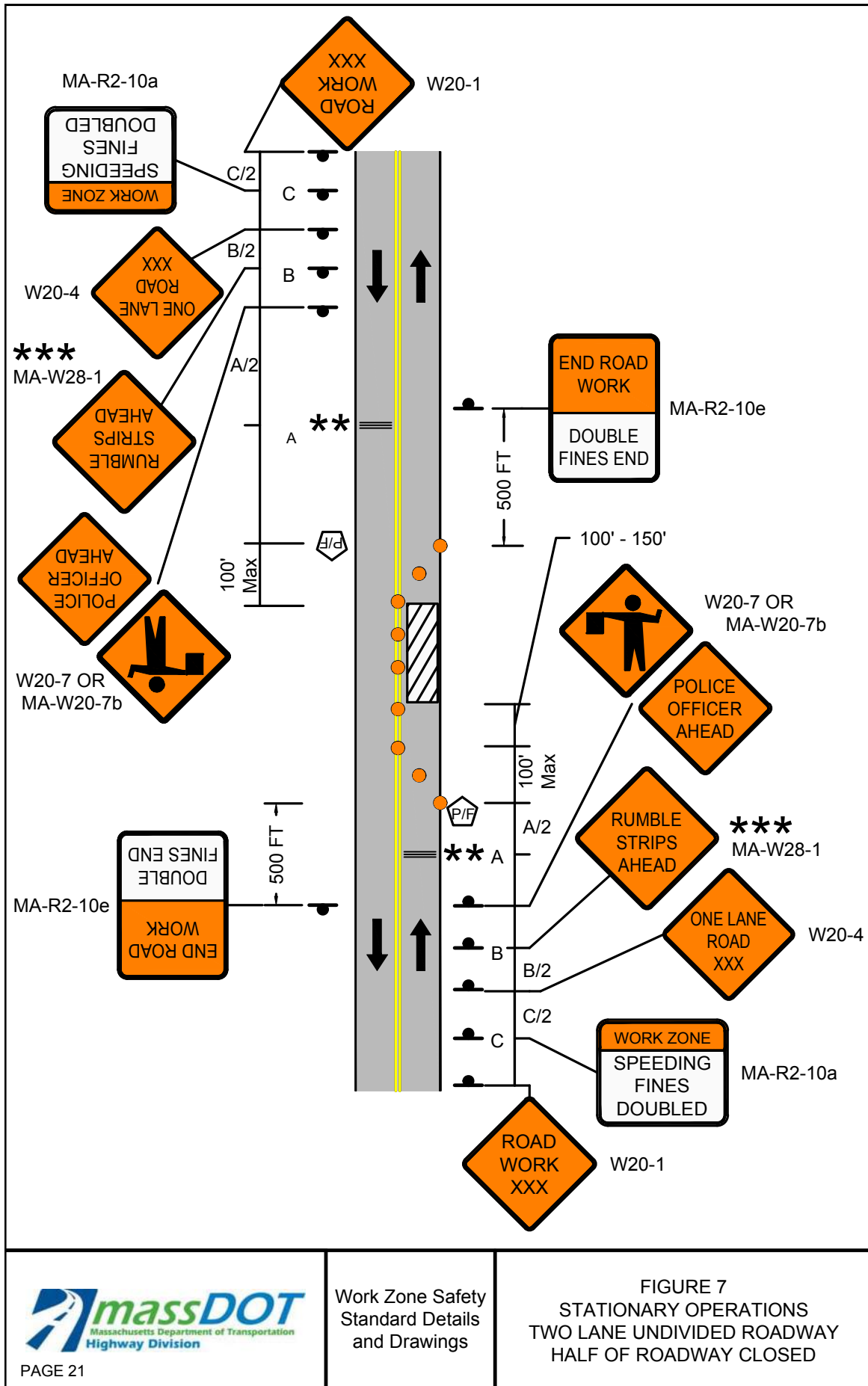


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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



WORK ZONE



CHANNELIZATION DEVICE



FLASHING ARROW BOARD



PORTABLE CHANGEABLE MESSAGE SIGN



TRUCK MOUNTED ATTENUATOR



RADAR SPEED FEEDBACK BOARD



POLICE DETAIL OR UNIFORMED FLAGGER

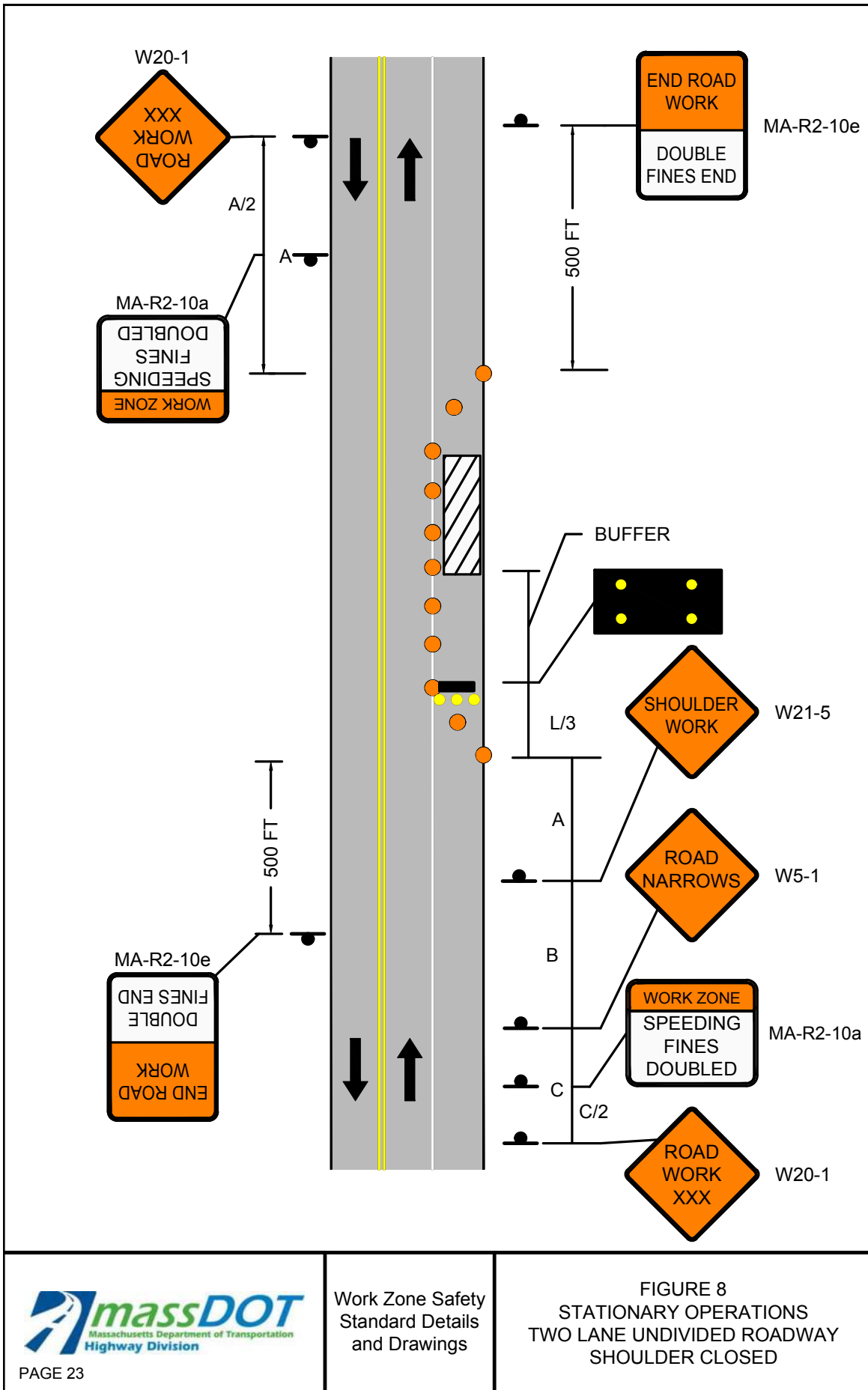


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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

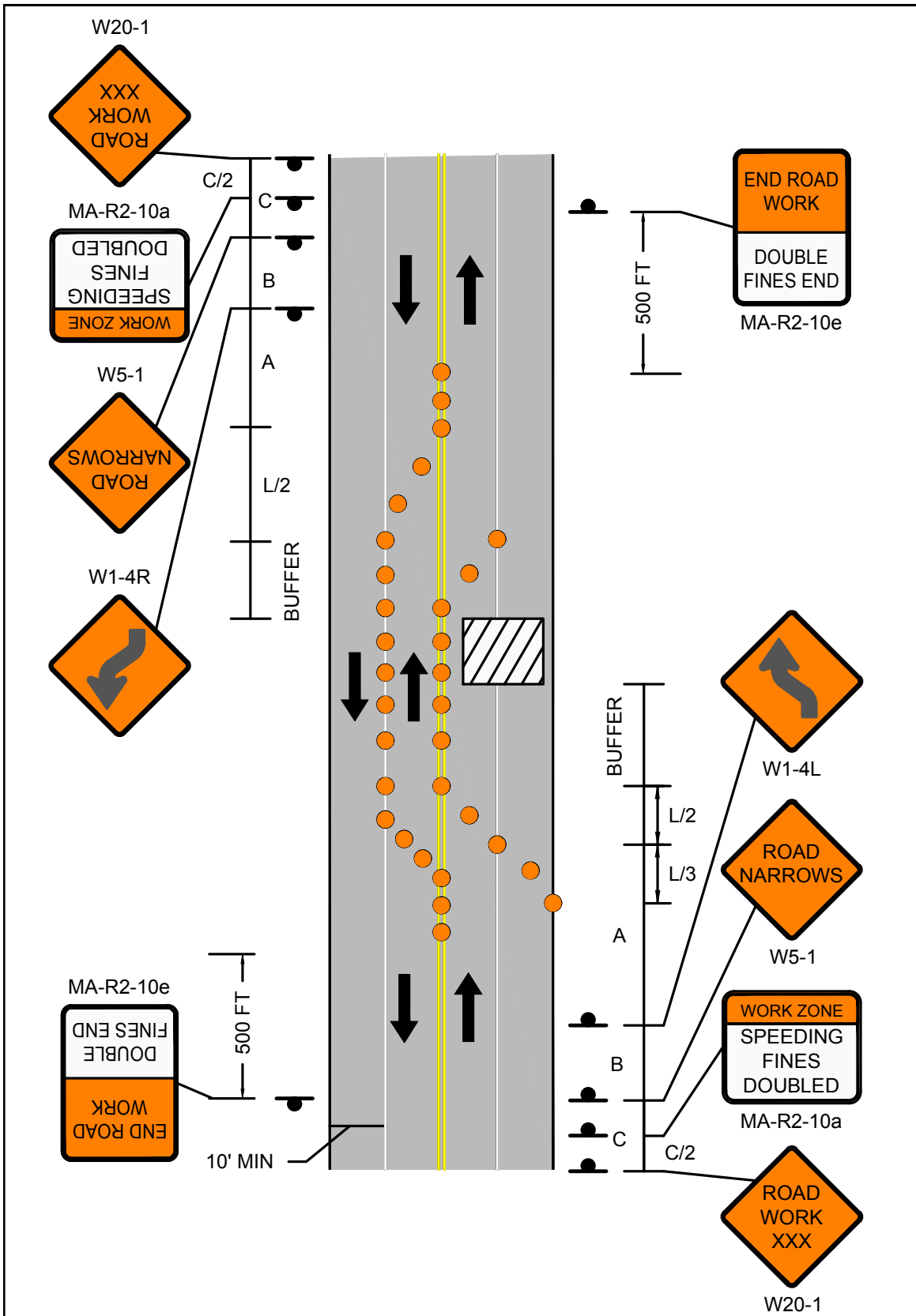


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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

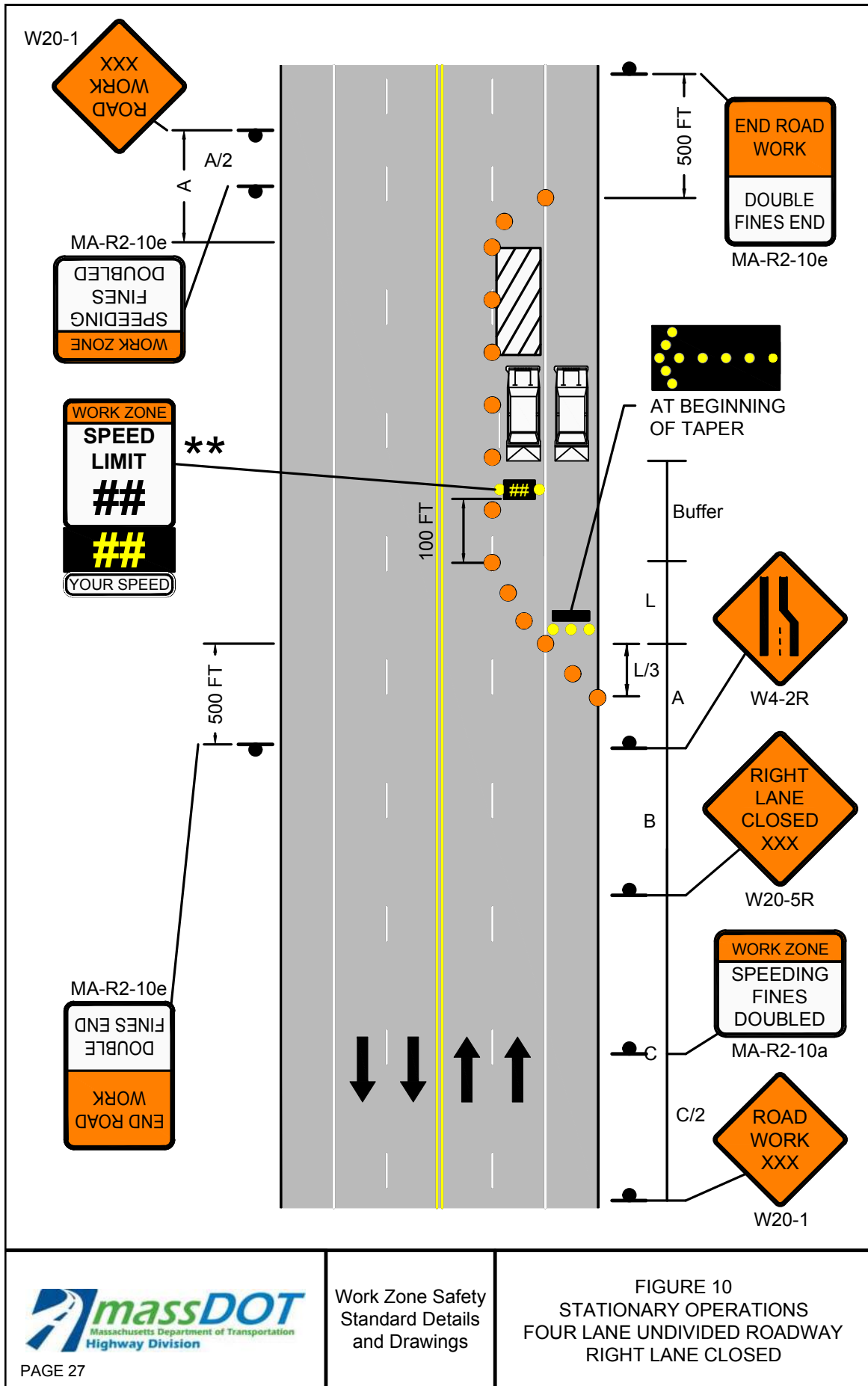
NOTES

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





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



WORK ZONE



CHANNELIZATION DEVICE



FLASHING ARROW BOARD



PORTABLE CHANGEABLE MESSAGE SIGN



TRUCK MOUNTED ATTENUATOR



RADAR SPEED FEEDBACK BOARD



POLICE DETAIL OR UNIFORMED FLAGGER

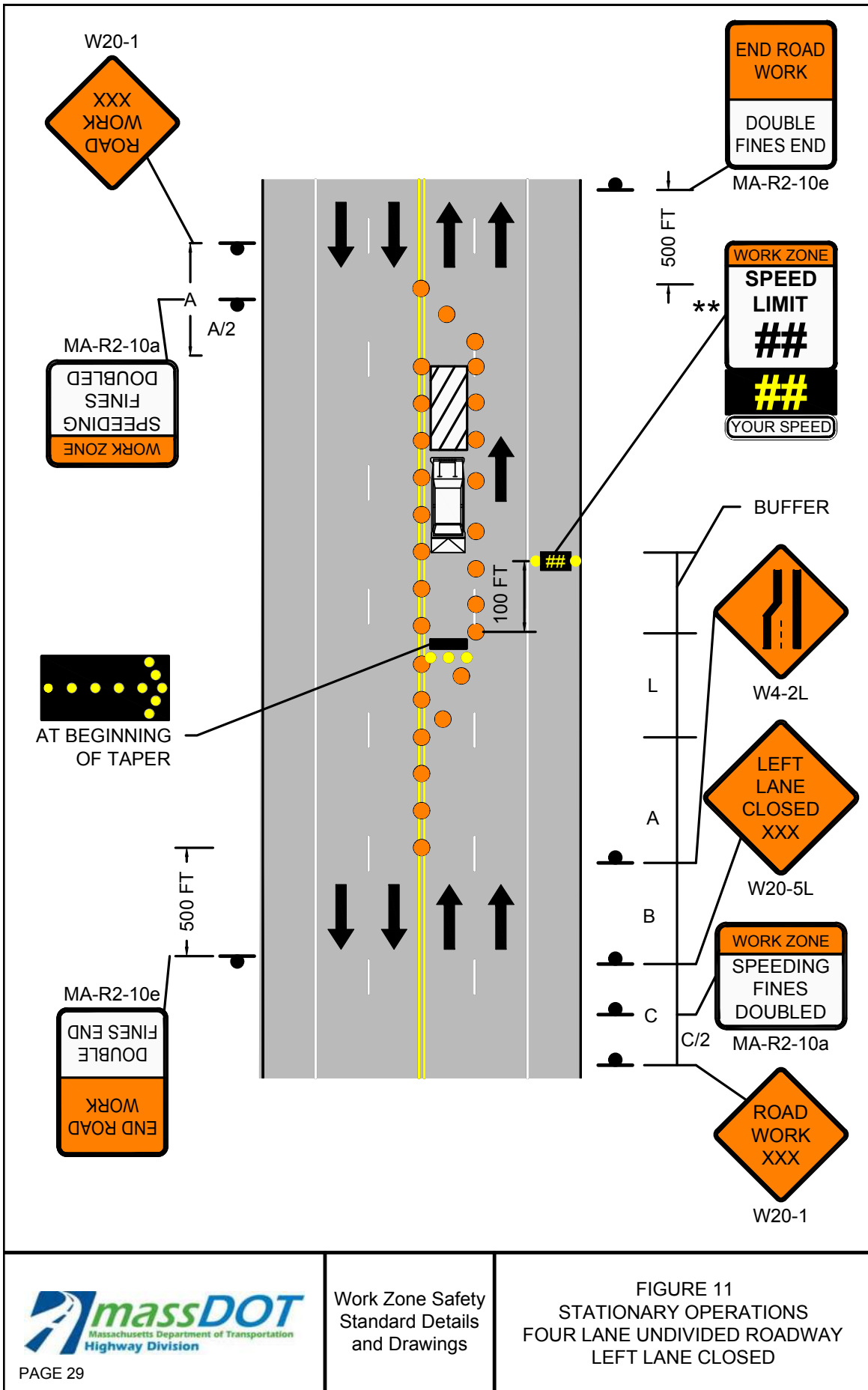


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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



WORK ZONE



CHANNELIZATION DEVICE



FLASHING ARROW BOARD



PORTABLE CHANGEABLE MESSAGE SIGN



TRUCK MOUNTED ATTENUATOR



RADAR SPEED FEEDBACK BOARD



POLICE DETAIL OR UNIFORMED FLAGGER

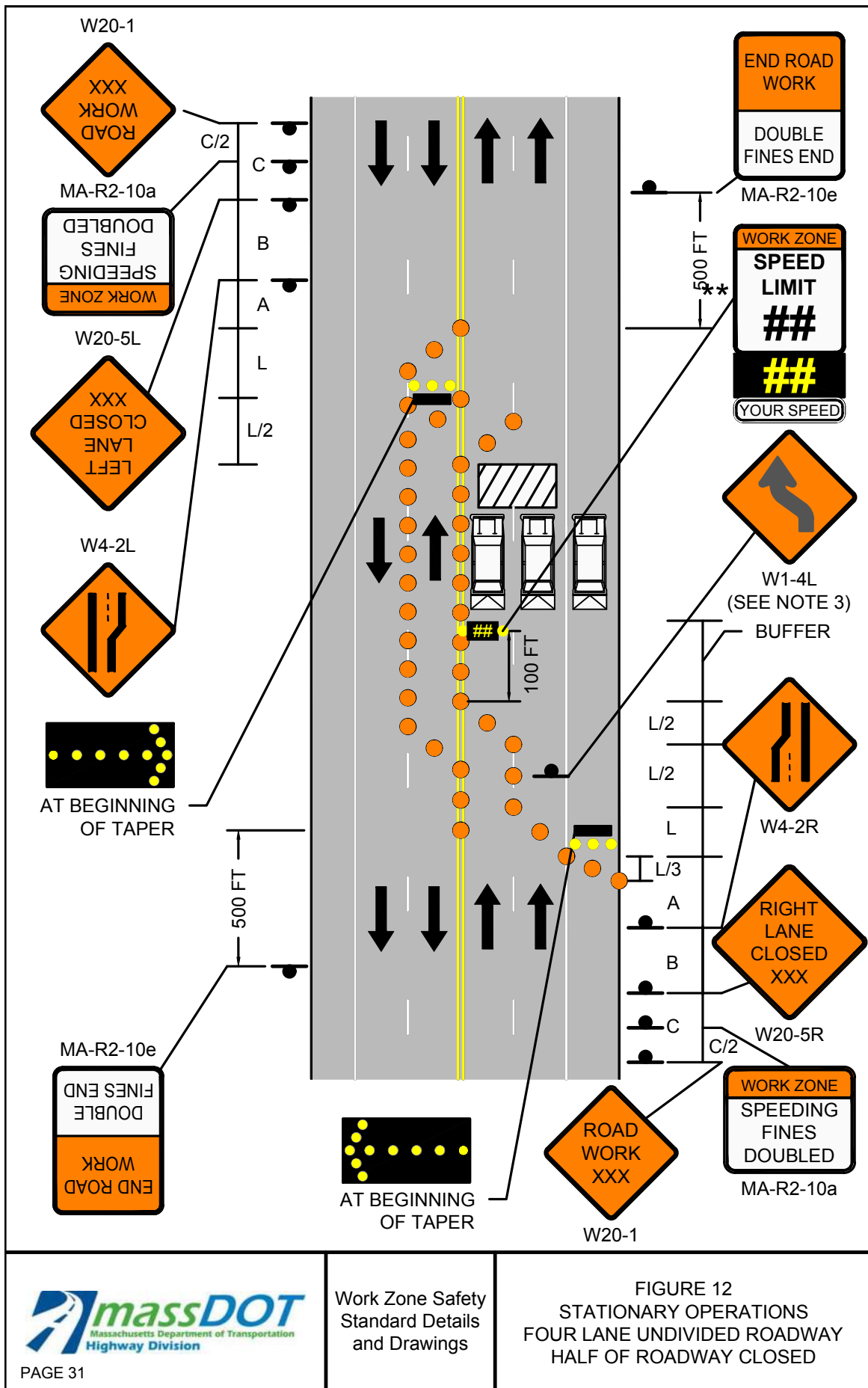


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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



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

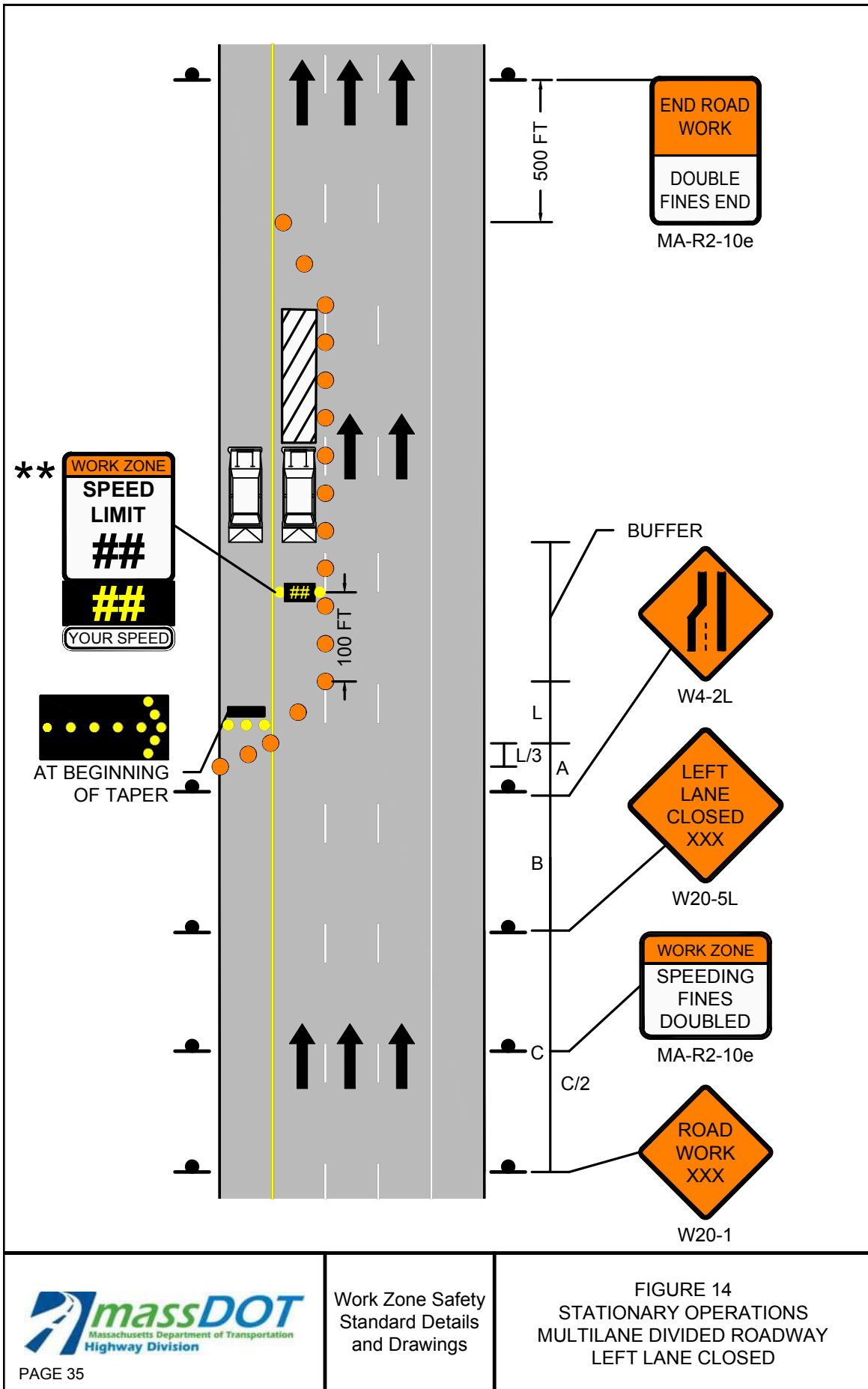


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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



WORK ZONE



CHANNELIZATION DEVICE



FLASHING ARROW BOARD



PORTABLE CHANGEABLE MESSAGE SIGN



TRUCK MOUNTED ATTENUATOR



RADAR SPEED FEEDBACK BOARD



POLICE DETAIL OR UNIFORMED FLAGGER

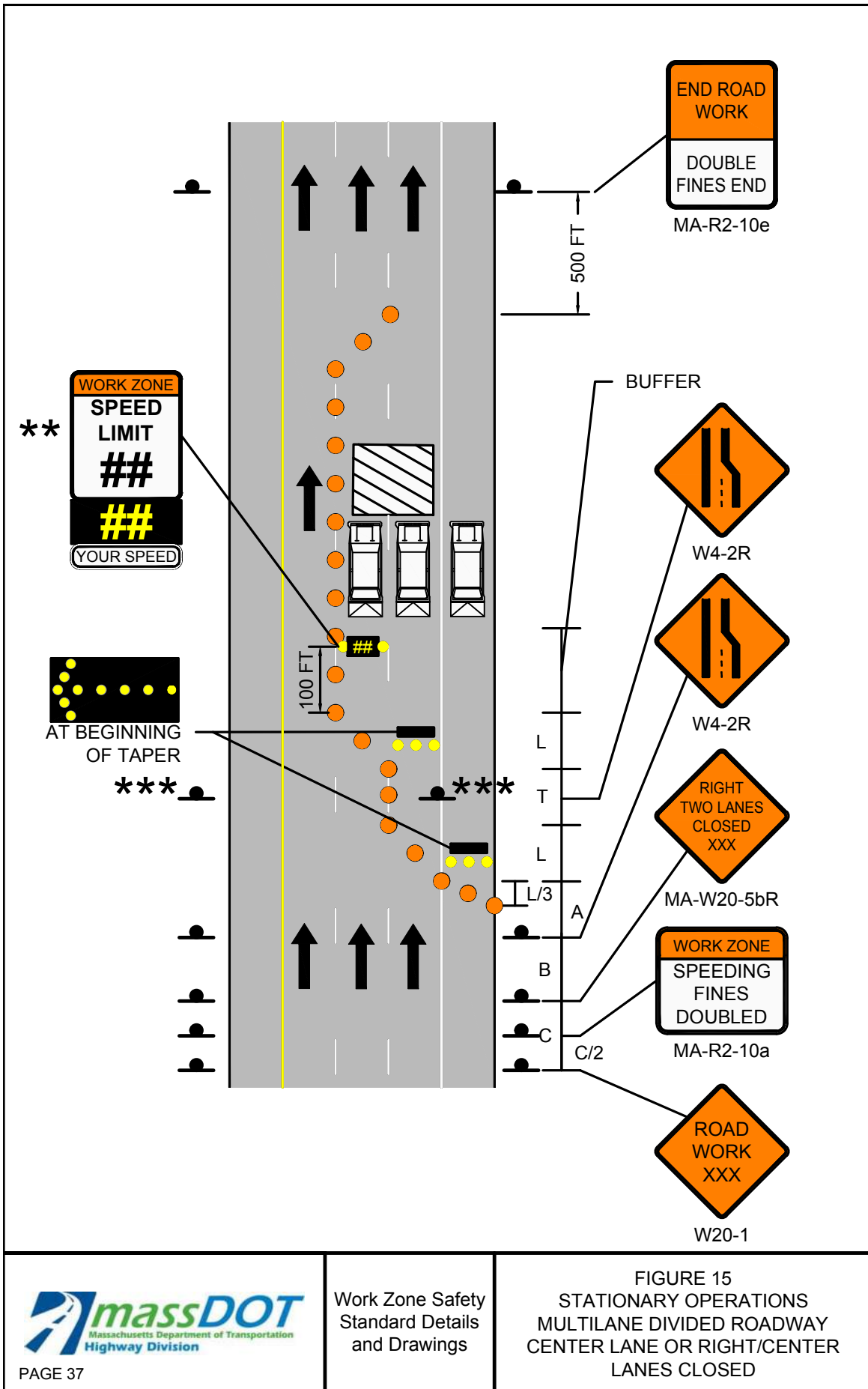


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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



WORK ZONE



CHANNELIZATION DEVICE



FLASHING ARROW BOARD



PORTABLE CHANGEABLE MESSAGE SIGN



TRUCK MOUNTED ATTENUATOR



RADAR SPEED FEEDBACK BOARD



POLICE DETAIL OR UNIFORMED FLAGGER

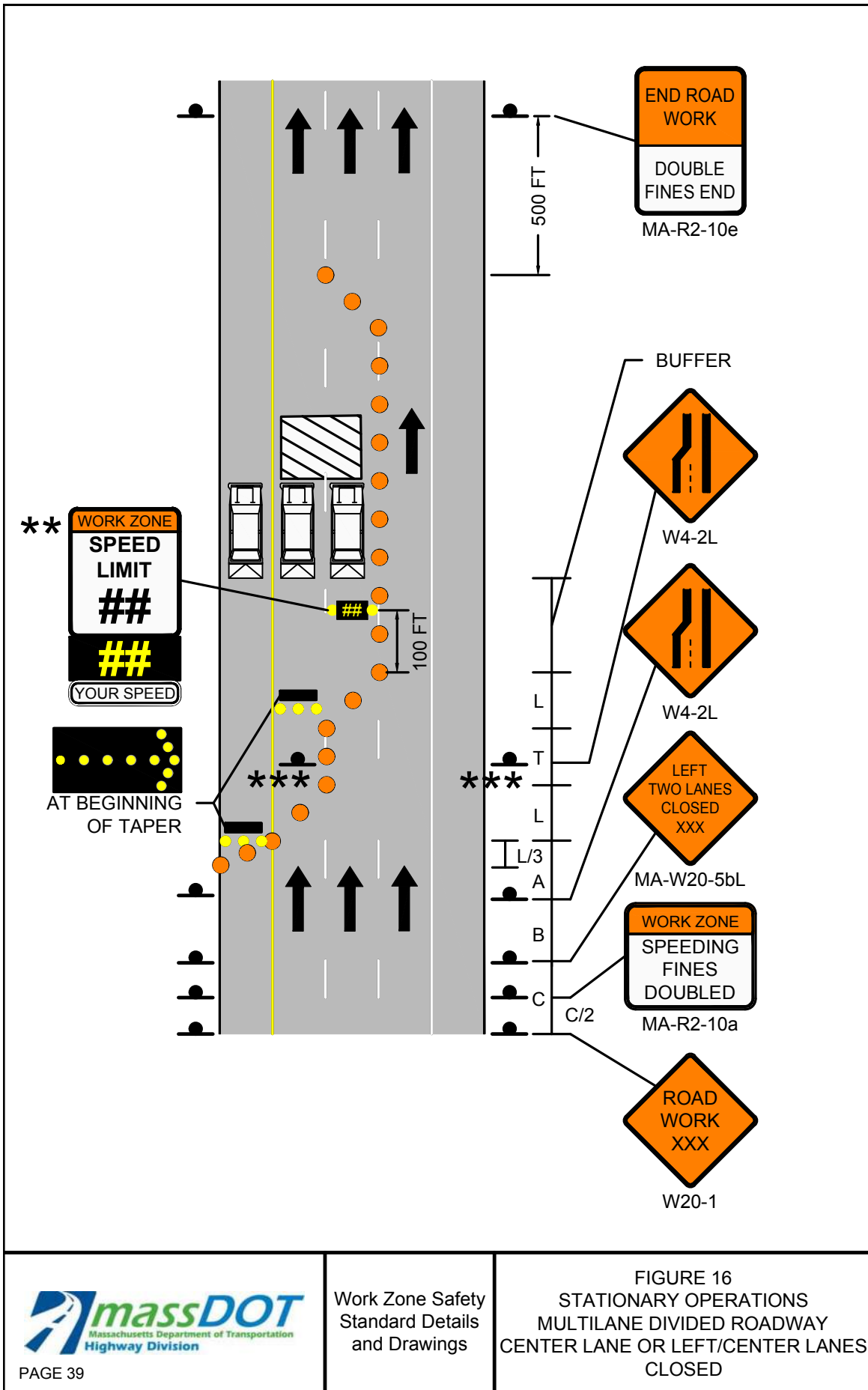


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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.

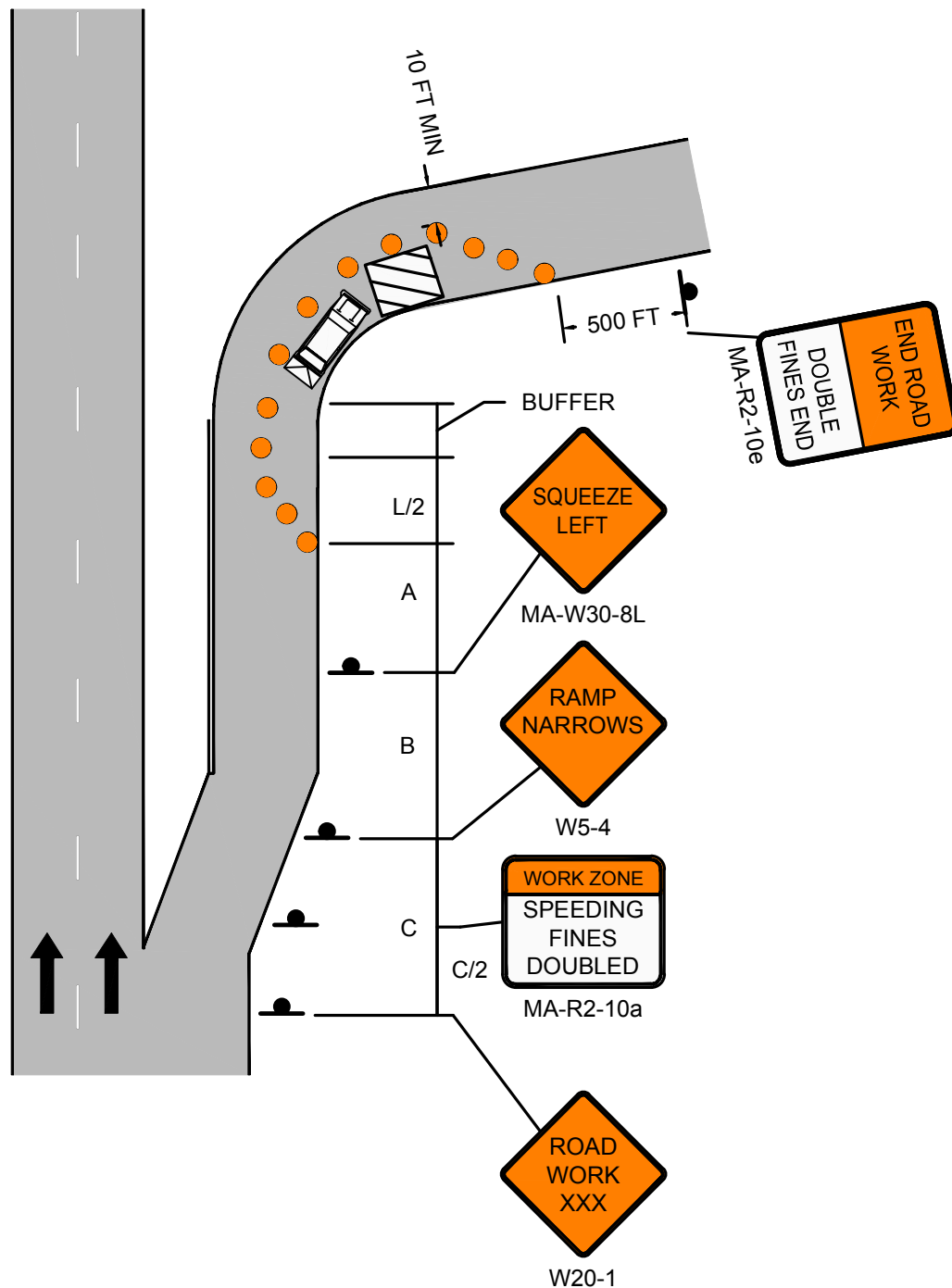
NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND

	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





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



WORK ZONE



CHANNELIZATION DEVICE



FLASHING ARROW BOARD



PORTABLE CHANGEABLE MESSAGE SIGN



TRUCK MOUNTED ATTENUATOR



RADAR SPEED FEEDBACK BOARD



POLICE DETAIL OR UNIFORMED FLAGGER

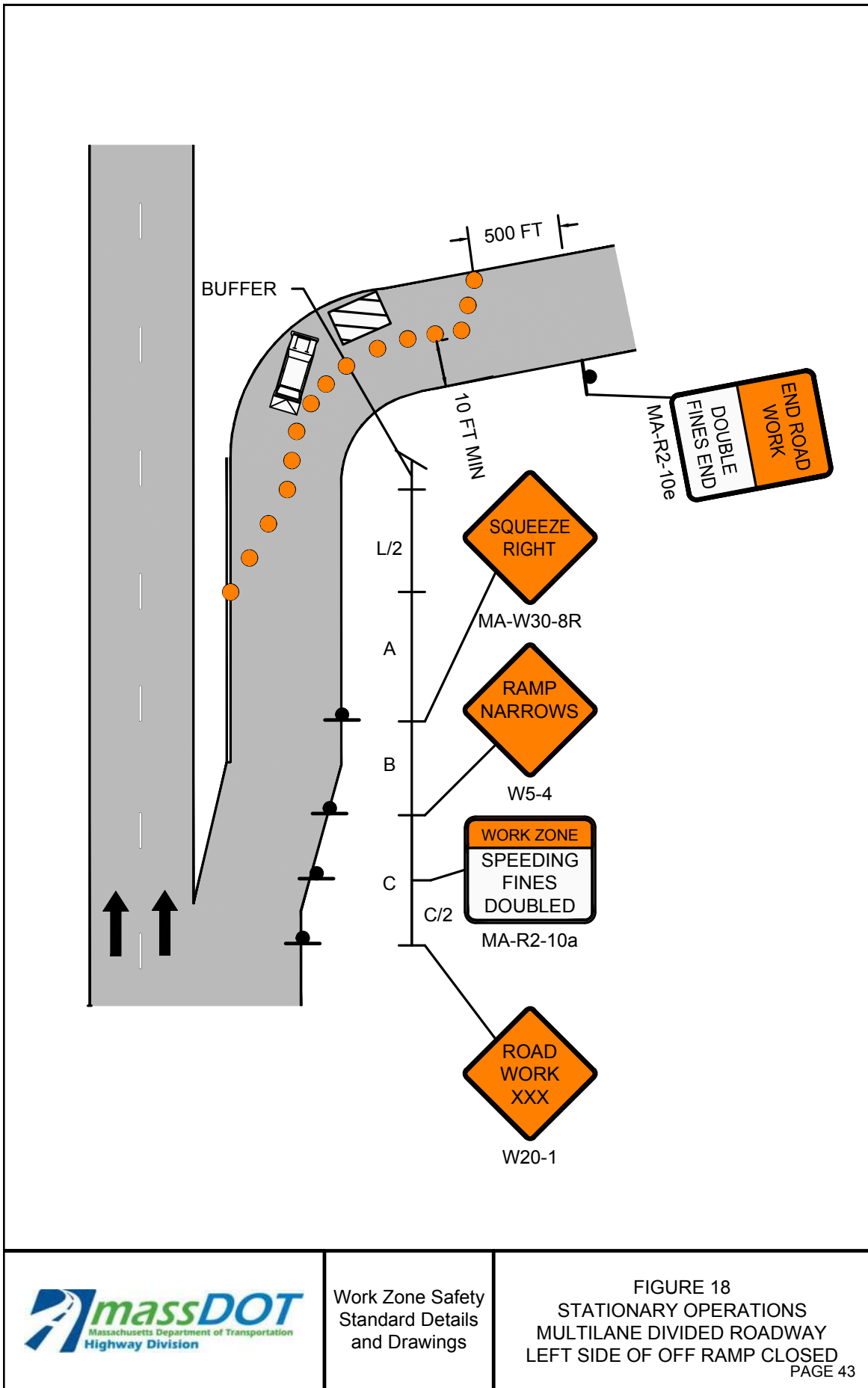


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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

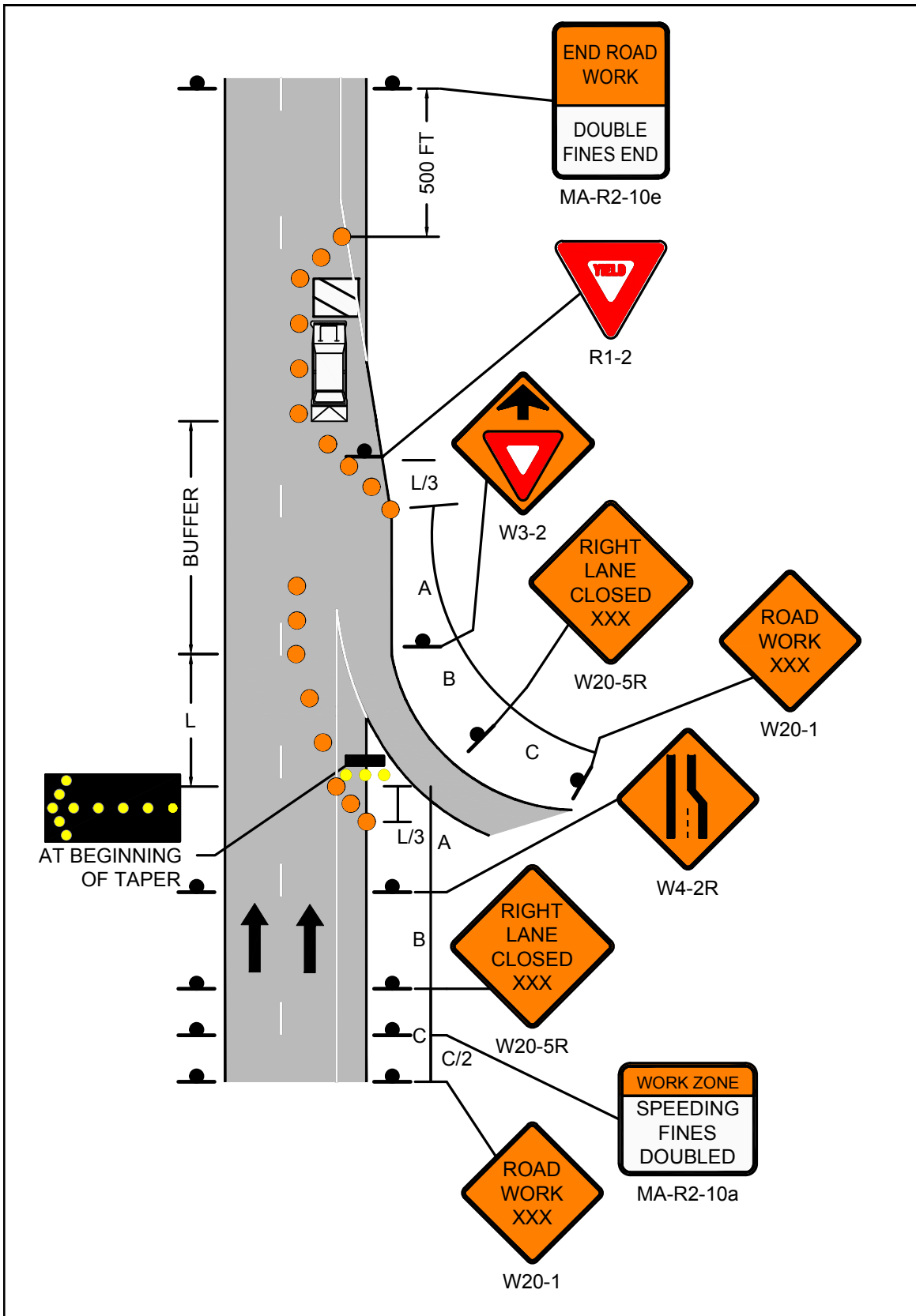


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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

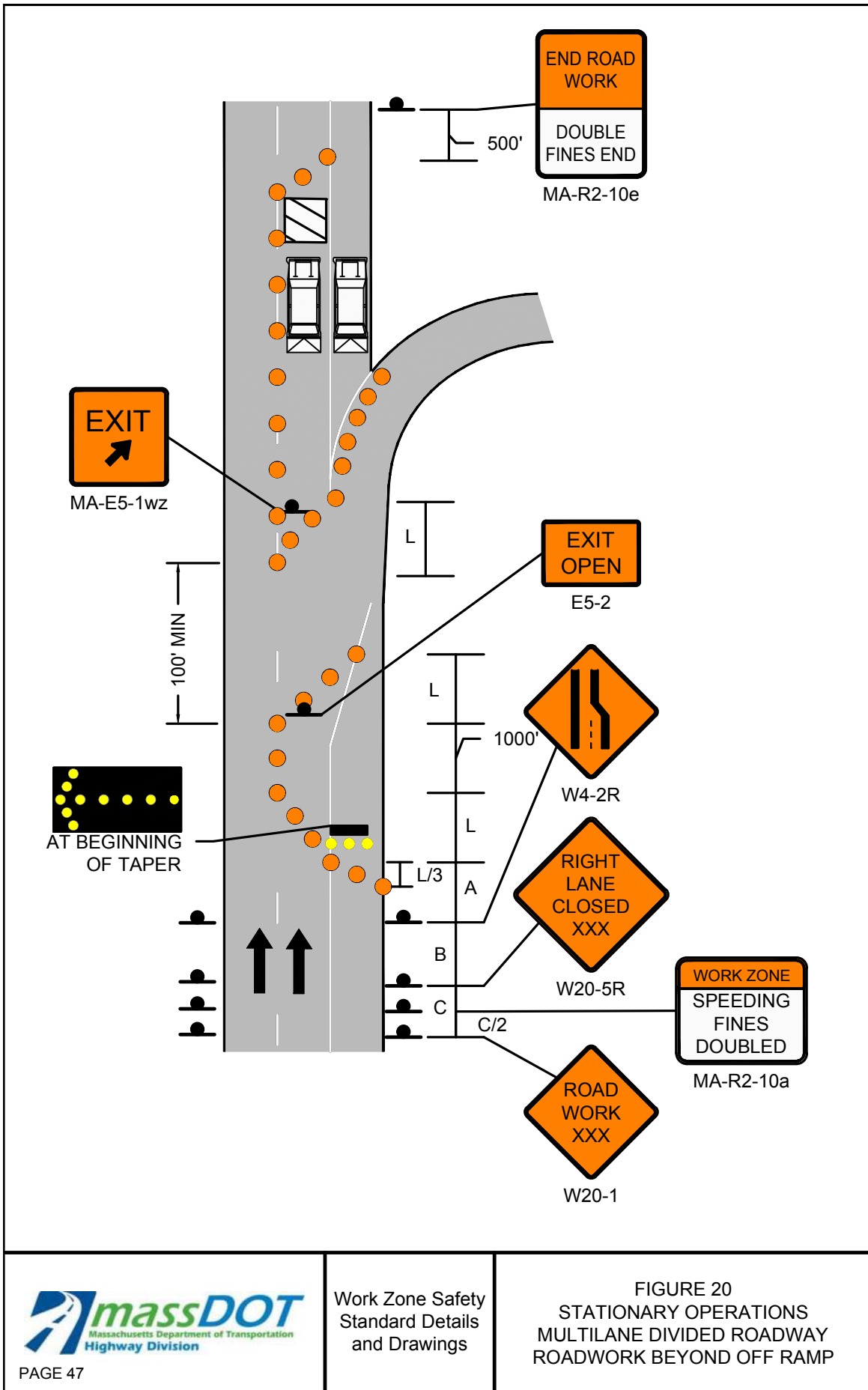


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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



WORK ZONE



CHANNELIZATION DEVICE



FLASHING ARROW BOARD



PORTABLE CHANGEABLE MESSAGE SIGN



TRUCK MOUNTED ATTENUATOR



RADAR SPEED FEEDBACK BOARD



POLICE DETAIL OR UNIFORMED FLAGGER

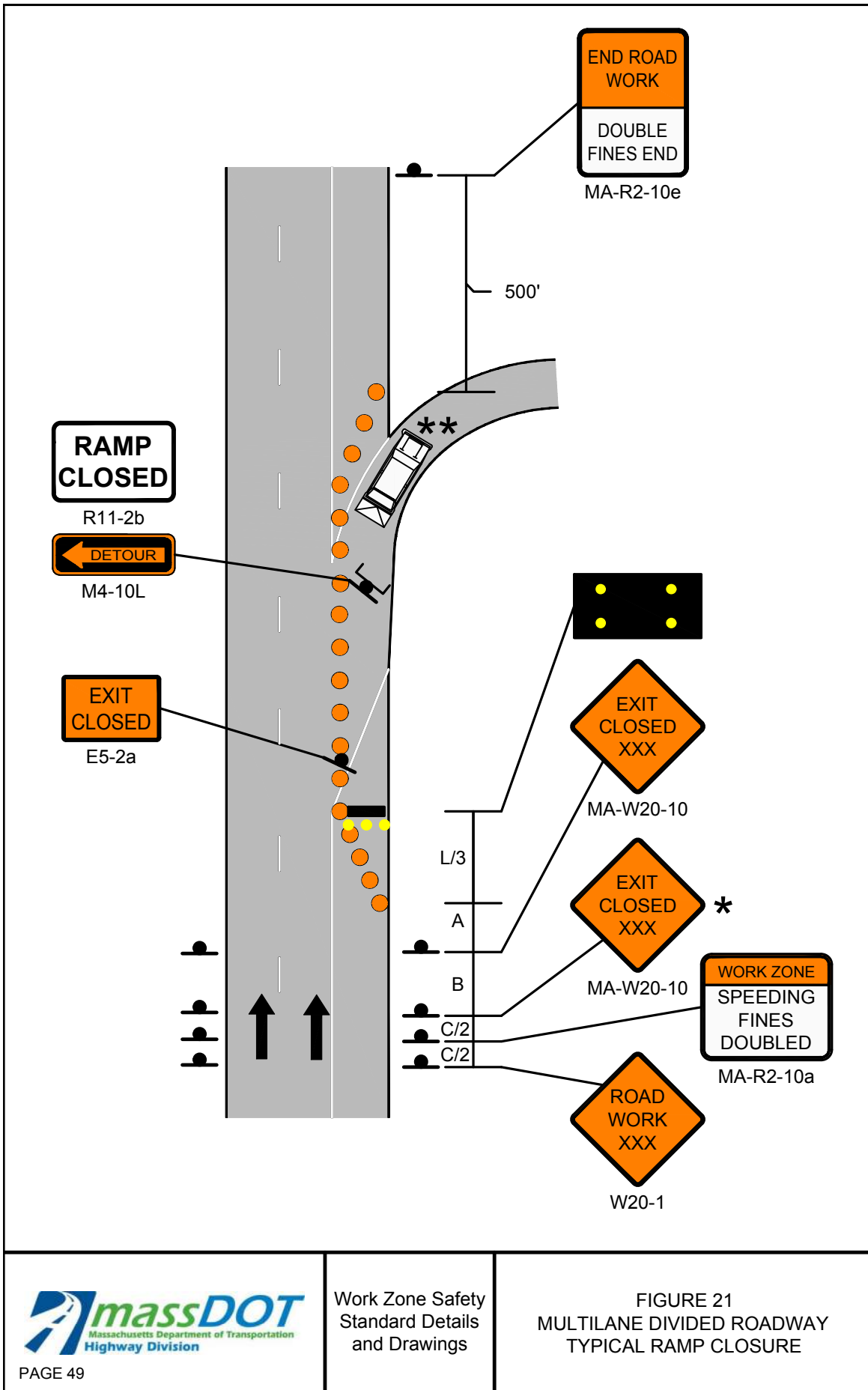


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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

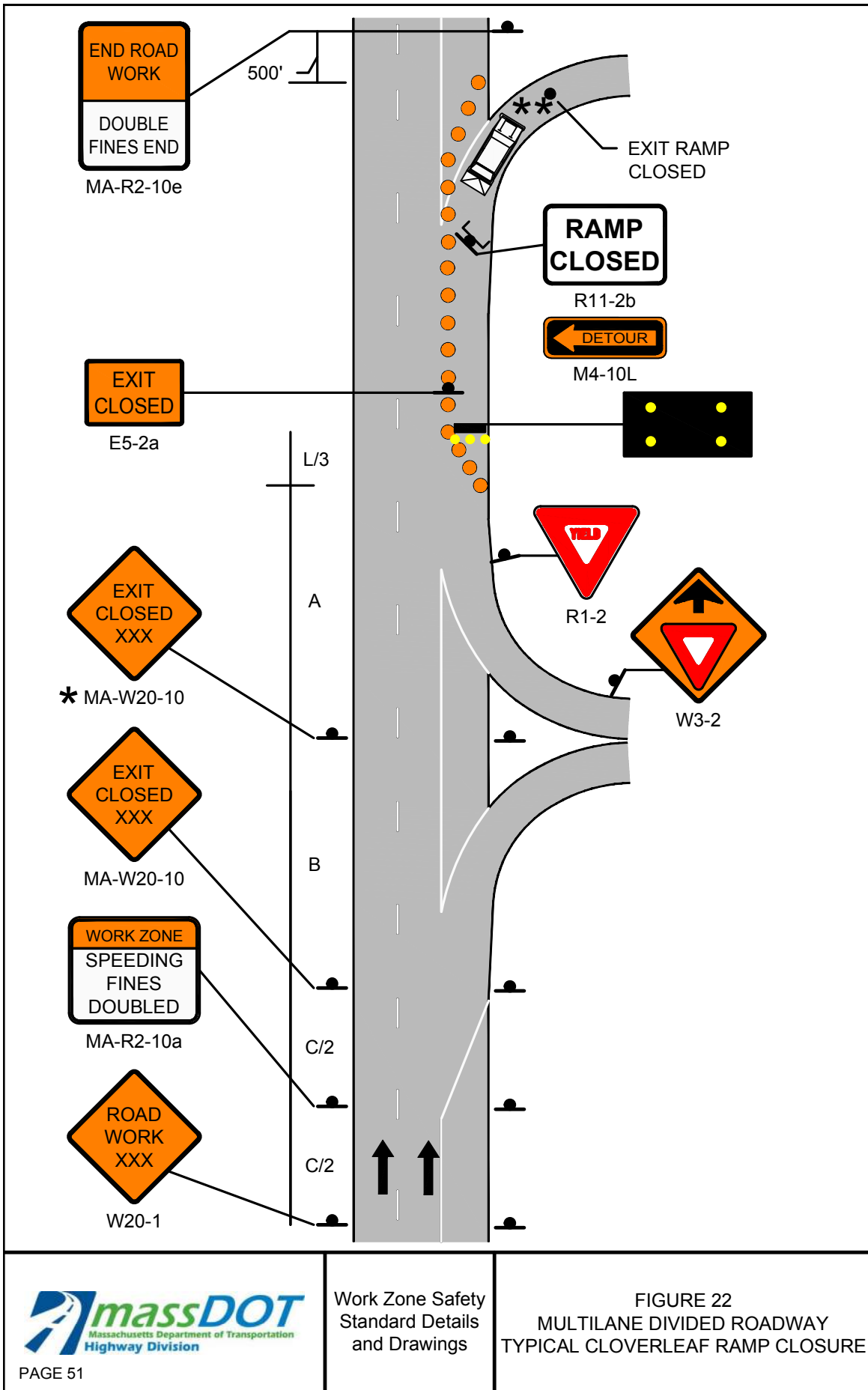


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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



WORK ZONE



CHANNELIZATION DEVICE



FLASHING ARROW BOARD



PORTABLE CHANGEABLE MESSAGE SIGN



TRUCK MOUNTED ATTENUATOR



RADAR SPEED FEEDBACK BOARD



POLICE DETAIL OR UNIFORMED FLAGGER

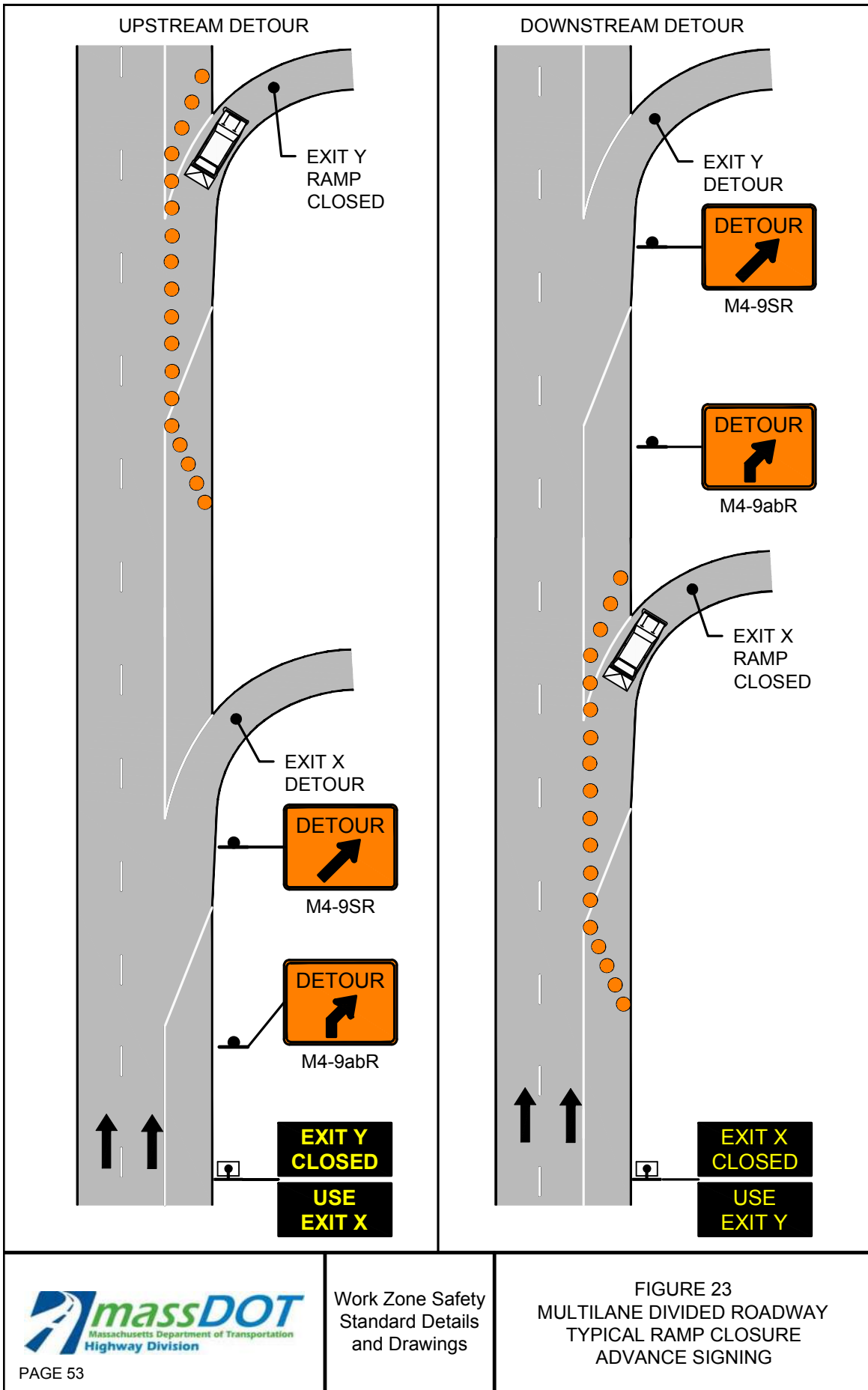


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





PAGE 54

Work Zone Safety
Standard Details
and DrawingsFIGURE 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

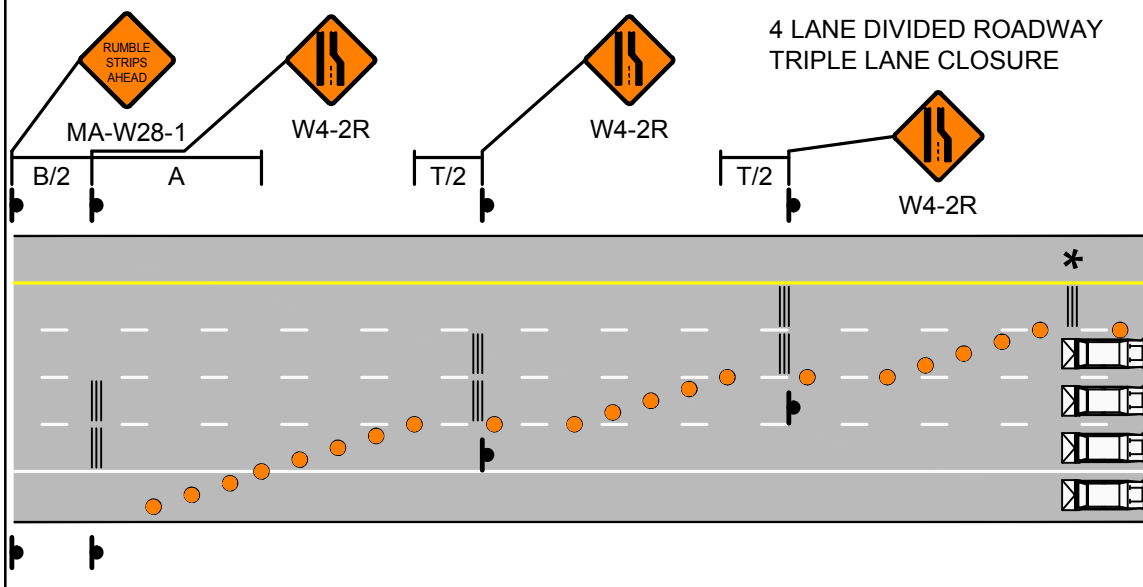
NOTES

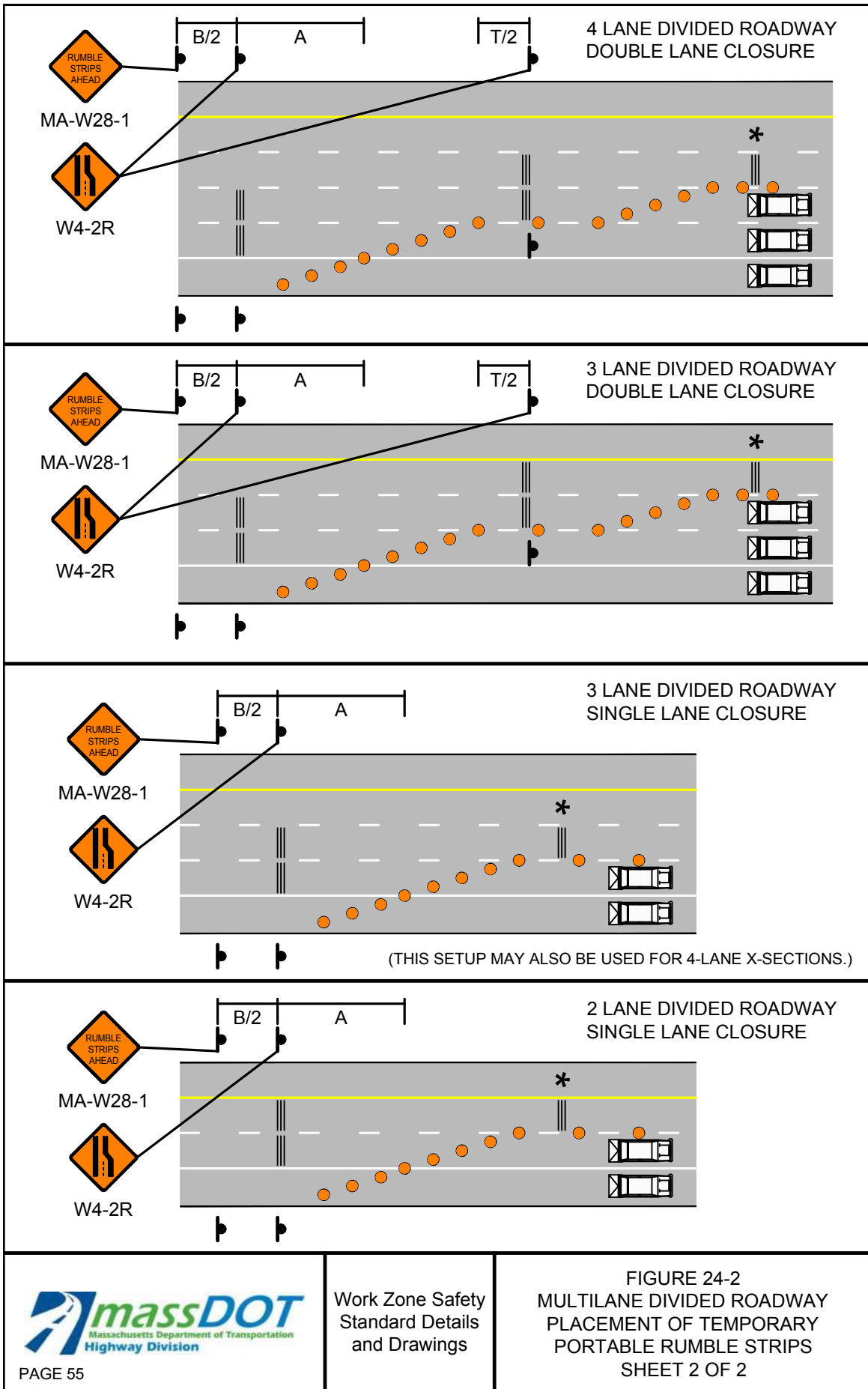
1. THE INTENTION OF THESE DETAILS IS ONLY TO DEPICT THE PLACEMENT OF TEMPORARY PORTABLE RUMBLE STRIPS (TPRS) IN RELATIONSHIP TO THE TAPER AND THE BUFFER OF A SINGLE- OR MULTI-LANE CLOSURE. THE DEPICTION OF THE NUMBER AND SPACING OF ALL OTHER TRAFFIC CONTROL DEVICES IS NOT TO SCALE. REFER TO OTHER DETAILS 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

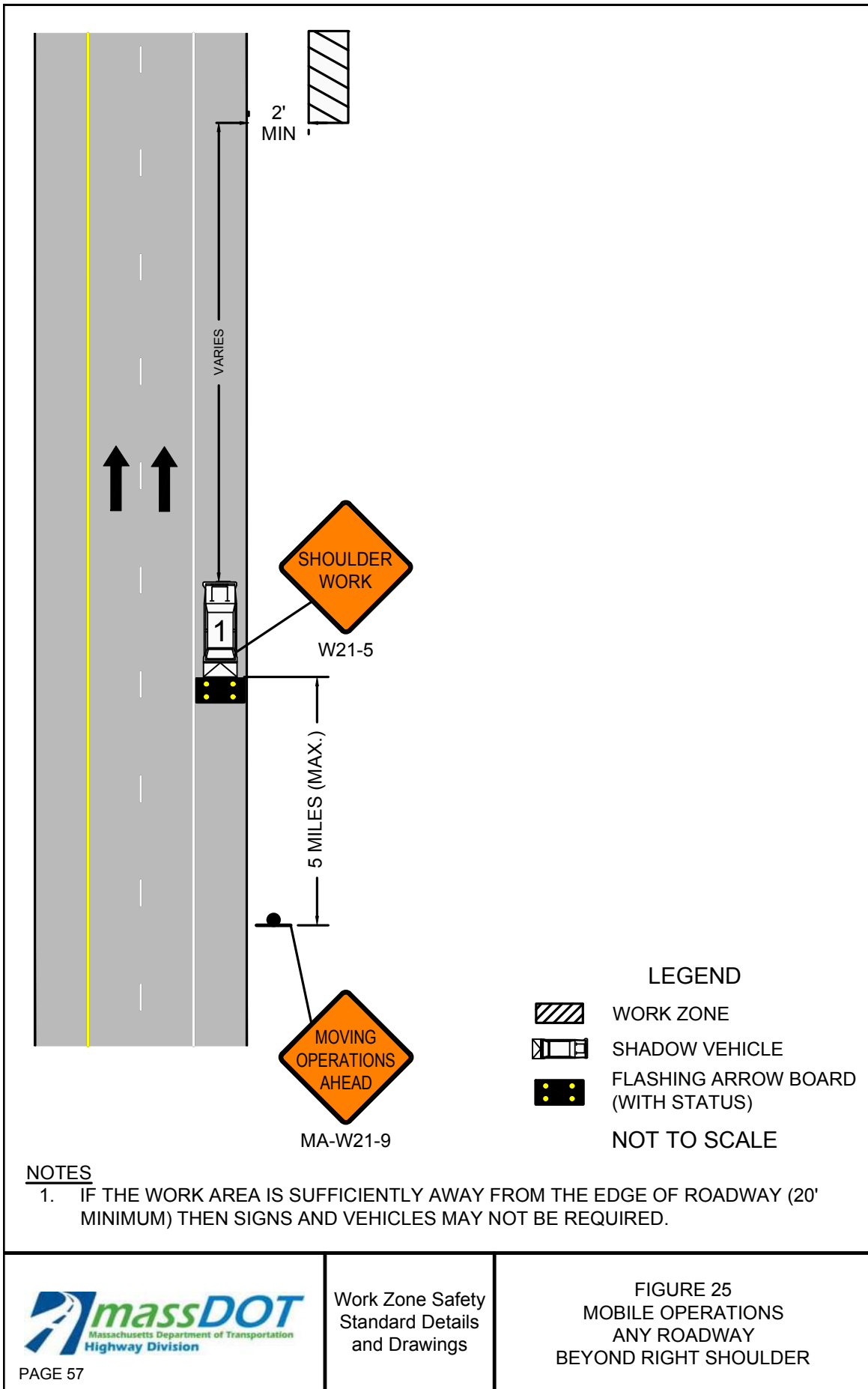
- CHANNELIZATION DEVICE
-  TRUCK MOUNTED ATTENUATOR
- ≡≡≡ TEMPORARY PORTABLE RUMBLE STRIP

NOT TO SCALE





 <p>PAGE 56</p>	<p>Work Zone Safety Standard Details and Drawings</p>	<p>NOTES FOR MOBILE OPERATIONS</p>
<p style="text-align: center;">Notes for Mobile Operations</p> <ul style="list-style-type: none"> • Unless otherwise stated, these notes shall apply to all Mobile Operation setups. • Additional, setup-specific notes may be found on individual sheets. <ol style="list-style-type: none"> 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. 		

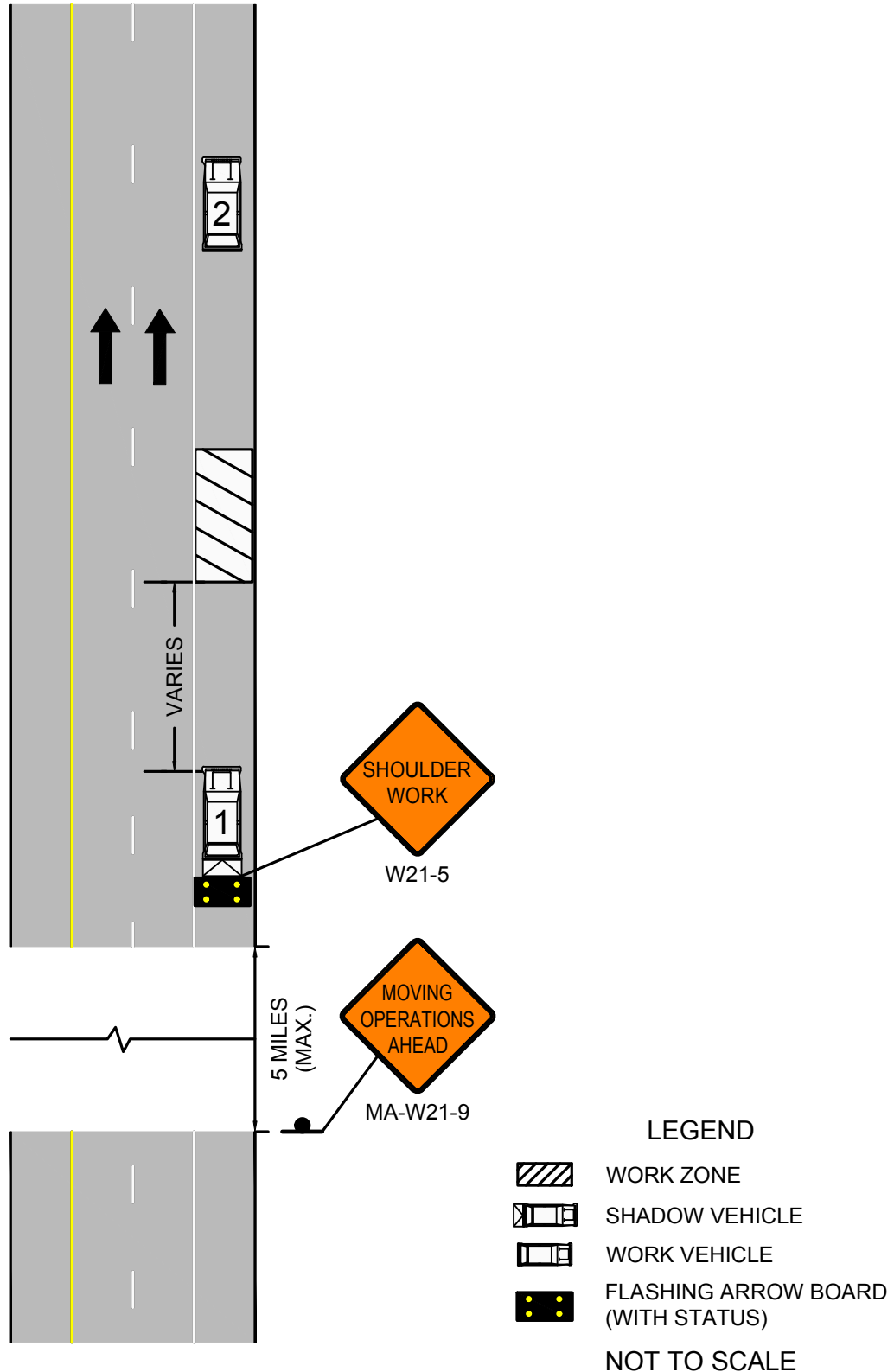


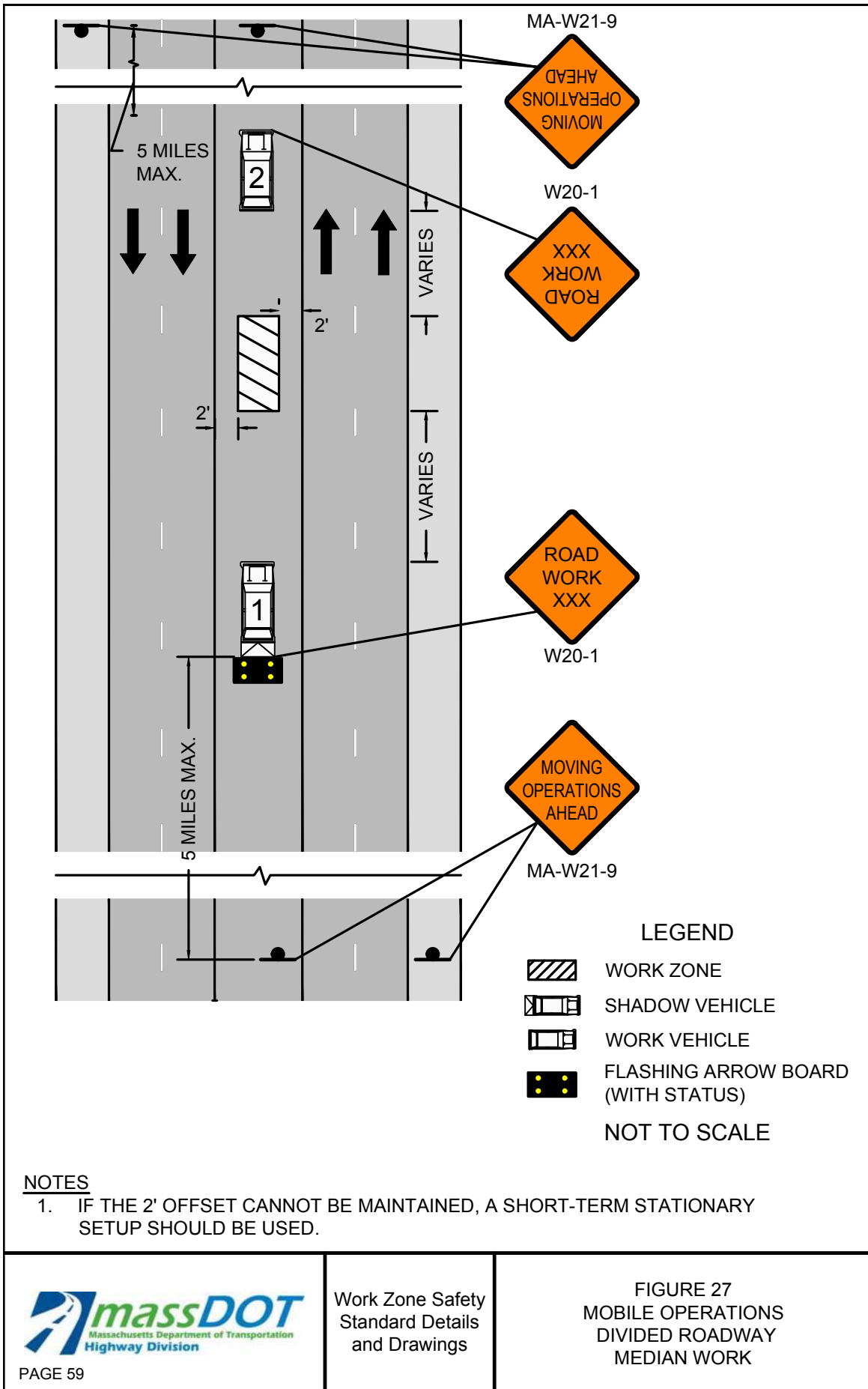


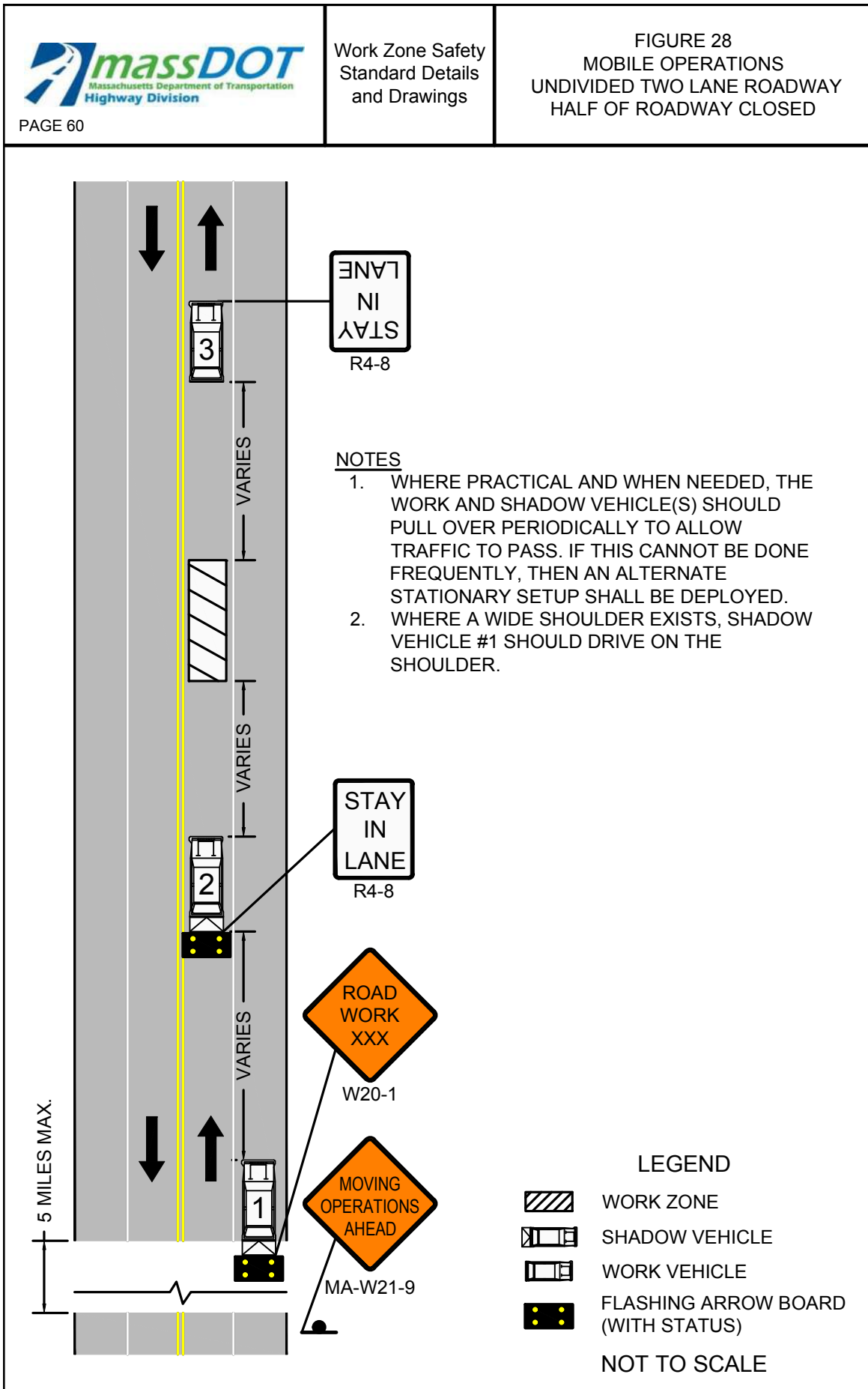
PAGE 58

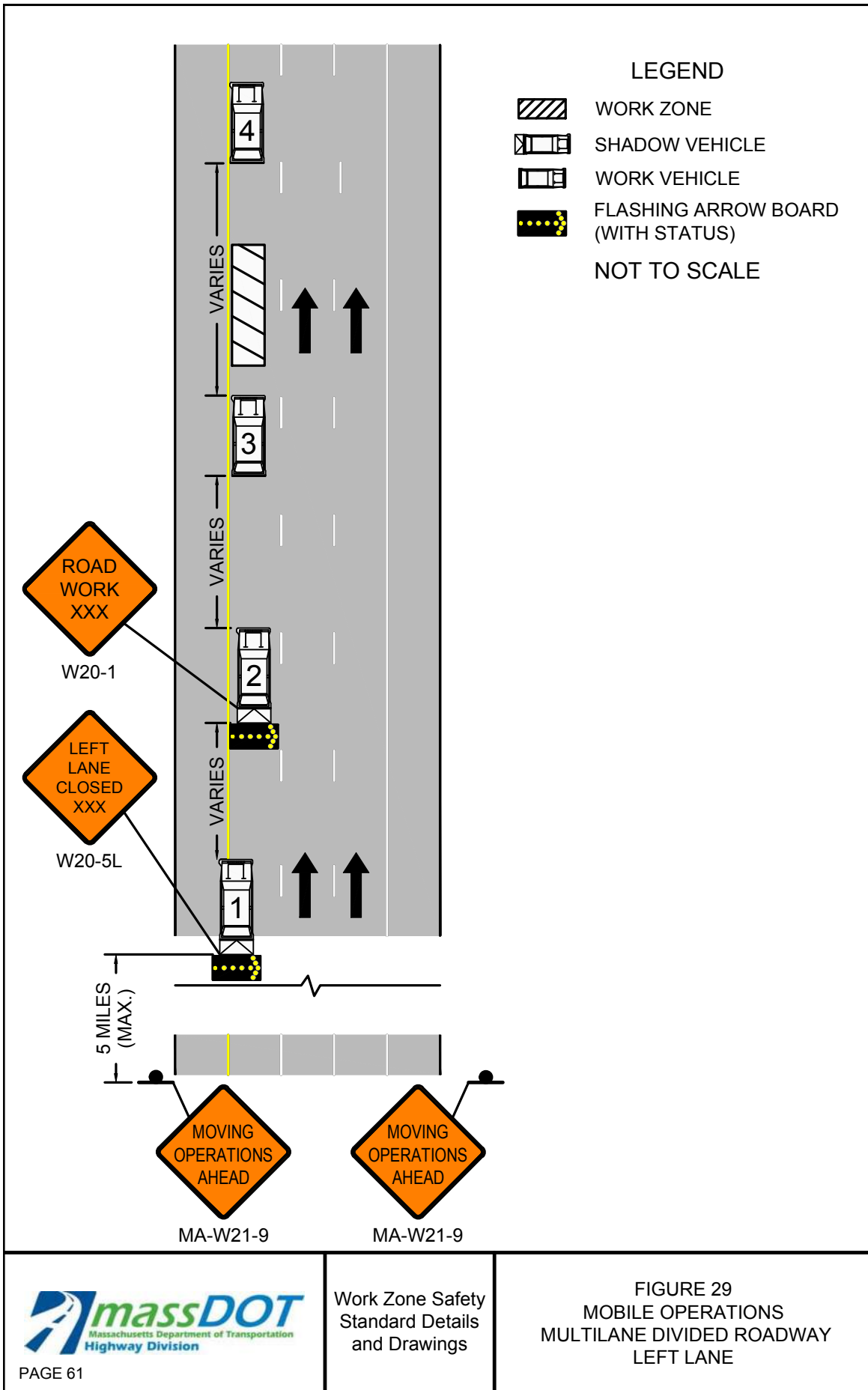
Work Zone Safety
Standard Details
and Drawings

FIGURE 26
MOBILE OPERATIONS
ANY ROADWAY SHOULDER







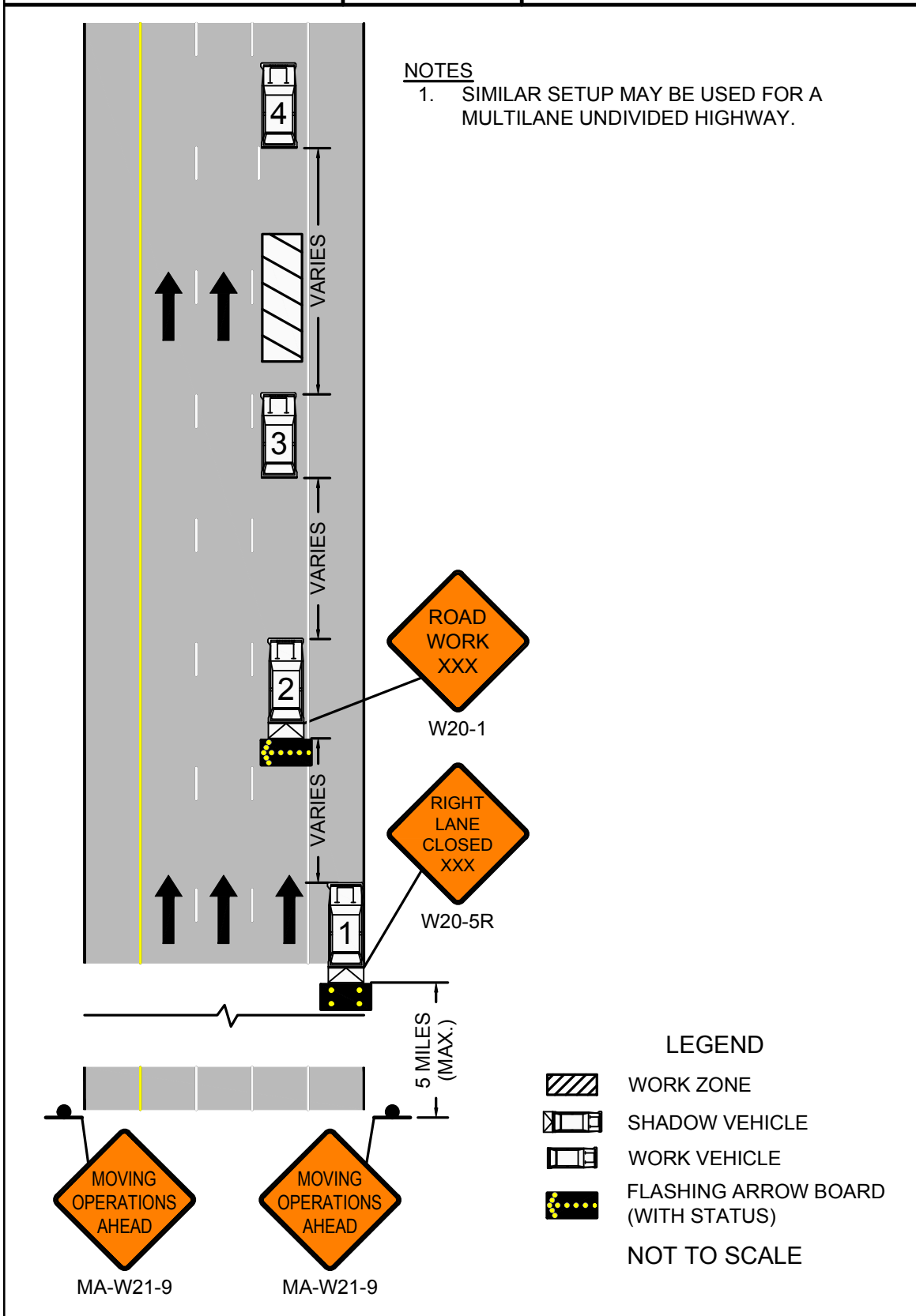


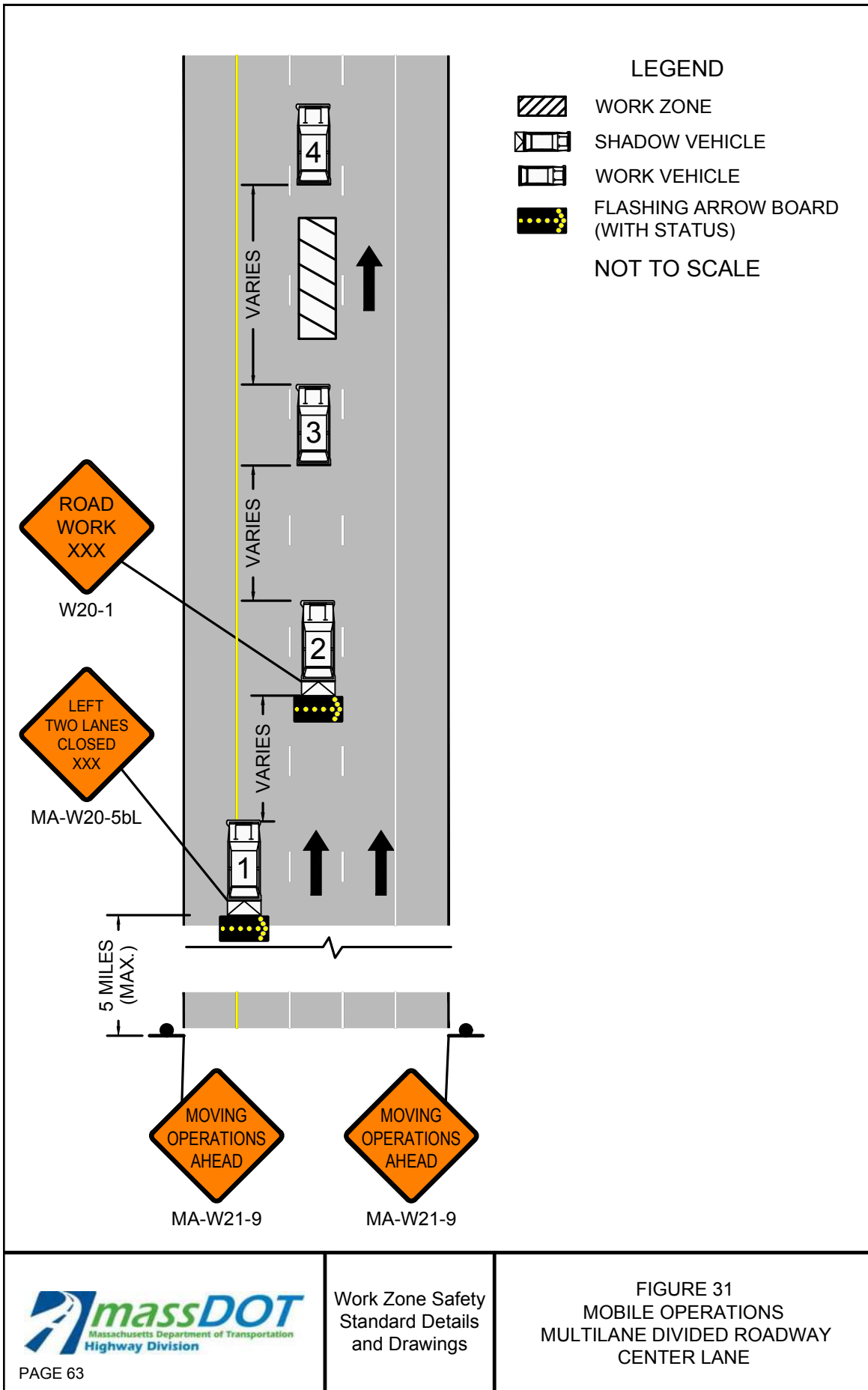


PAGE 62

Work Zone Safety
Standard Details
and Drawings

FIGURE 30
MOBILE OPERATIONS
MULTILANE DIVIDED ROADWAY
RIGHT LANE



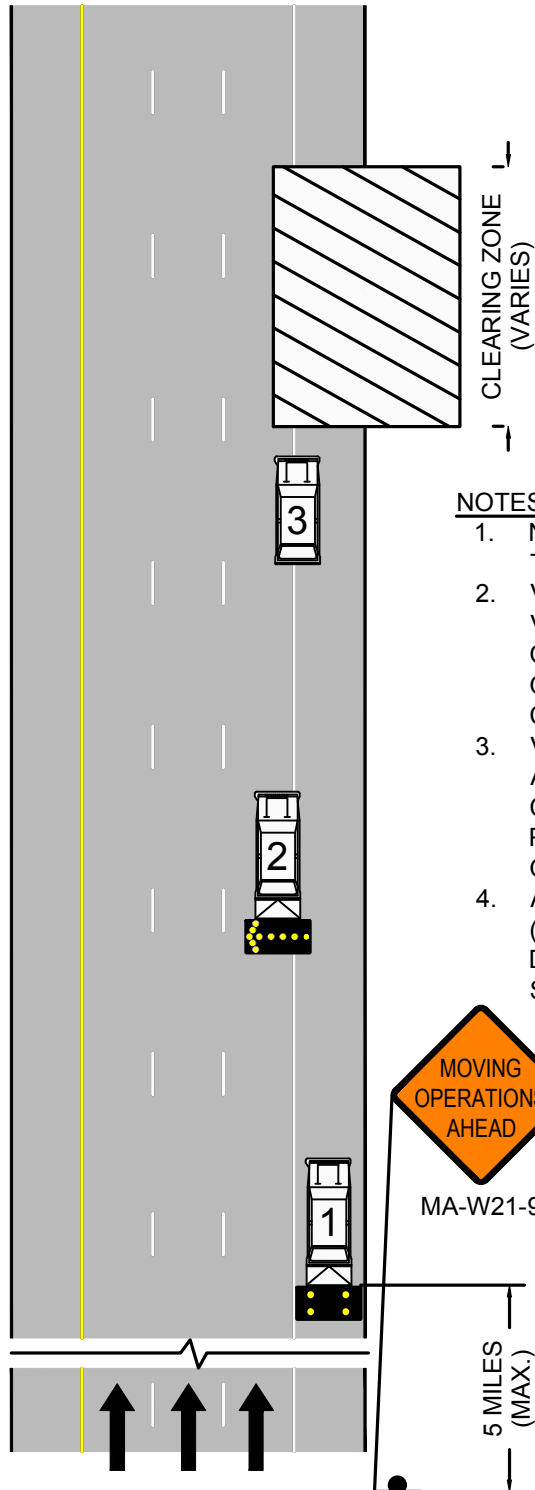




PAGE 64

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

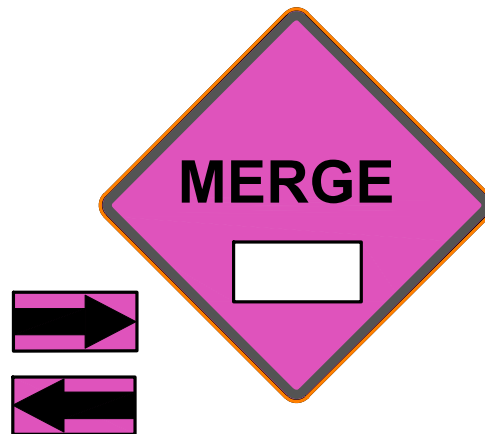
Notes for Traffic Emergency or Incident Operations

- 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



MA-W4-2aR/L





PAGE 66

Work Zone Safety
Standard Details
and Drawings

FIGURE 33
EMERGENCY RESPONSE
ANY ROADWAY
SHOULDER ENCROACHMENT

LEGEND



EMERGENCY AREA

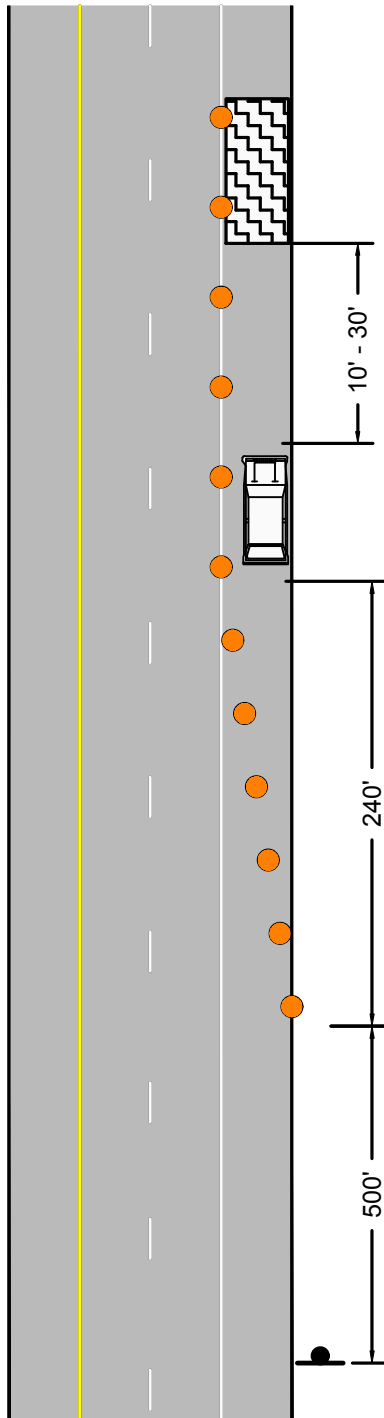


CHANNELIZATION DEVICE



EMERGENCY RESPONSE
VEHICLE

NOT TO SCALE



ORDER OF RESPONSE ACTIVITIES

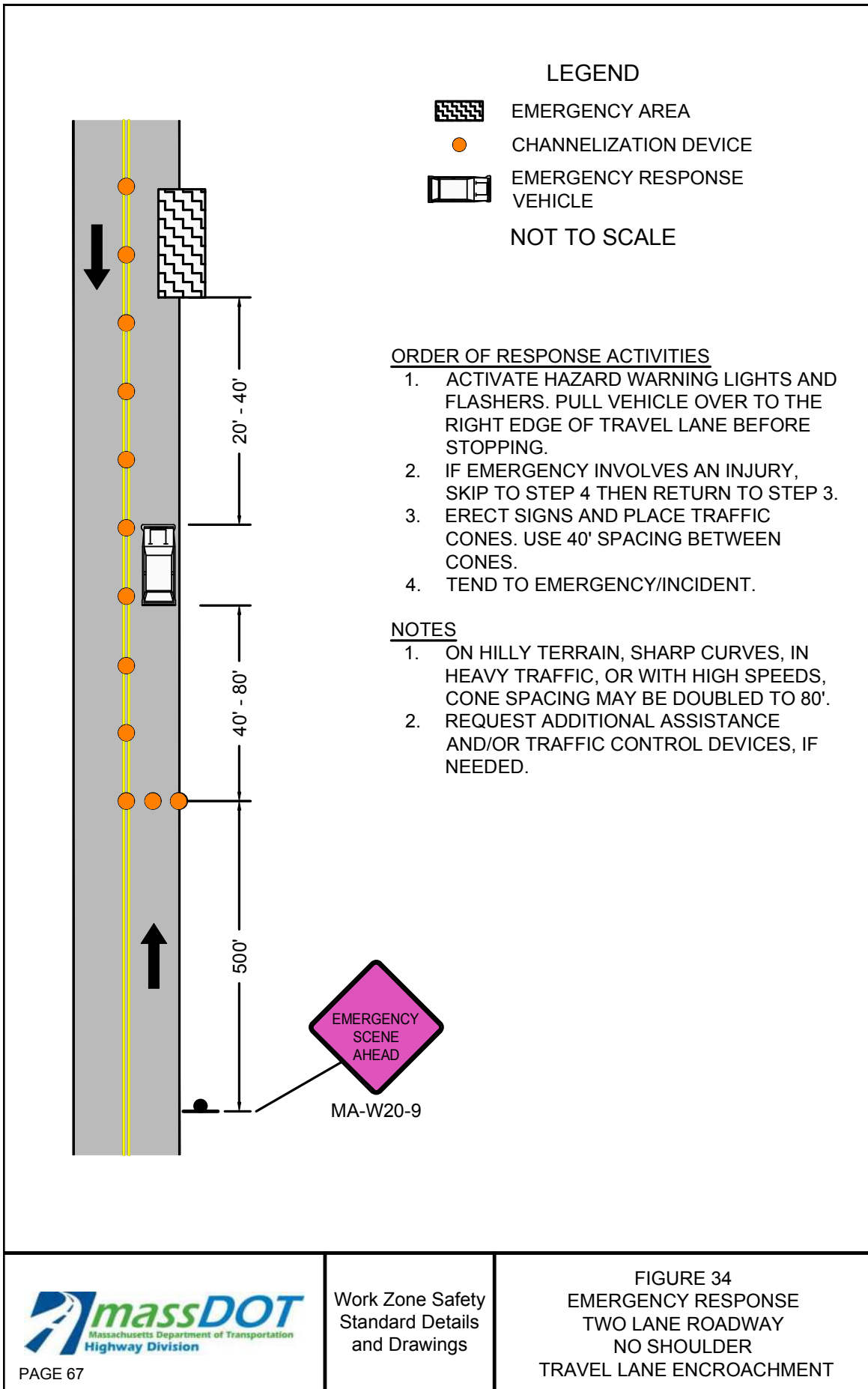
1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE RIGHT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

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.



MA-W20-9








PAGE 68

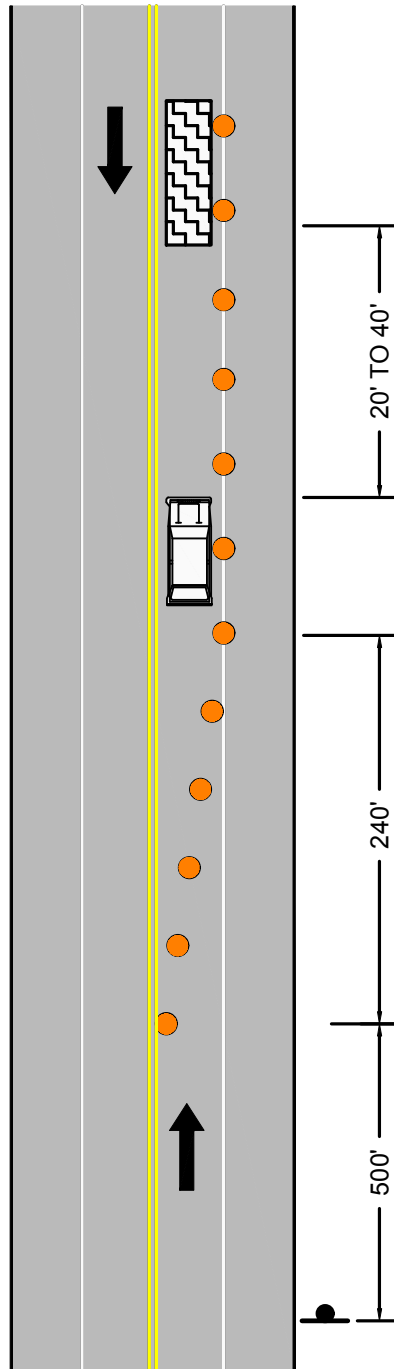
Work Zone Safety
Standard Details
and Drawings

FIGURE 35
EMERGENCY RESPONSE
TWO LANE ROADWAY
TRAVERSABLE SHOULDER
SINGLE LANE ENCROACHMENT

LEGEND

-  EMERGENCY AREA
-  CHANNELIZATION DEVICE
-  EMERGENCY RESPONSE VEHICLE

NOT TO SCALE

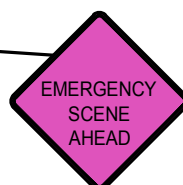


ORDER OF RESPONSE ACTIVITIES

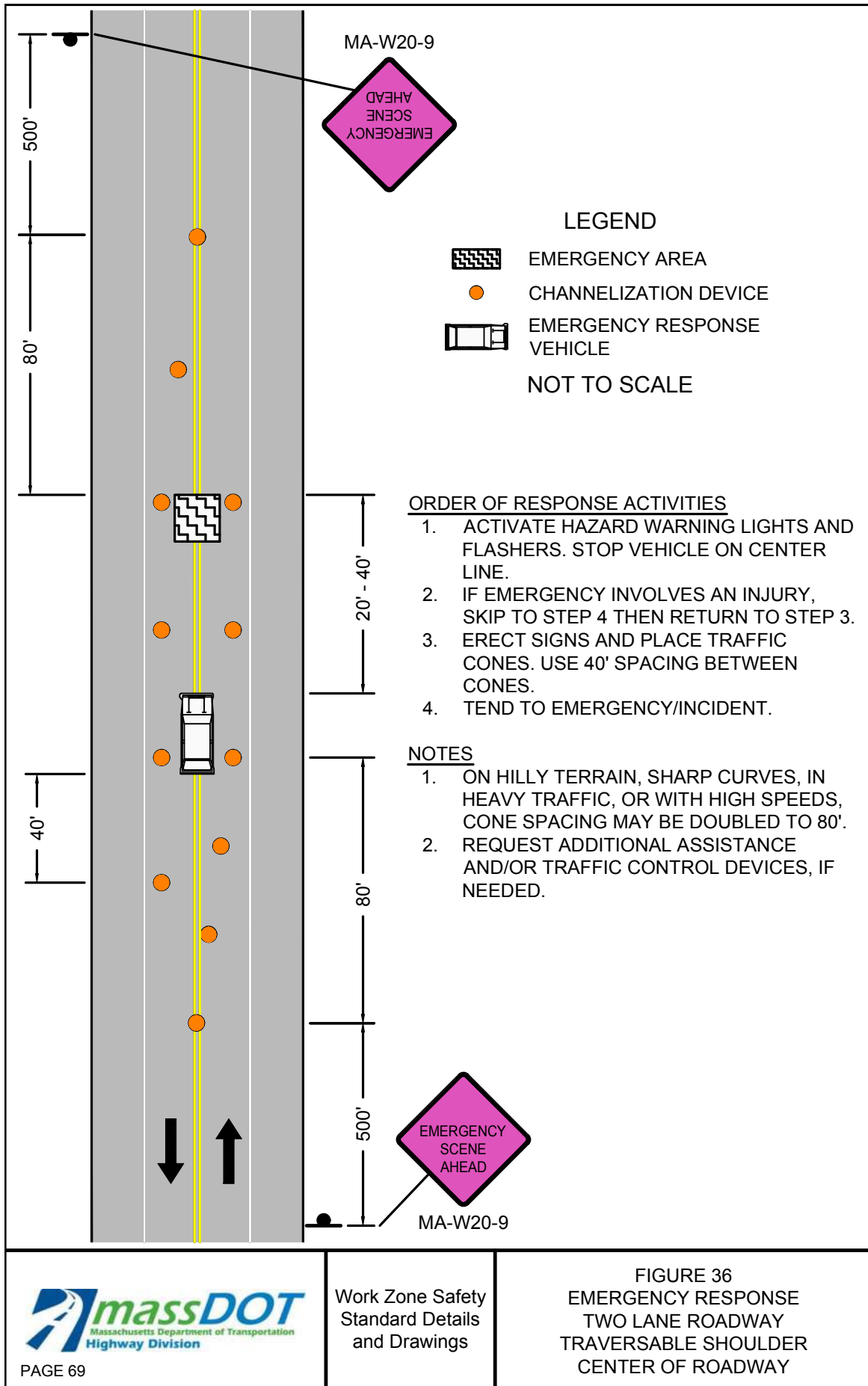
1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE LEFT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

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.



MA-W20-9

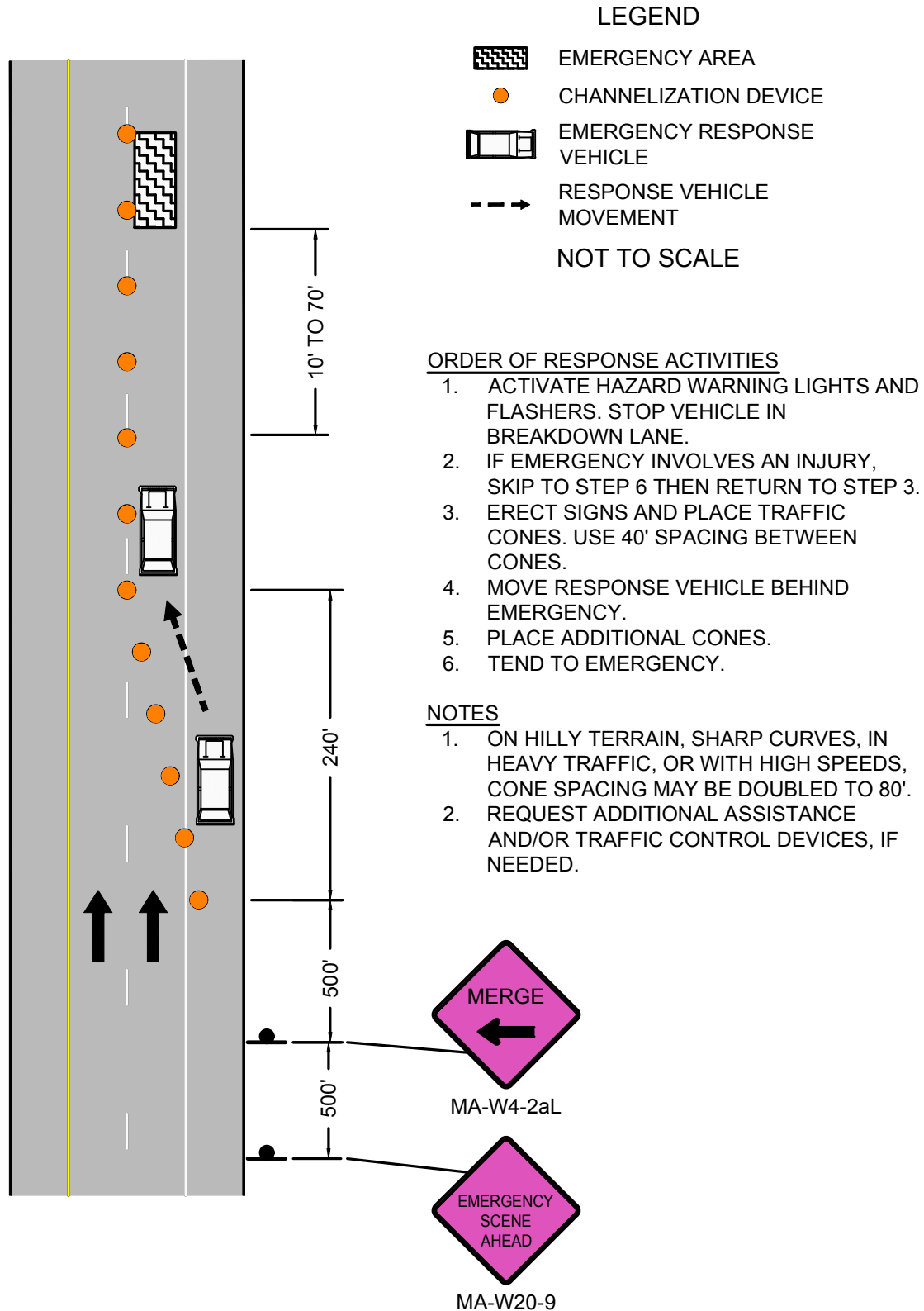


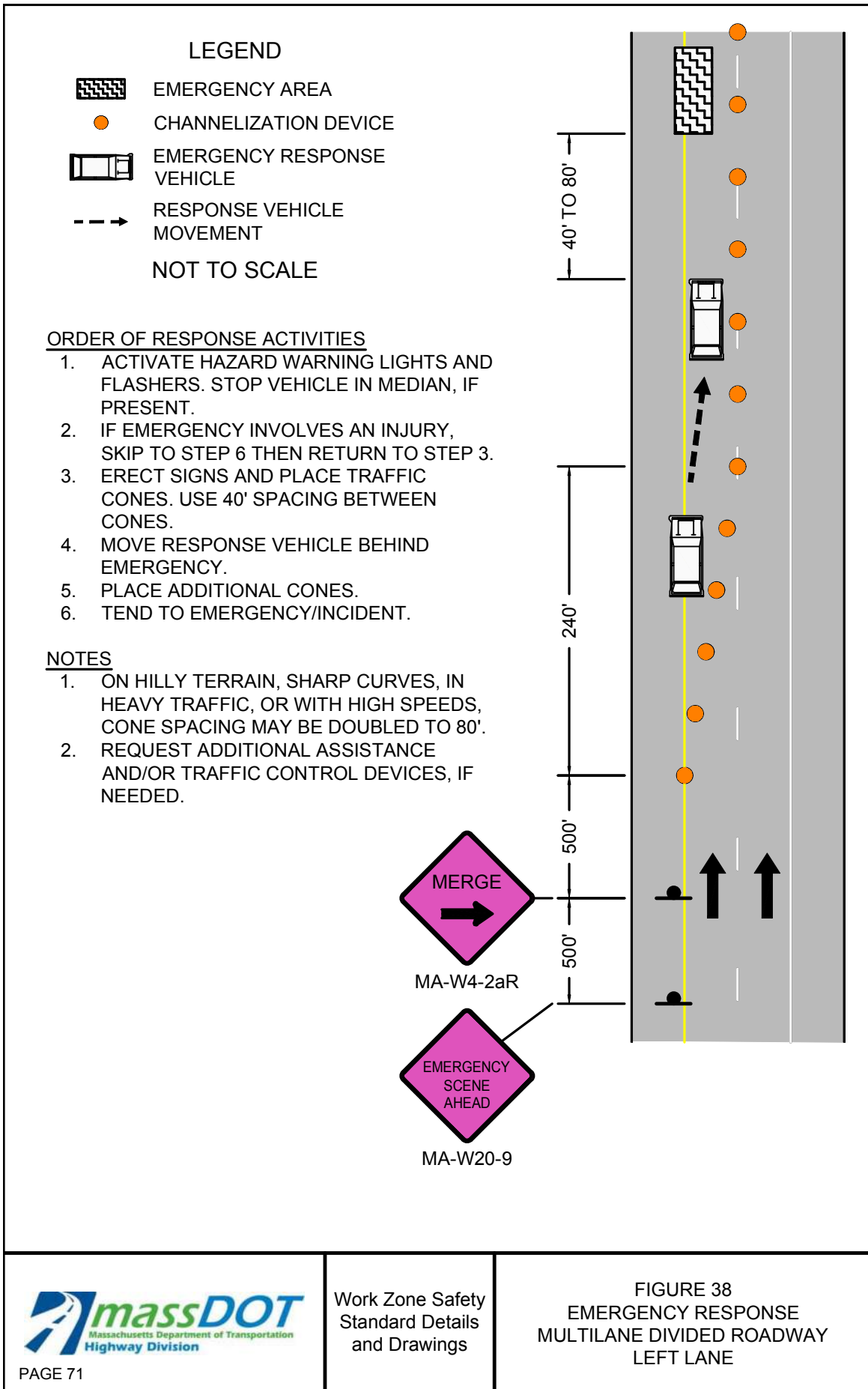


PAGE 70

Work Zone Safety
Standard Details
and Drawings

FIGURE 37
EMERGENCY RESPONSE
MULTILANE DIVIDED ROADWAY
RIGHT LANE



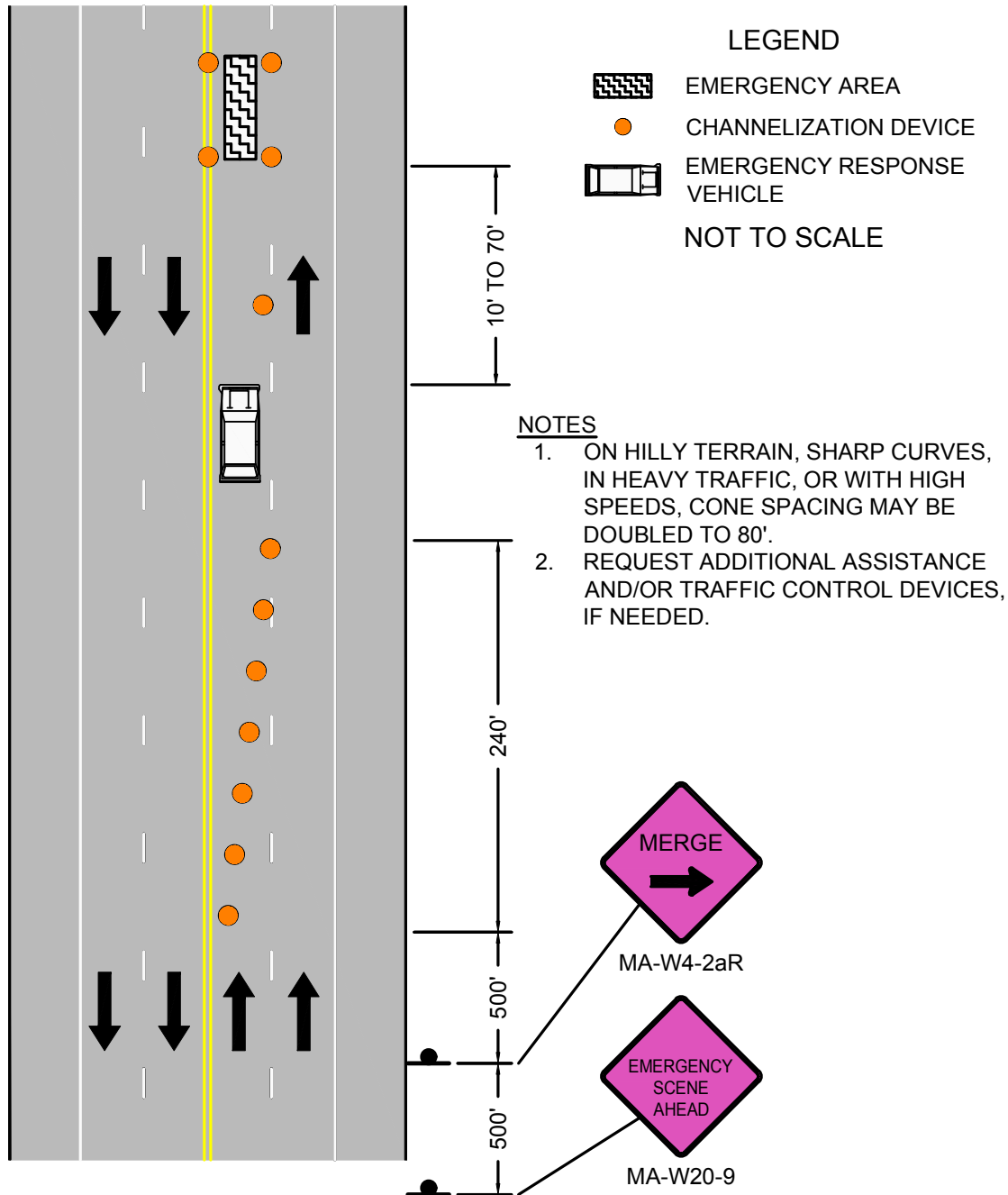


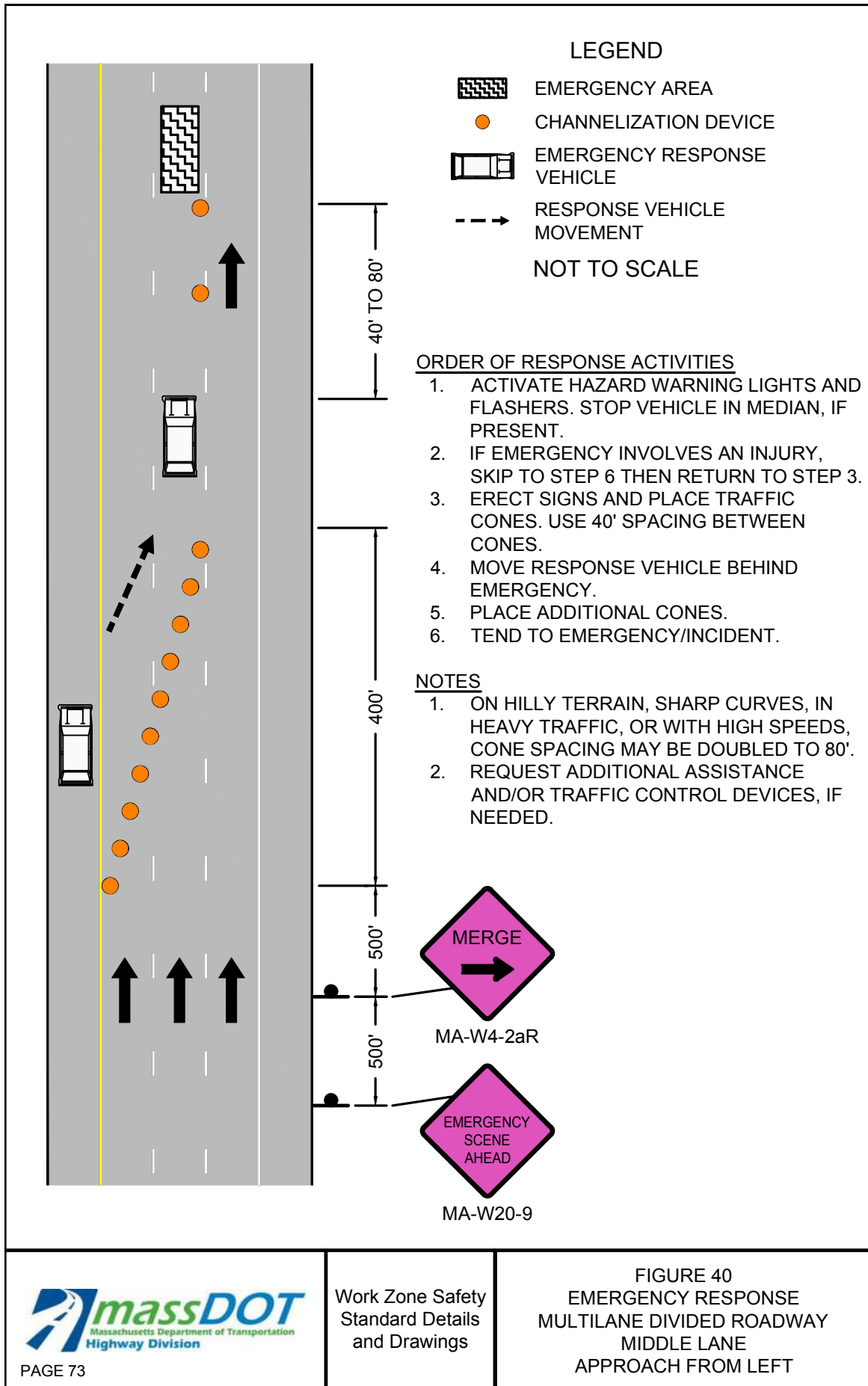


PAGE 72

Work Zone Safety
Standard Details
and Drawings

FIGURE 39
EMERGENCY RESPONSE
MULTILANE UNDIVIDED
ROADWAY
LEFT LANE



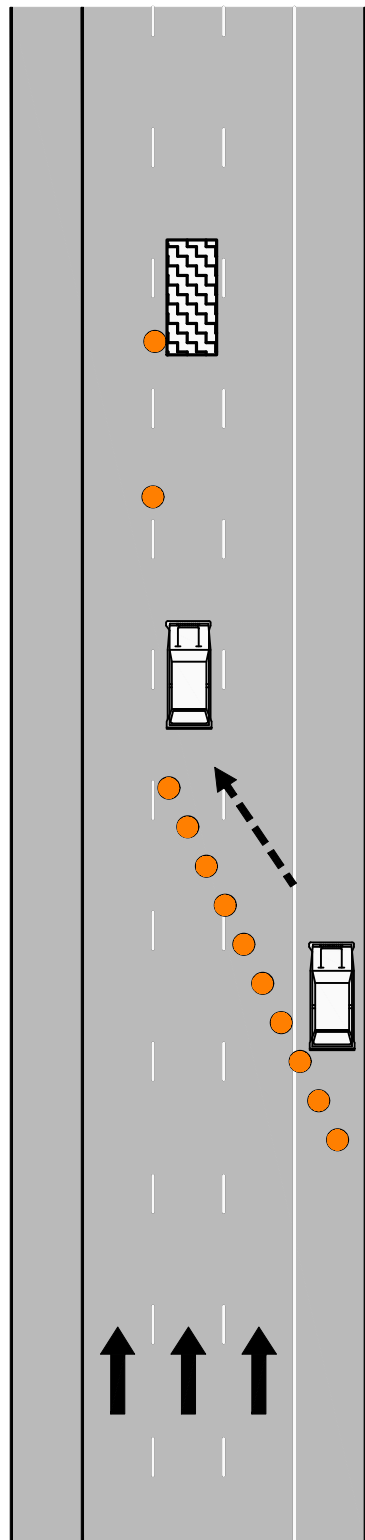








PAGE 74

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

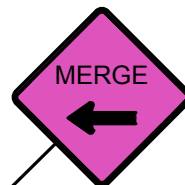
NOT TO SCALE

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

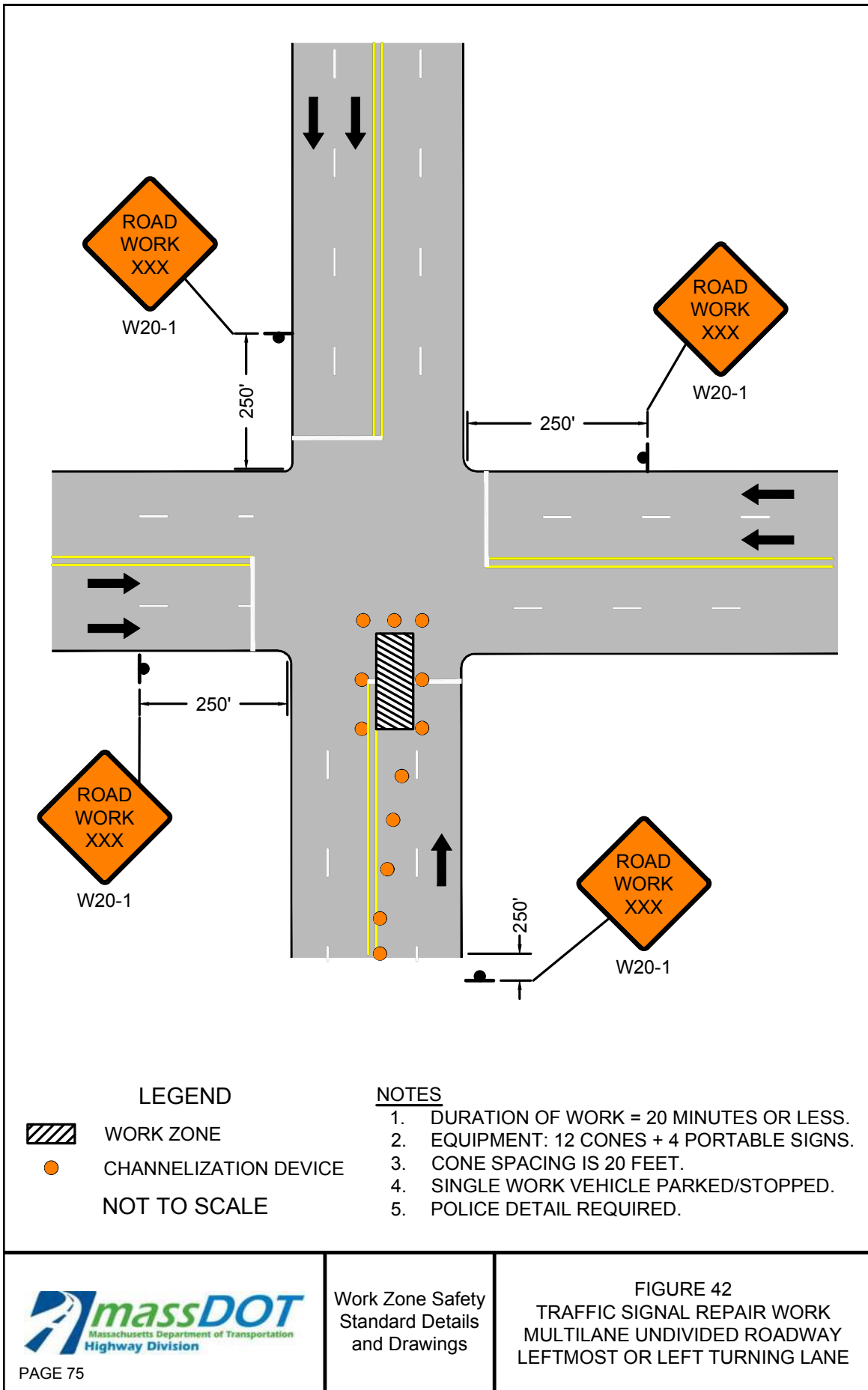
1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.



MA-W4-2aL



MA-W20-9

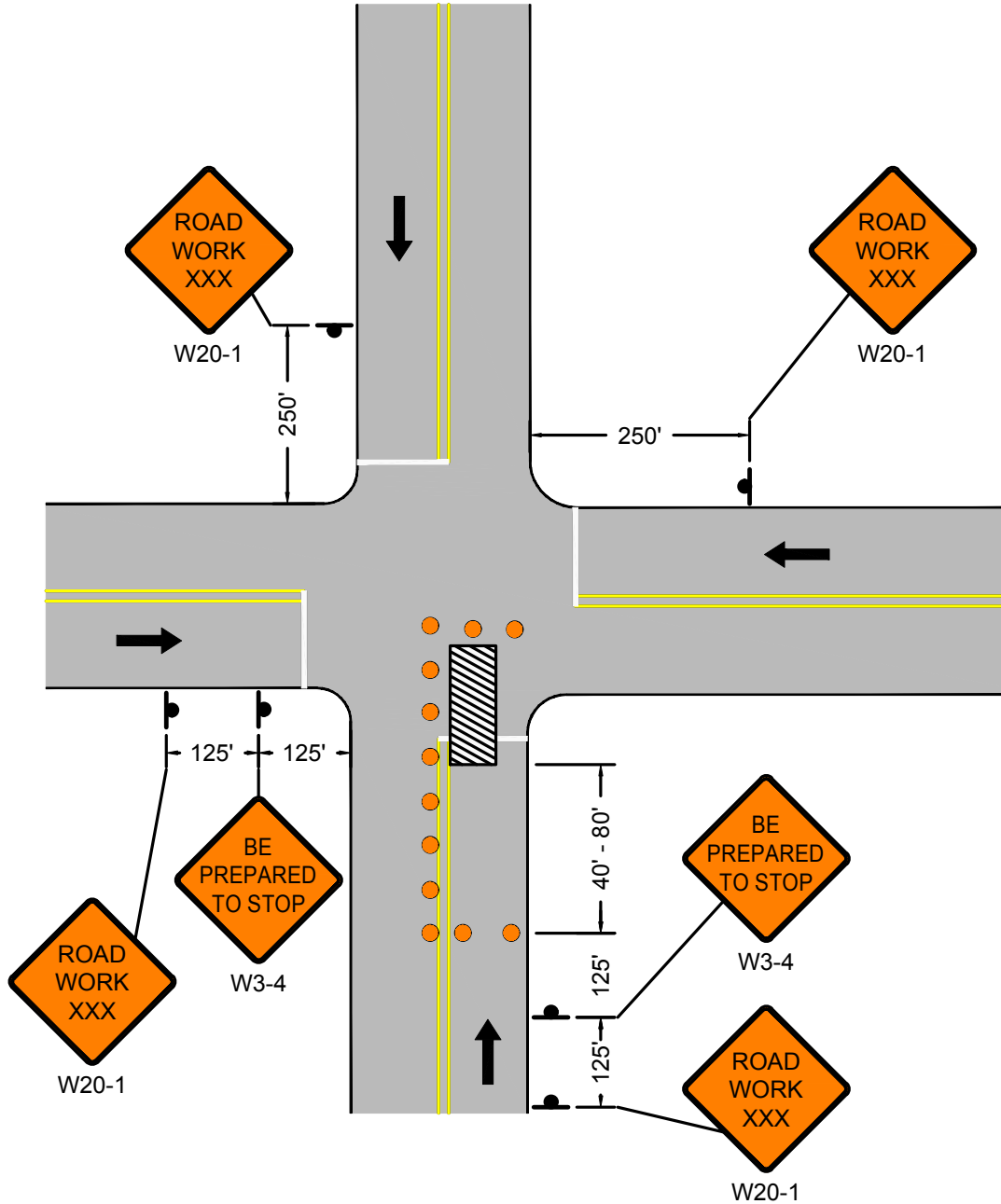




PAGE 76

Work Zone Safety
Standard Details
and Drawings

FIGURE 43
TRAFFIC SIGNAL REPAIR WORK
TWO LANE UNDIVIDED ROADWAY
ONE LEG OF INTERSECTION



LEGEND



WORK ZONE

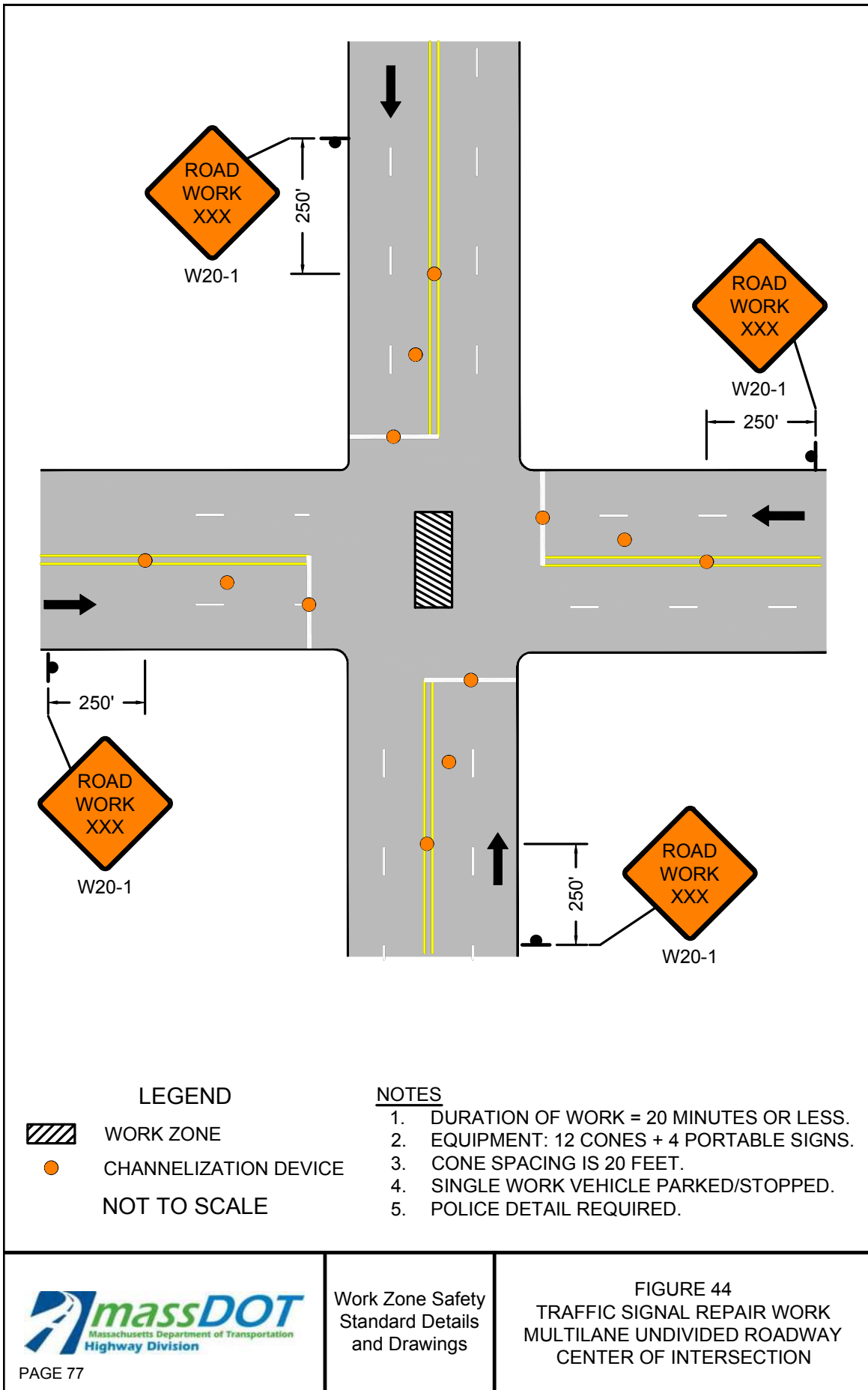


CHANNELIZATION DEVICE

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.

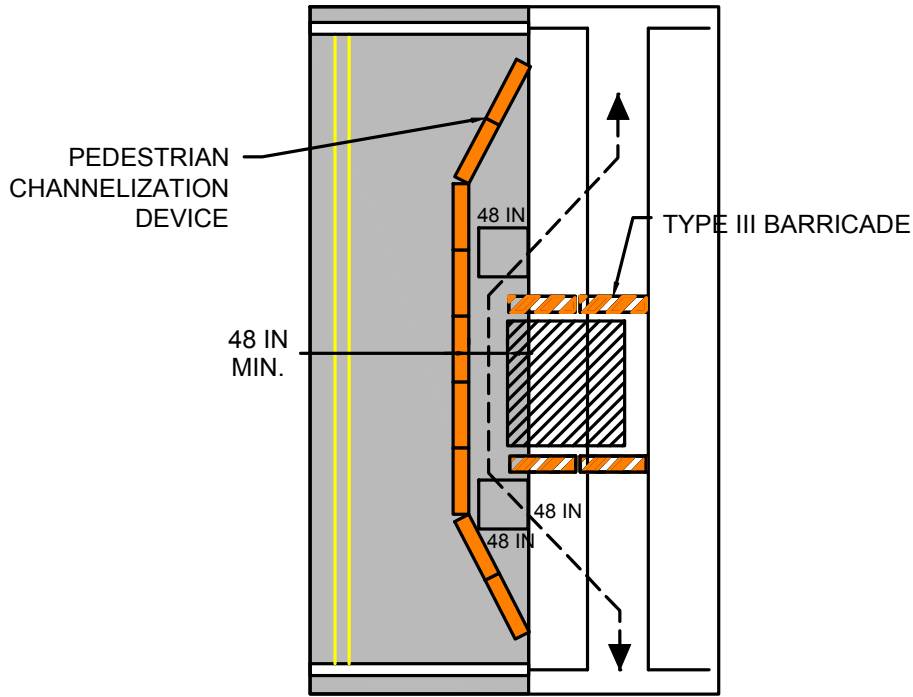




PAGE 78

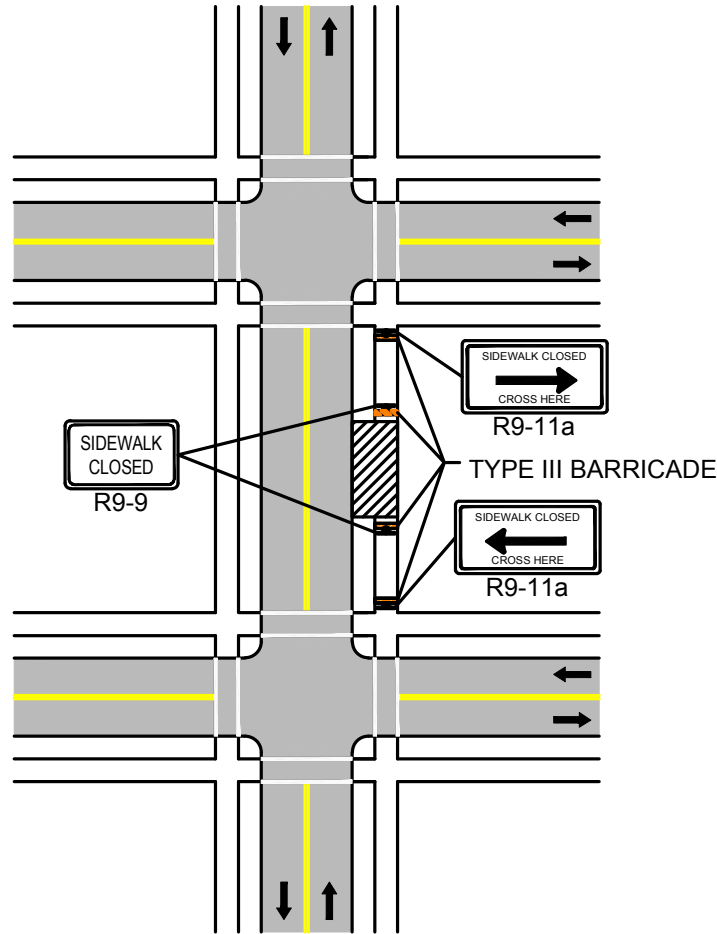
Work Zone Safety
Standard Details
and Drawings

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.



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

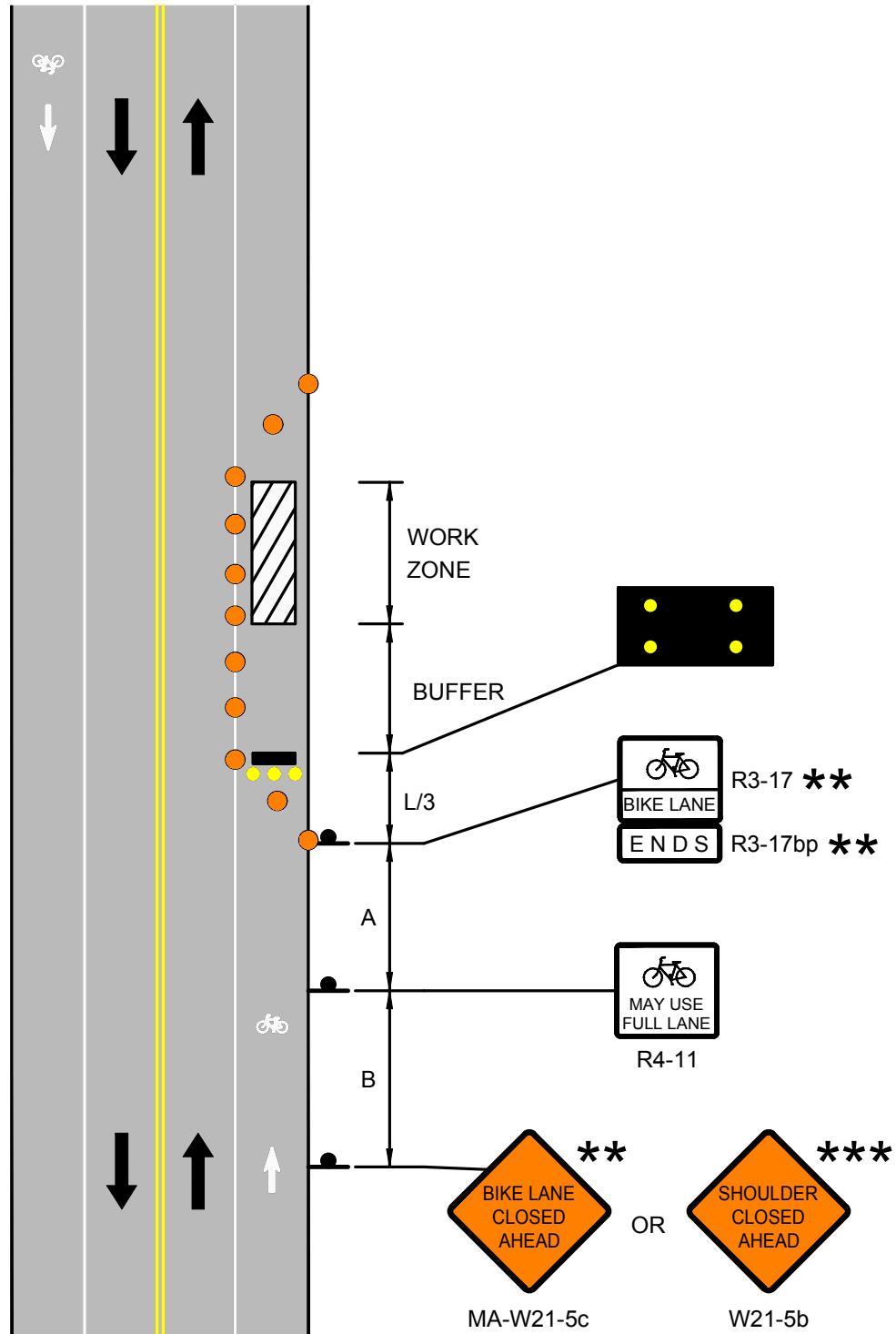


TEMPORARY PORTABLE RUMBLE STRIP



TYPE III BARRICADE

NOT TO SCALE





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)

Contract Number: 113892 Project File Number: 605356City/Town: WilliamstownProject Description: Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2
(Main Street) over the Green River (Re-Advertised Project)

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: _____

THIS PAGE INTENTIONALLY LEFT BLANK

DOCUMENT A00831

ARMY CORPS OF ENGINEERS

GENERAL PERMIT

THIS PAGE INTENTIONALLY LEFT BLANK



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

January 30, 2020

Regulatory Division
File Number: NAE-2019-03226

Massachusetts Department of Transportation – Highway Division
Attention: Susan McArthur
10 Park Plaza, Room 4260
Boston, Massachusetts 02116

Dear Ms. McArthur:

We have reviewed your application to permanently discharge 437 square feet of fill material below the Ordinary High Water (OHW) mark of the Green River resulting from the replacement of an existing bridge pier with a new pier with a slightly wider footing. This work is associated with the replacement of the bridge conveying Route 2 (Main Street) over the Green River in Williamstown, Massachusetts. The existing two-span bridge will be replaced with a new two-span bridge in the same alignment. The new abutments will be constructed behind the existing abutments, and the existing abutments cut down and capped. The project also includes 6,554 square feet of temporary impacts below OHW associated with construction access and dewatering behind cofferdams to facilitate construction of the new pier. The work is shown on the enclosed plans titled "WILLIAMSTOWN ROUTE 2 (MAIN STREET) OVER GREEN RIVER", on nine sheets, and dated "12-18-2019").

Based on the information that you have provided, we verify that the activity is authorized under General Permit # 10 of the enclosed April 16, 2018 Federal permit known as the Massachusetts General Permits (GPs).

Please review the enclosed GPs carefully, including the general conditions beginning on page 19, to be sure that you and whoever does the work understand its requirements. A copy of the GPs and this verification letter shall be available at the project site throughout the time the work is underway. Performing work within our jurisdiction that is not specifically authorized by this determination or failing to comply with any special condition provided above or all of the terms and conditions of the GPs may subject you to the enforcement provisions of our regulations. You must perform this work in compliance with the terms and conditions of the GPs, and also in compliance with the following special condition:

Your application indicates 0.5 acres of tree clearing will occur as part of this project. If additional trees will be removed, you must notify this office in advance so we may reinitiate consultation regarding the northern long-eared bat.

This authorization requires you to complete and return the enclosed Work Start Notification Form to this office at least two weeks before the anticipated starting date. You must also

complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work.

This authorization presumes that the work as described above and as shown on your plans noted above is in waters of the U.S.

This authorization expires on April 5, 2023. You must commence or be under contract to commence the work authorized herein by April 5, 2023, and complete the work by April 5, 2024. If not, you must contact this office to determine the need for further authorization before beginning or continuing the activity. We recommend that you contact us *before* this authorization expires to discuss reissuance. Please contact us immediately if you change the plans or construction methods for work within our jurisdiction. We must approve any changes before you undertake them.

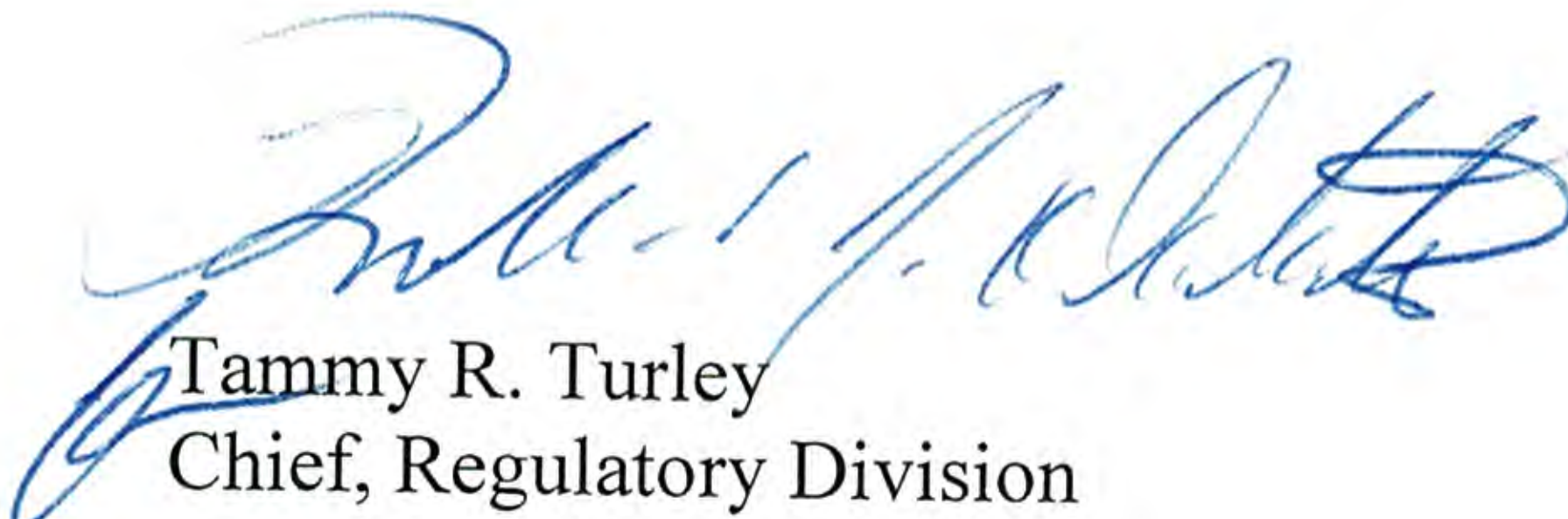
This authorization does not obviate the need to obtain other Federal, State, or local authorizations required by law.

This authorization becomes valid only after the Massachusetts Department of Environmental Protection (MassDEP) issues or waives Water Quality Certification (WQC) as required under Section 401 of the Clean Water Act. In the event the MassDEP denies the 401 WQC, this determination becomes null and void. The address of the MassDEP regional office for your area is provided on page 47 of the enclosed MA GPs.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Please contact Dan Vasconcelos, of my staff, at (978) 318-8653 if you have any questions.

Sincerely,



Tammy R. Turley
Chief, Regulatory Division

cc:

Ed Reiner, U.S. EPA, Region 1, Boston, Massachusetts, reiner.ed@epa.gov
David Simmons, USFWS; david_simmons@fws.gov

cc list continued next page

cc (continued):

Kerry Bogdan, FEMA, Region 1, Boston, Massachusetts, Kerry.Bogdan@fema.dhs.gov
MassDEP-WRP, Boston, Massachusetts; dep.waterways@mass.gov
Christopher Ross, MassDEP, Lakeville, Massachusetts, christopher.ross@state.ma.us
Conservation Commission, Williamstown, Massachusetts,
concom@williamstownma.gov
Cori Beckwith, MassDOT – Highway Division, Boston, Massachusetts,
corinna.beckwith2@state.ma.us



**US Army Corps
of Engineers®**
New England District

WORK-START NOTIFICATION FORM
(Minimum Notice: Two weeks before work begins)

* EMAIL TO: cenae-r@usace.army.mil; or *
* * * * *
* MAIL TO: U.S. Army Corps of Engineers, New England District *
* Permits and Enforcement Branch *
* Regulatory Division *
* 696 Virginia Road *
* Concord, Massachusetts 01742-2751 *

Corps of Engineers Permit No. NAE-2019-03226 was issued to MassDOT – Highway Division and authorized the applicant to permanently discharge 437 square feet of fill material resulting from the installation of a bridge pier below the Ordinary High Water (OHW) mark of the Green River associated with the replacement of the bridge conveying Route 2 (Main Street) over the Green River in Williamstown, Massachusetts. The existing two-span bridge will be replaced with a new two-span bridge in the same alignment. The new abutments will be constructed behind the existing abutments, and the existing abutments cut down and capped. The existing center pier will be replaced with a new pier with a slightly wider footing. The project also includes 6,554 square feet of temporary impacts below OHW associated with construction access and dewatering behind cofferdams to facilitate construction of the center pier.

The people (e.g., contractor) listed below will do the work, and they understand the permit's conditions and limitations.

PLEASE PRINT OR TYPE

Name of Person/Firm: _____

Business Address: _____

Telephone Numbers: () _____ () _____

Proposed Work Dates: **Start:** _____ **Finish:** _____

Permittee/Agent Signature: _____ **Date:** _____

Printed Name: _____ **Title:** _____

Date Permit Issued: _____ **Date Permit Expires:** _____

FOR USE BY THE CORPS OF ENGINEERS

PM: Vasconcelos **Submittals Required:** _____

Inspection Recommendation: _____



**US Army Corps
of Engineers®**
New England District

COMPLIANCE CERTIFICATION FORM

(Minimum Notice: Permittee must sign and return notification
within one month of the completion of work.)

Permit Number: NAE-2019-03226

Project Manager: Vasconcelos

Name of Permittee: MassDOT – Highway Division

Permit Issuance Date: January 30, 2020

Please sign this certification and return it to our office upon completion of the activity and any mitigation required by the permit. You must submit this after the mitigation is complete, but not the mitigation monitoring, which requires separate submittals.

* E-MAIL TO: cenae-r@usace.army.mil; or *
* *
* MAIL TO: Permits and Enforcement Branch A *
* U.S. Army Corps of Engineers, New England District *
* Regulatory Division *
* 696 Virginia Road *
* Concord, Massachusetts 01742-2751 *

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the above referenced permit, and any required mitigation was completed in accordance with the permit conditions.

Signature of Permittee

Date

Printed Name

Date of Work Completion

() _____
Telephone Number

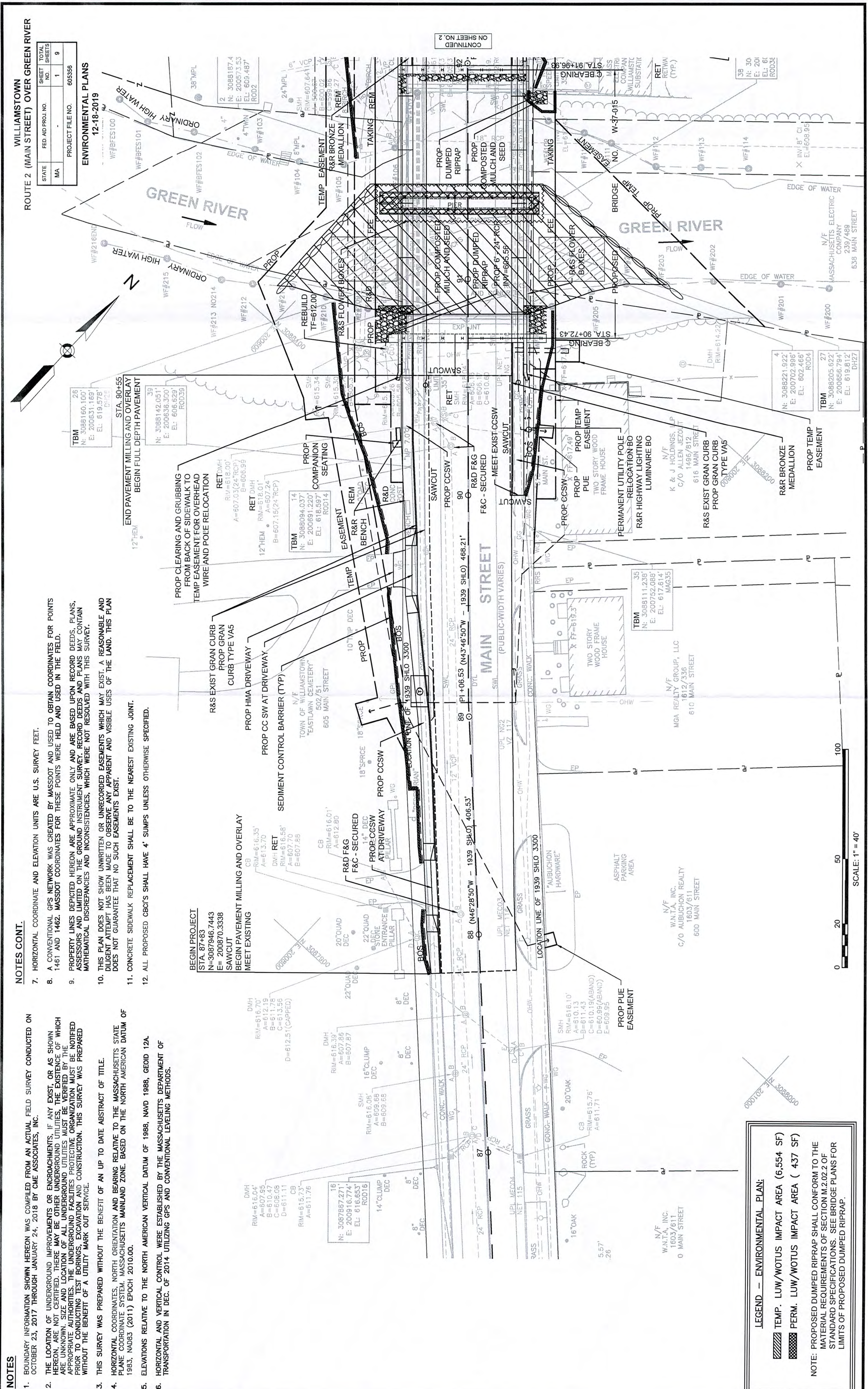
() _____
Telephone Number

NOTES

1. BOUNDARY INFORMATION SHOWN HEREON WAS COMPILED FROM AN ACTUAL FIELD SURVEY CONDUCTED ON OCTOBER 23, 2017 THROUGH JANUARY 24, 2018 BY CME ASSOCIATES, INC.
2. THE LOCATION OF UNDERGROUND IMPROVEMENTS OR ENCROACHMENTS, IF ANY EXIST, OR AS SHOWN HEREON, ARE NOT CERTIFIED. THERE MAY BE OTHER UNDERGROUND UTILITIES. THE EXISTENCE OF WHICH ARE UNKNOWN. SIZE AND LOCATION OF ALL UNDERGROUND UTILITIES MUST BE VERIFIED BY THE APPROPRIATE AUTHORITIES. THE UNDERGROUND FACILITIES PROTECTIVE ORGANIZATION MUST BE NOTIFIED PRIOR TO CONDUCTING TEST BORINGS, EXCAVATION AND CONSTRUCTION. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A UTILITY MARK OUT SERVICE.
3. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF AN UP TO DATE ABSTRACT OF TITLE.
4. HORIZONTAL COORDINATES, NORTH ORIENTATION AND BEARING RELATIVE TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM, MASSACHUSETTS MAINLAND ZONE, BASED ON THE NORTH AMERICAN DATUM OF 1983, NAD83 (2011) EPOCH 2010.00.
5. ELEVATIONS RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988, NAVD 1988, GEOID 12A.
6. HORIZONTAL AND VERTICAL CONTROL WERE ESTABLISHED BY THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION IN DEC. OF 2014 UTILIZING GPS AND CONVENTIONAL LEVELING METHODS.

NOTES CONT.

7. HORIZONTAL COORDINATE AND ELEVATION UNITS ARE U.S. SURVEY FEET.
8. A CONVENTIONAL GPS NETWORK WAS CREATED BY MASSDOT AND USED TO OBTAIN COORDINATES FOR POINTS 1461 AND 1462. MASSDOT COORDINATES FOR THESE POINTS WERE HELD AND USED IN THE FIELD.
9. PROPERTY LINES DEPICTED HEREON ARE APPROXIMATE ONLY AND ARE BASED UPON RECORD DEEDS, PLANS, ASSESSORS AND LIMITED ON THE GROUND INSTRUMENT SURVEY. RECORD DEEDS AND PLANS MAY CONTAIN MATHEMATICAL DISCREPANCIES AND INCONSISTENCIES, WHICH WERE NOT RESOLVED WITH THIS SURVEY.
10. THIS PLAN DOES NOT SHOW UNWRITTEN OR UNRECORDED EASEMENTS WHICH MAY EXIST. A REASONABLE AND DILIGENT ATTEMPT HAS BEEN MADE TO OBSERVE ANY APPARENT AND VISIBLE USES OF THE LAND. THIS PLAN DOES NOT GUARANTEE THAT NO SUCH EASEMENTS EXIST.
11. CONCRETE SIDEWALK REPLACEMENT SHALL BE TO THE NEAREST EXISTING JOINT.
12. ALL PROPOSED CBCI'S SHALL HAVE 4" SUMPS UNLESS OTHERWISE SPECIFIED.



WILLIAMSTOWN
ROUTE 2 (MAIN STREET) OVER GREEN RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	2	9

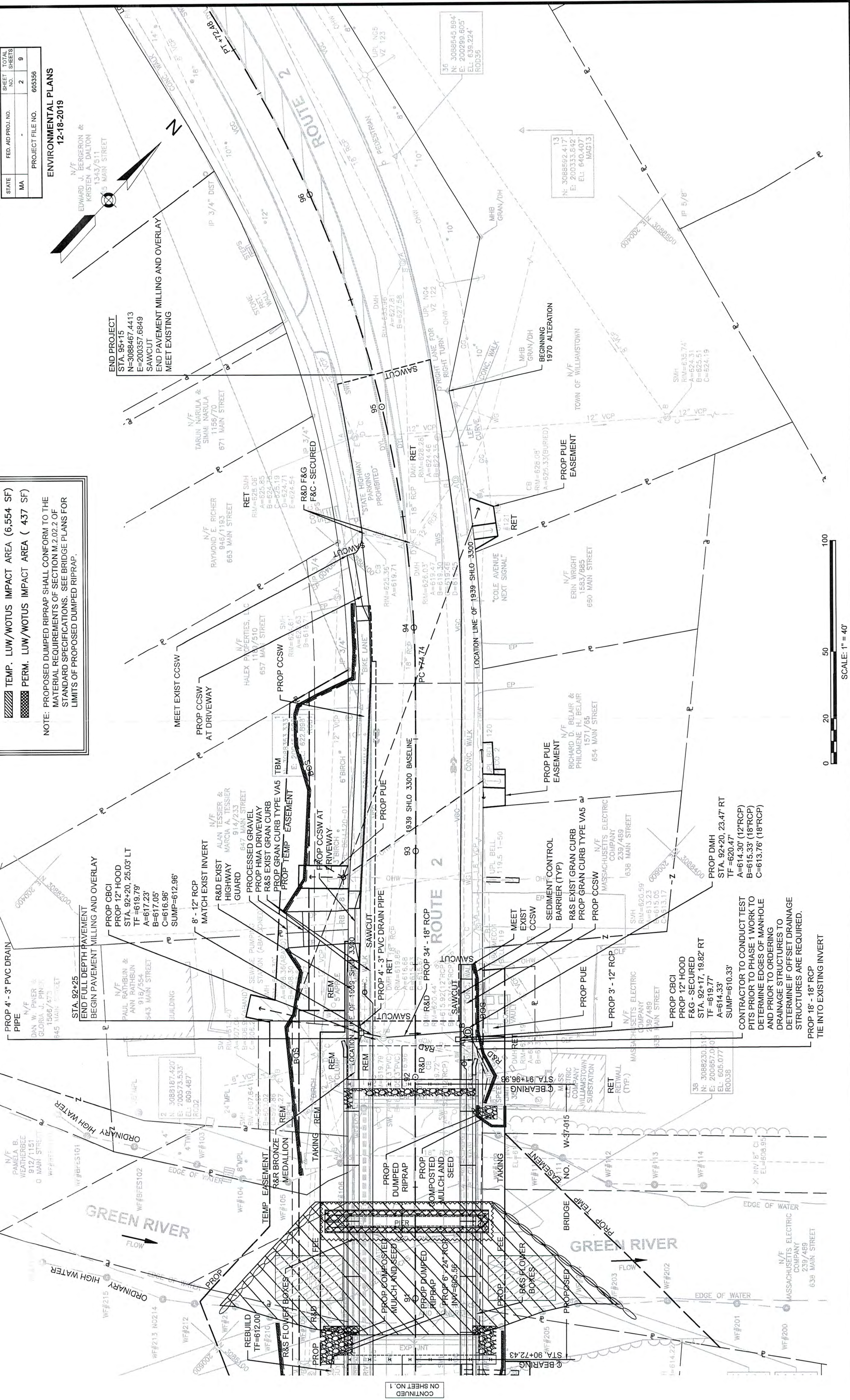
PROJECT FILE NO.	605356
------------------	--------

ENVIRONMENTAL PLANS
12-18-2019

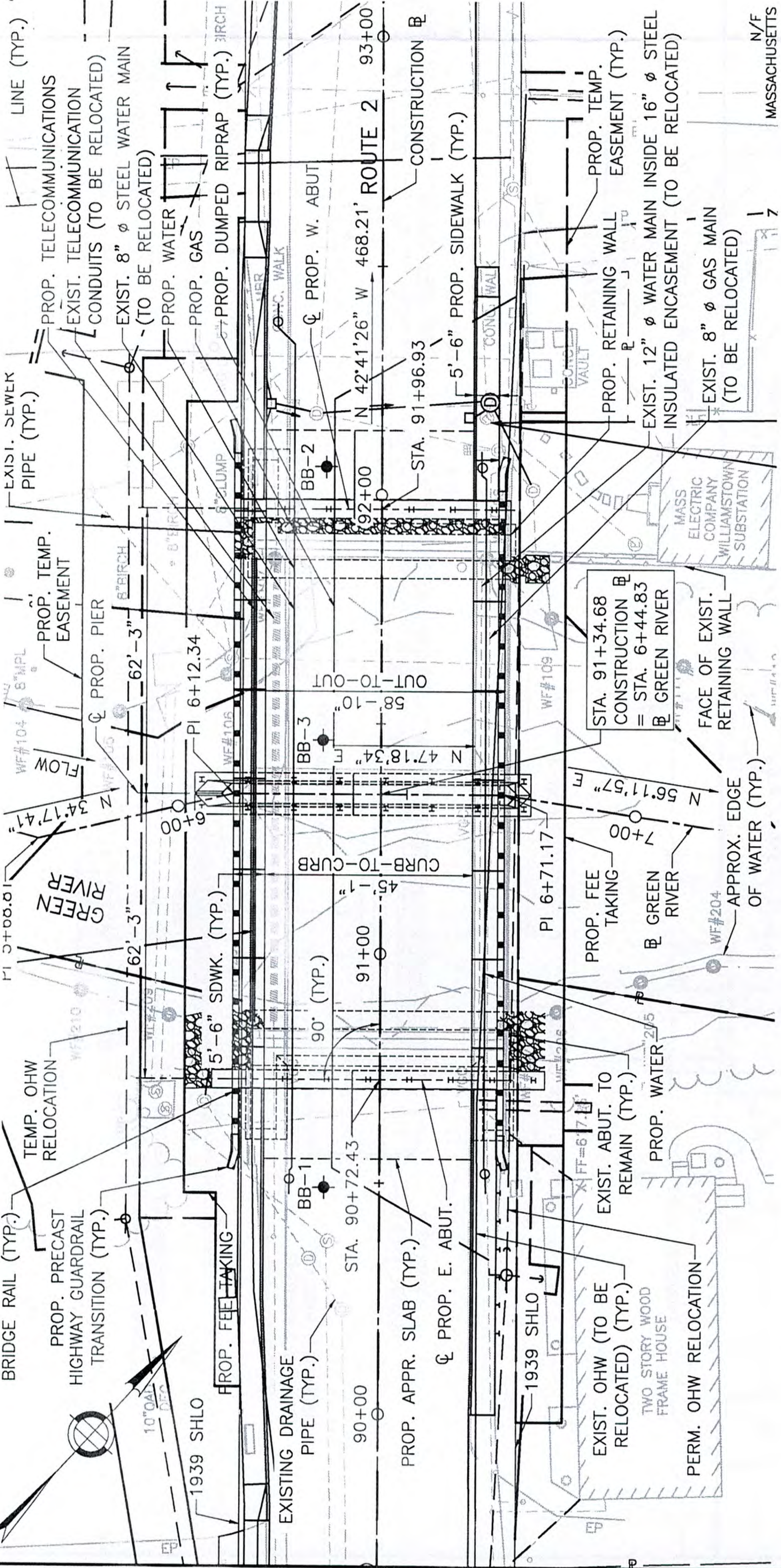
LEGEND — ENVIRONMENTAL PLAN:

- TEMP. LUW/WOTUS IMPACT AREA (6,554 SF)
- PERM. LUW/WOTUS IMPACT AREA (437 SF)

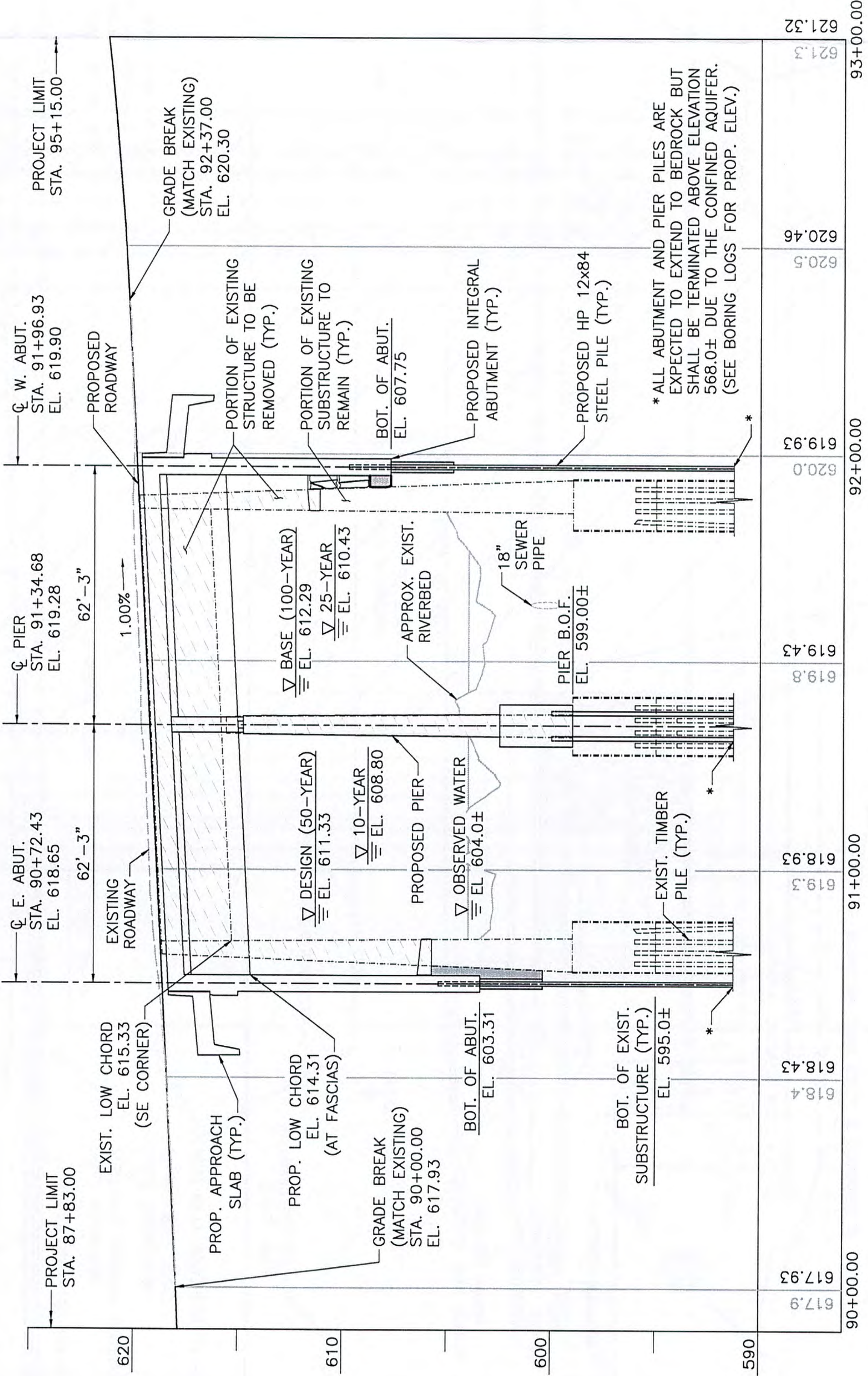
NOTE: PROPOSED DUMPED RIPRAP SHALL CONFORM TO THE MATERIAL REQUIREMENTS OF SECTION M.2.02.2 OF STANDARD SPECIFICATIONS. SEE BRIDGE PLANS FOR LIMITS OF PROPOSED DUMPED RIPRAP.



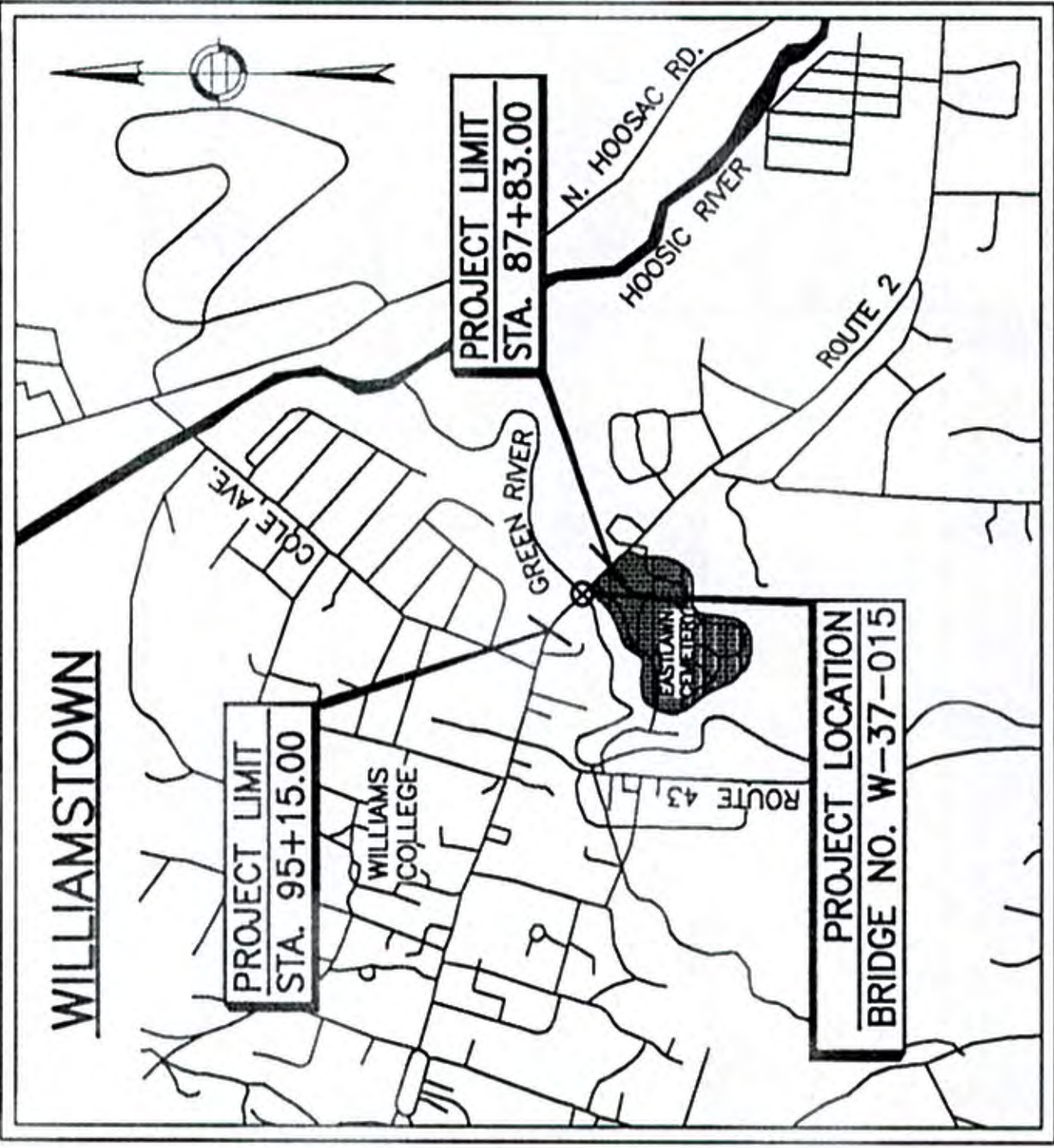
CONTINUED ON SHEET NO. 1



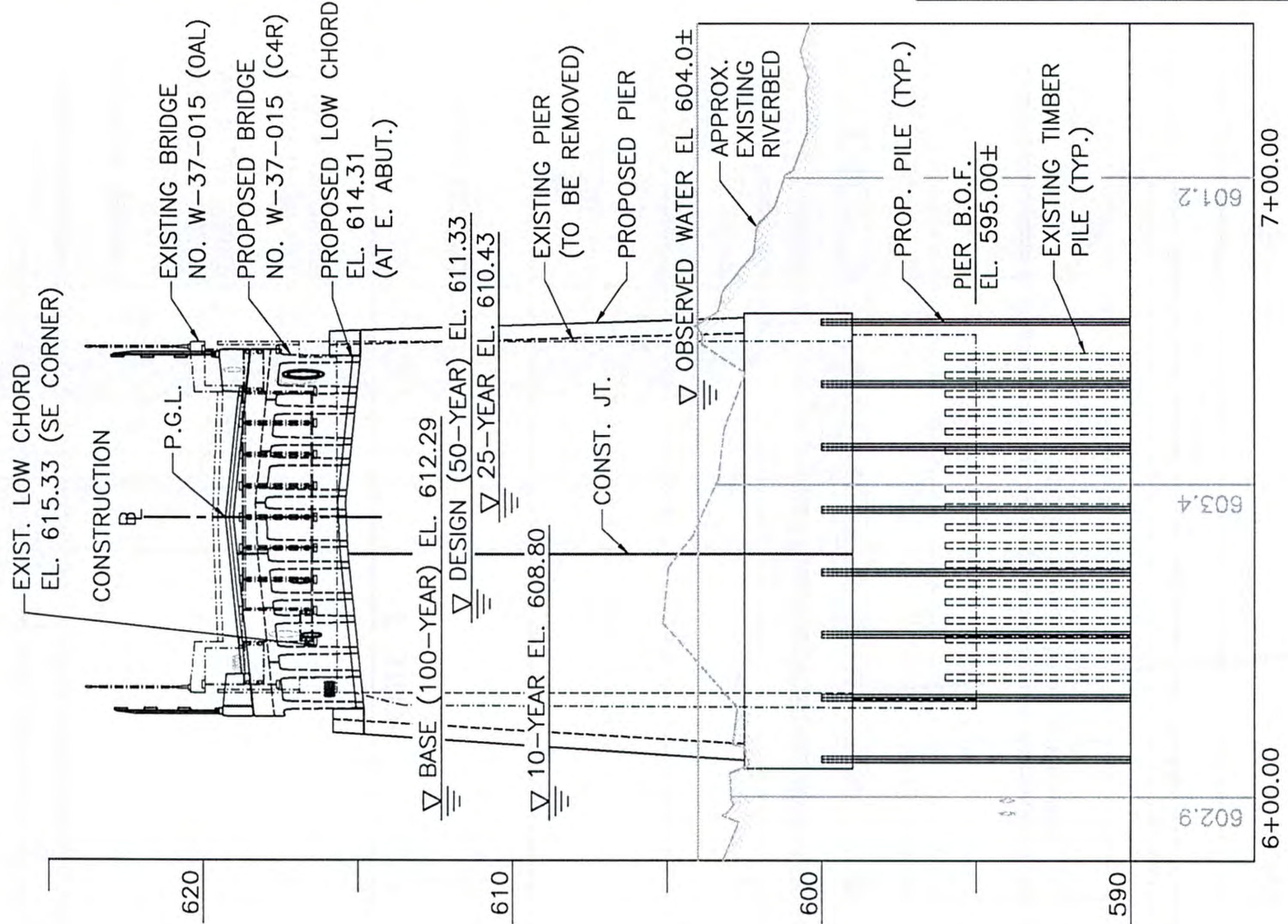
KEY PLAN
SCALE: 1" = 40'-0"



PROFILE — CONSTRUCTION B (ROUTE 2)
HORIZONTAL SCALE: 1" = 40'-0"
VERTICAL SCALE: 1" = 2'-0"



LOCUS
SCALE: 1" = 4000'



PROFILE — GREEN RIVER
HORIZONTAL SCALE: 1" = 40'-0"
VERTICAL SCALE: 1" = 2'-0"

WILLIAMSTOWN
ROUTE 2 (MAIN STREET) OVER GREEN RIVER
ENVIRONMENTAL PLANS
12-18-2019

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	3	9

PROJECT FILE NO. 605356

MONTH DD, YYYY ISSUED FOR CONSTRUCTION



PROPOSED BRIDGE REPLACEMENT
WILLIAMSTOWN

ST 2 (MAIN STREET)
OVER GREEN RIVER
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

P.E.
STAMP
SIGNATURE

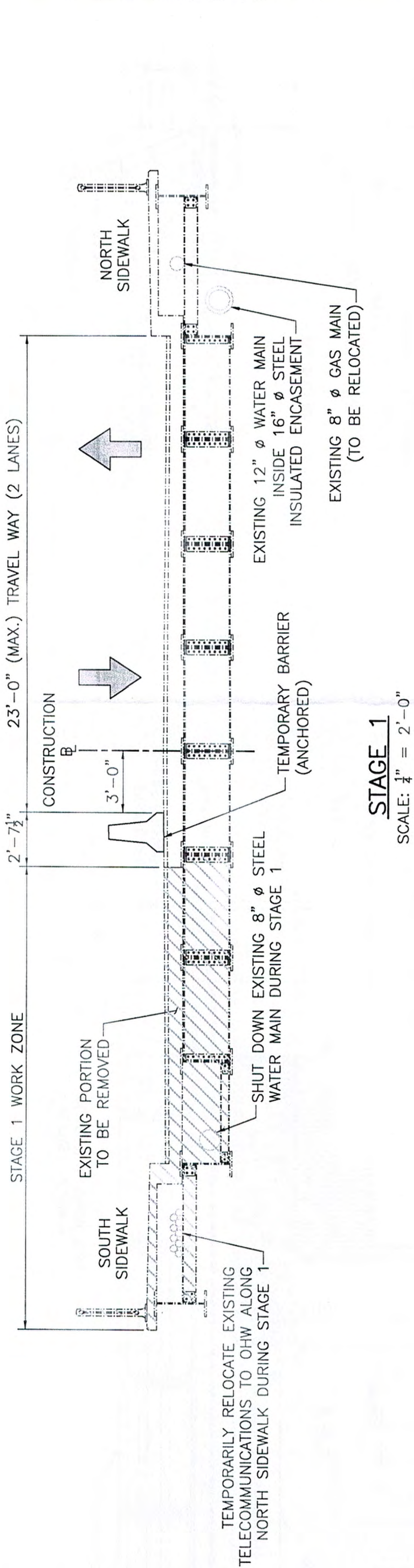


CME ASSOCIATES, INC.
101 East River Drive, 1st Floor
Boston, MA 02110
888-291-3227 | www.cmeengineering.com

TITLE: CHIEF ENGINEER

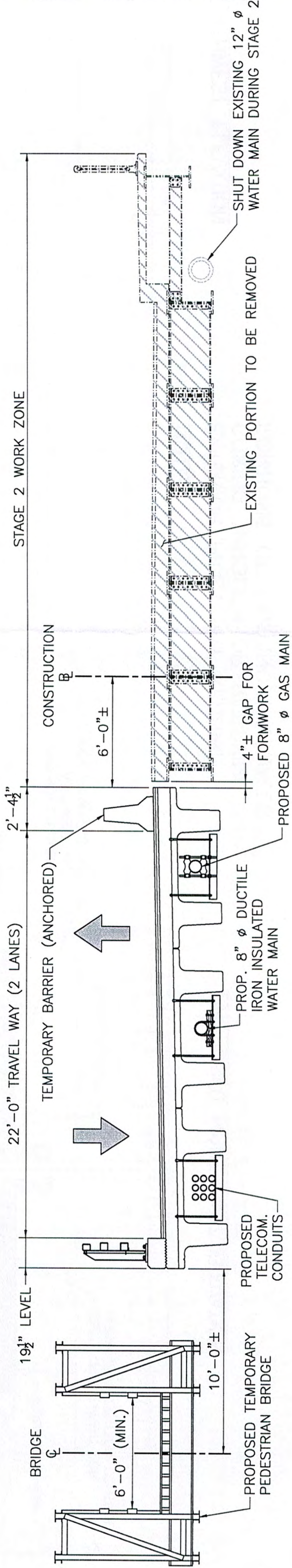
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	5	9
PROJECT FILE NO. 605356			

ENVIRONMENTAL PLANS
09-16-2019



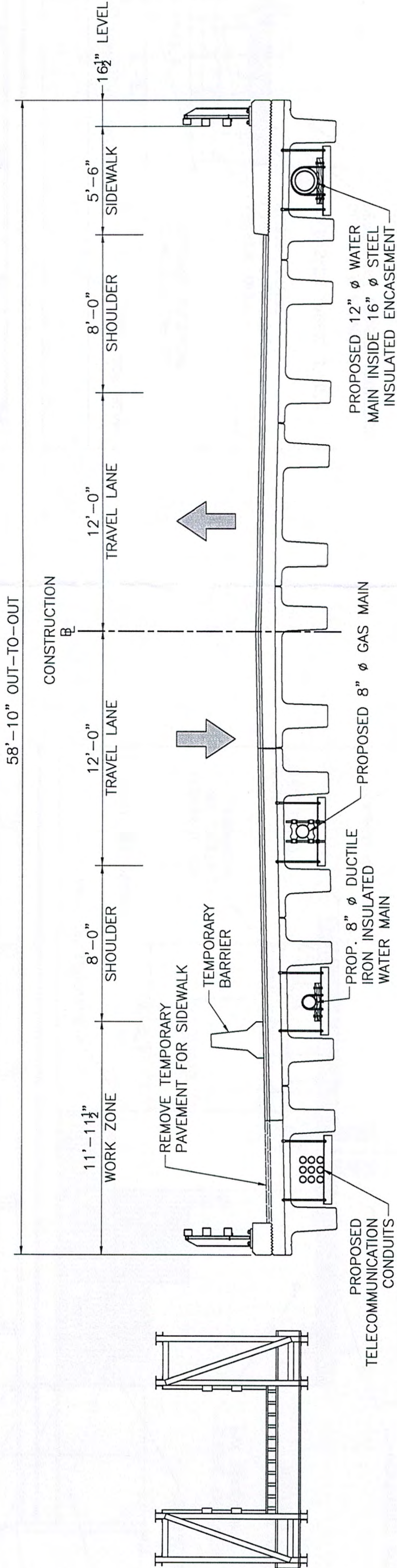
STAGE 1

SCALE: 1/4" = 2'-0"



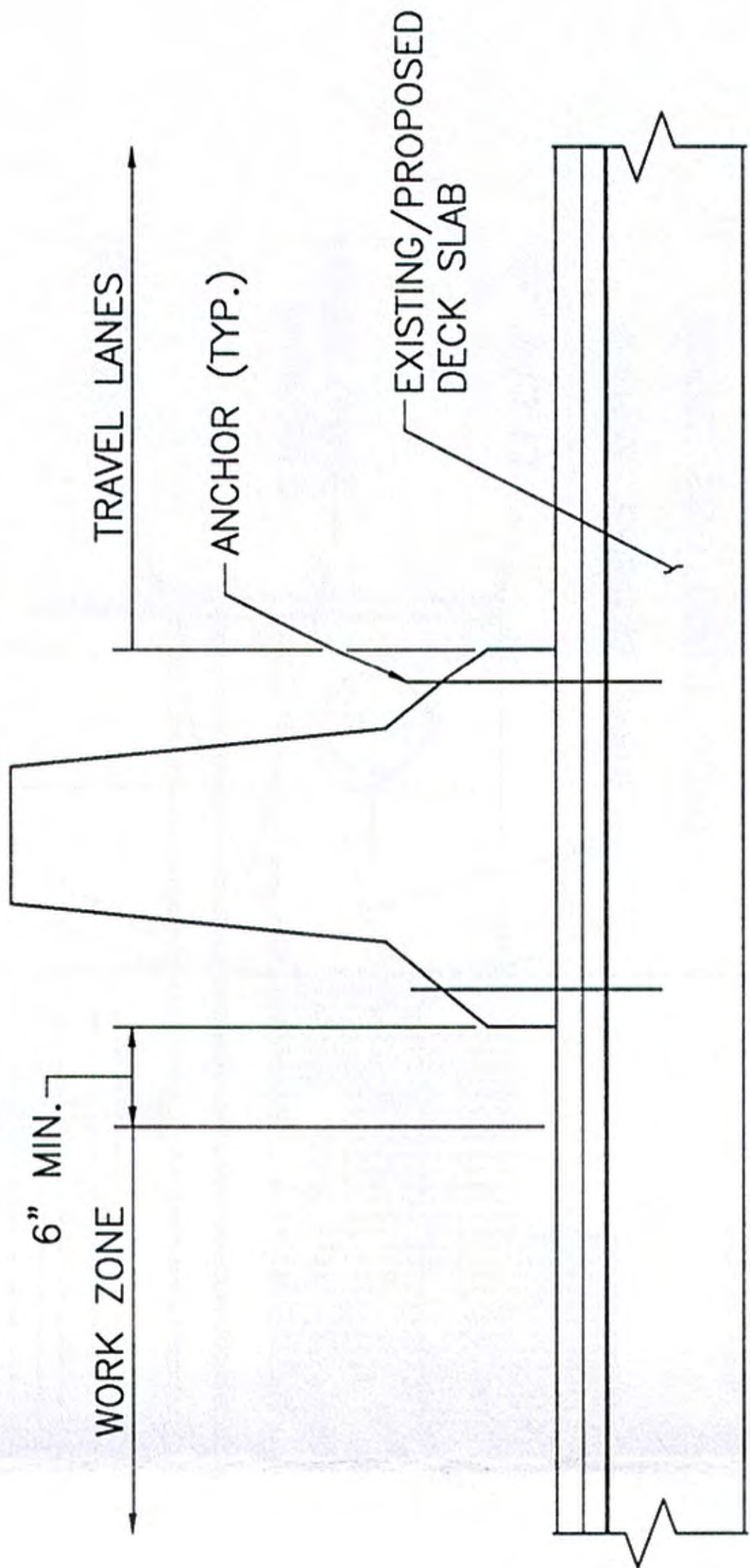
STAGE 2

SCALE: 1/4" = 2'-0"



POST-STAGE 2

SCALE: 1/4" = 2'-0"



TEMPORARY ANCHORED BARRIER

SCALE: 1" = 2'-0"

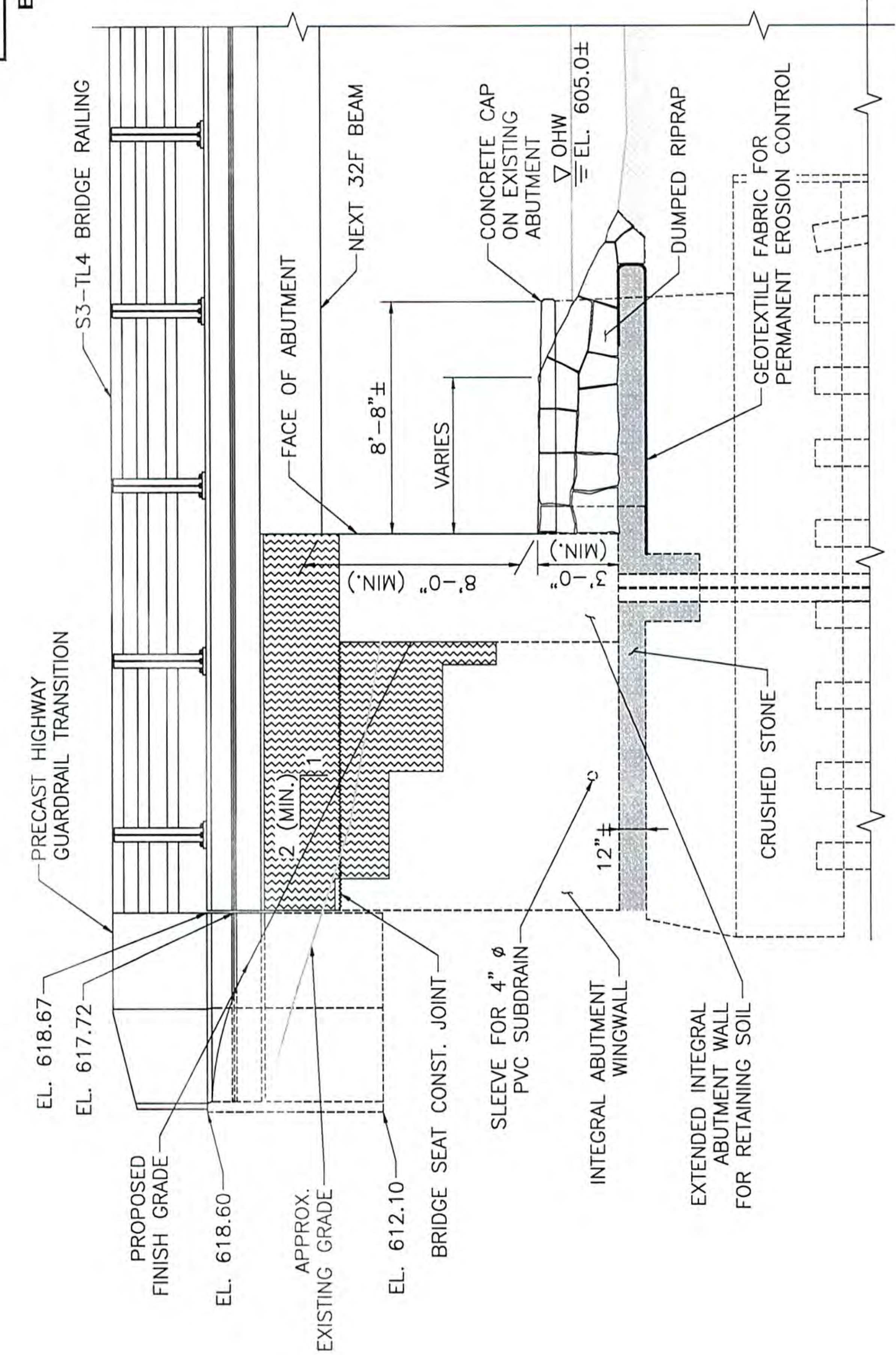
NOTES:

- EXISTING UTILITIES SHALL BE RELOCATED THROUGHOUT CONSTRUCTION. CONTRACTOR SHALL PROVIDE ACCESS FOR UTILITY COMPANY TO REPAIR BROKEN CONDUIT JOINTS.

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	6	9
PROJECT FILE NO.		605356	

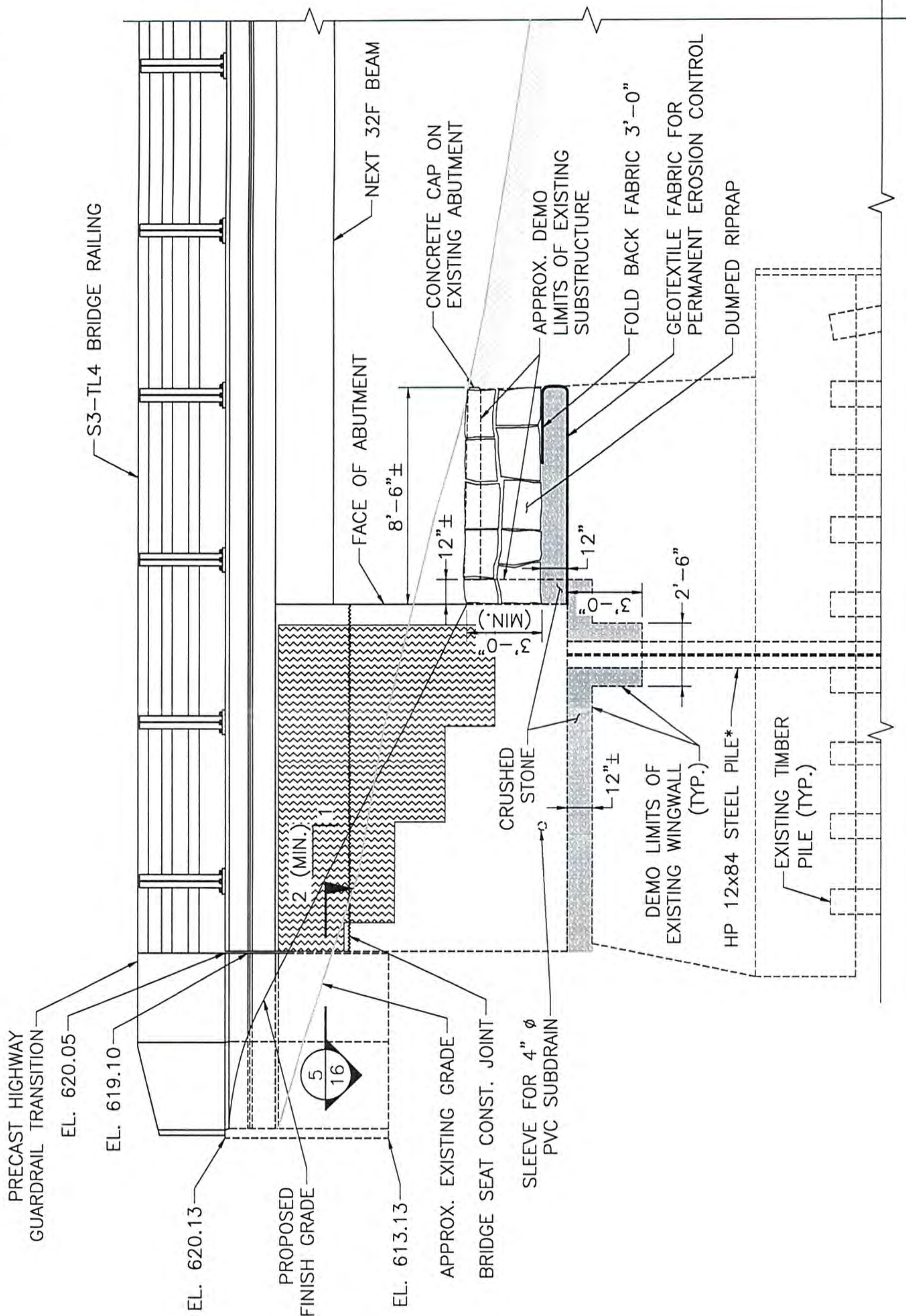
ENVIRONMENTAL PLANS
12-18-2019



NOTE:
EXTERIOR PILES MAY REQUIRE
CORING THROUGH OR REMOVING
PORTIONS OF EXISTING WINGWALLS

PROPOSED NORTHWEST ELEVATION

SCALE: 1/4" = 2'-0"

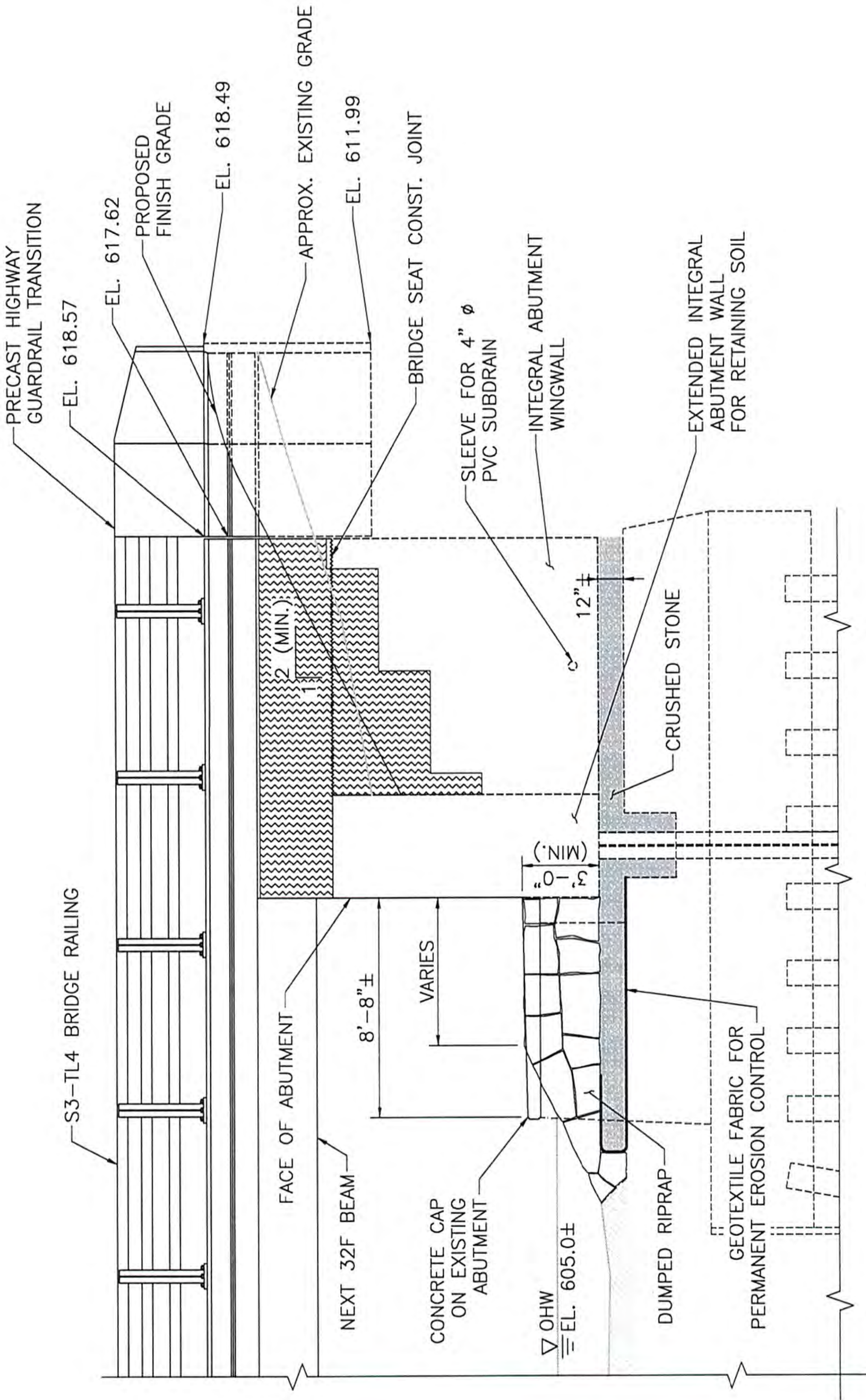


PROPOSED SOUTHWEST ELEVATION

SCALE: 1/4" = 2'-0"

PROPOSED NORTHEAST ELEVATION

SCALE: 1/4" = 2'-0"



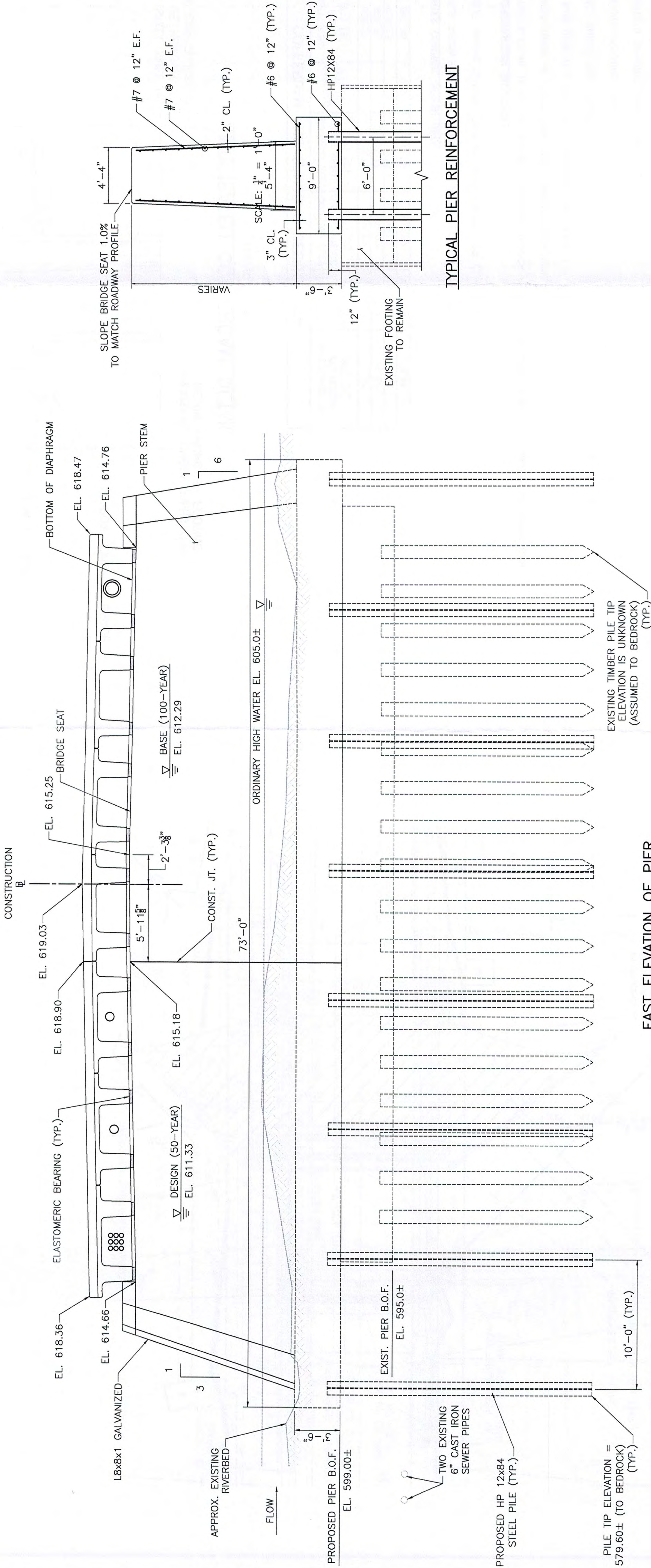
PROPOSED SOUTHEAST ELEVATION

SCALE: 1/4" = 2'-0"

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	7	9
PROJECT FILE NO. 605356			

ENVIRONMENTAL PLANS
12-18-2019



TYPICAL PIER REINFORCEMENT

EAST ELEVATION OF PIER

SCALE: 1/4" = 2'-0"

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
	USE ONLY PRINTS OF LATEST DATE

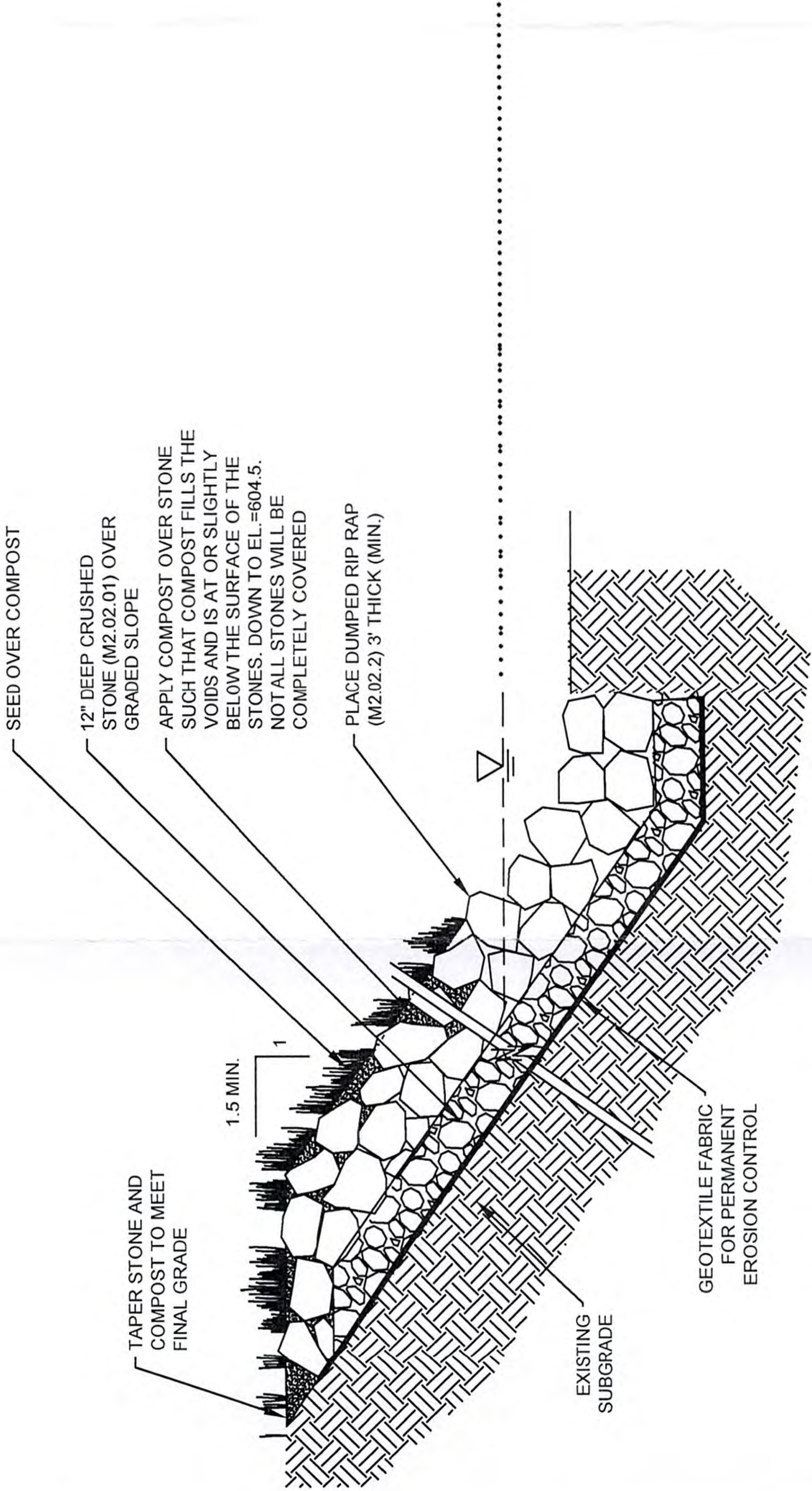
WILLIAMSTOWN

ROUTE 2 (MAIN STREET) OVER GREEN RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	9	9
PROJECT FILE NO.		605356	

ENVIRONMENTAL PLANS

12-18-2019



COMPOST AND SEED OVER DUMPED RIPRAP

NOT TO SCALE

20160320_MassDOT

COMPOST FILTER TUBE
MINIMUM 12 INCHES (300mm) IN DIAMETER WITH AN
EFFECTIVE HEIGHT OF 9.5 INCHES (240mm).

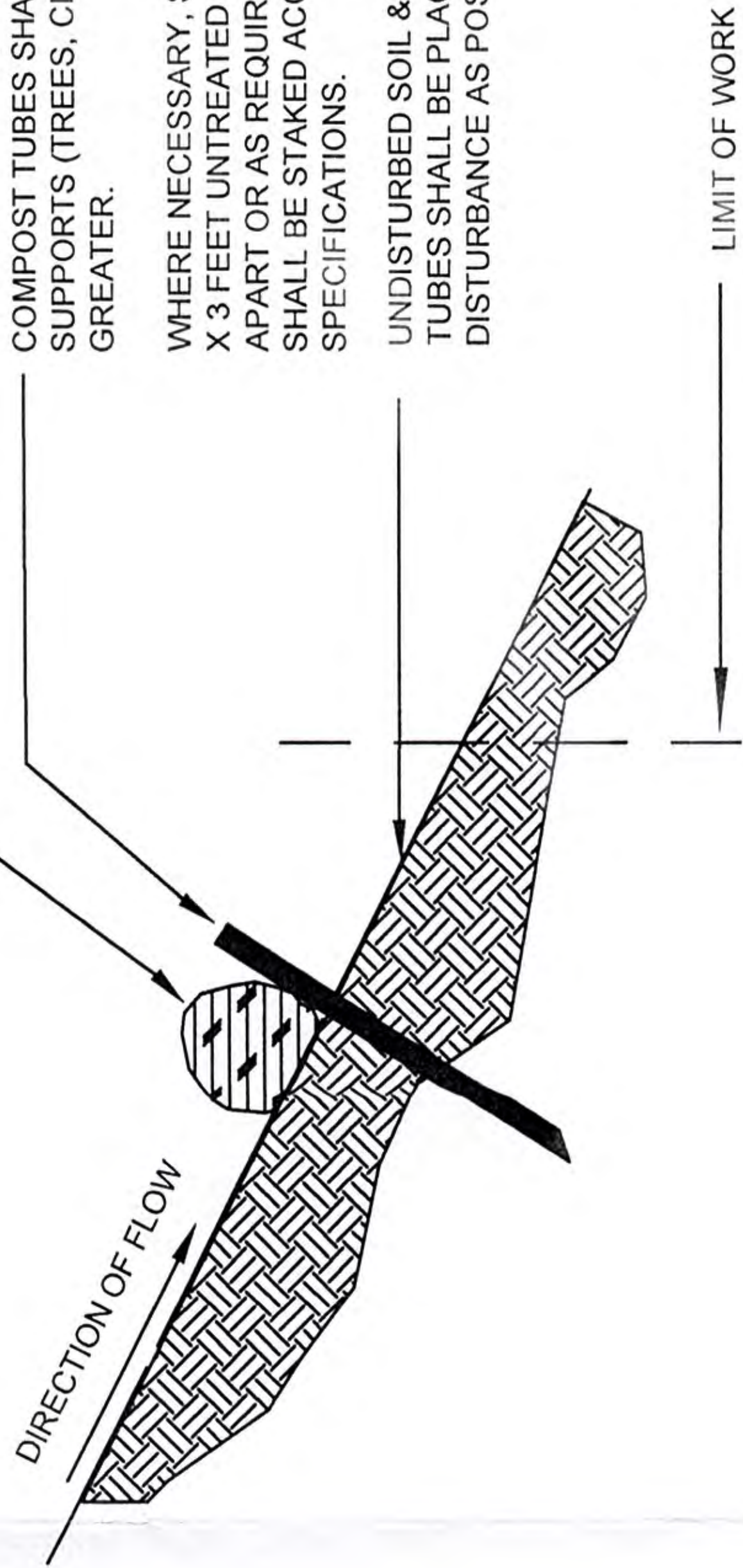
TUBES FOR COMPOST FILTERS SHALL BE JUTE MESH OR
APPROVED BIODEGRADABLE MATERIAL. HOWEVER
PHOTO-BIODEGRADABLE FABRIC SHALL BE REMOVED AT END
OF CONTRACT.

TAMP TUBES IN PLACE TO ENSURE GOOD CONTACT WITH
SOIL SURFACE. IT IS NOT NECESSARY TO TRENCH TUBES
INTO EXISTING GRADE.

COMPOST TUBES SHALL BE STAKED OR LEANED AGAINST
SUPPORTS (TREES, CINDER BLOCKS) ON SLOPES 2:1 OR
GREATER.

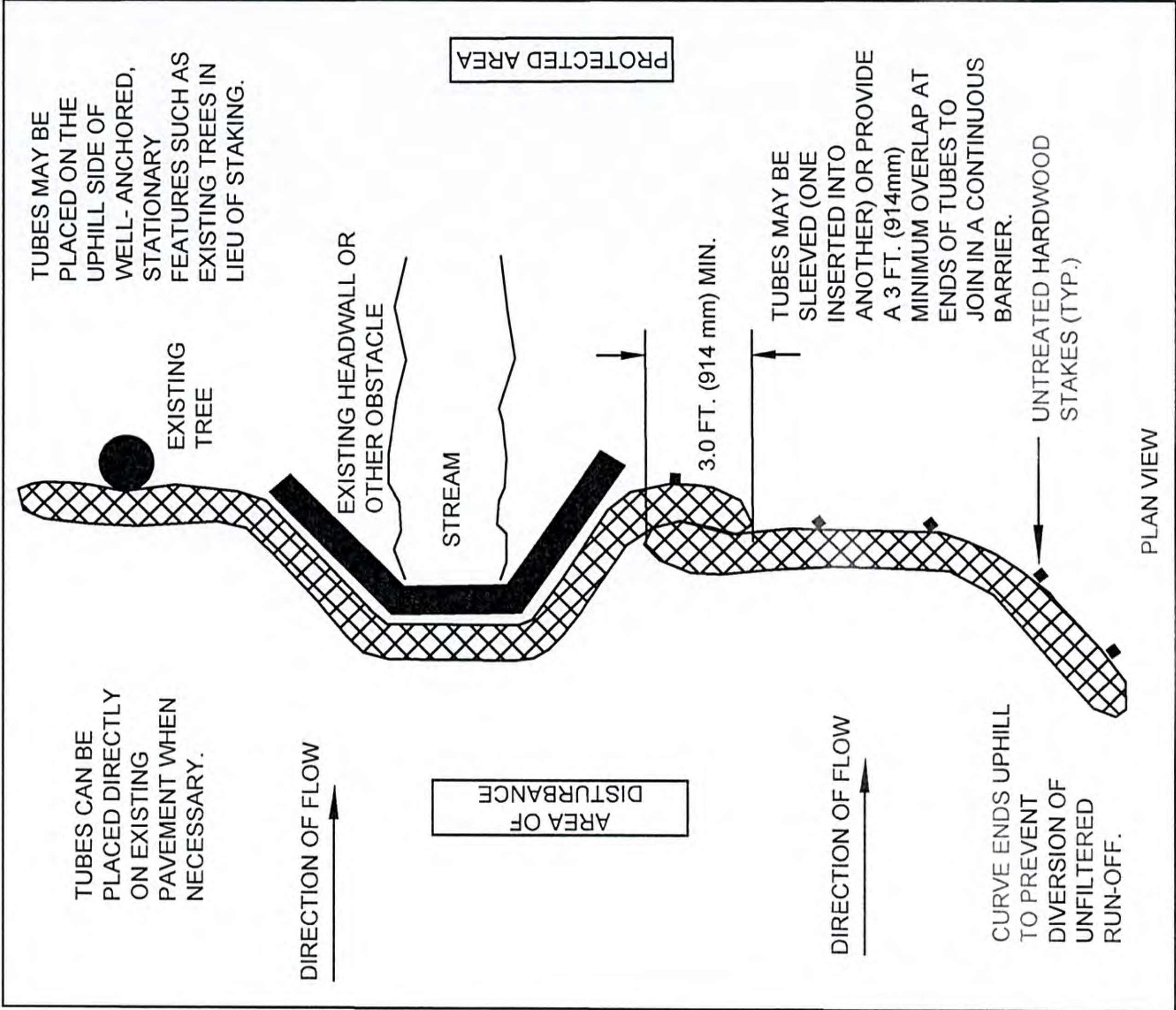
WHERE NECESSARY, STAKING SHALL BE MIN. 1 INCH X 1 INCH
X 3 FEET UNTREATED HARDWOOD STAKES, UP TO 5 FT. (1.5m)
APART OR AS REQUIRED TO SECURE TUBES IN PLACE. TUBES
SHALL BE STAKED ACCORDING TO MANUFACTURER'S
SPECIFICATIONS.

UNDISTURBED SOIL & VEGETATION.
TUBES SHALL BE PLACED AS CLOSE TO LIMITS OF SOIL
DISTURBANCE AS POSSIBLE.



COMPOST FILTER TUBE DETAIL

NOT TO SCALE



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 COURSEING 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. TUBE LOCATION MAY BE SHIFTED TO ADJUST TO LANDSCAPE FEATURES, BUT SHALL PROTECT UNDISTURBED AREA AND VEGETATION TO MAXIMUM EXTENT POSSIBLE.
4. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
5. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.
6. ADDITIONAL STAKING SHALL BE USED AT THE DIRECTION OF THE ENGINEER.

20150226_MassDOT_rev7



**US Army Corps
of Engineers®**
New England District
696 Virginia Road
Concord, MA 01742-2751

PUBLIC NOTICE

Date: April 17, 2018
File Number: NAE-2016-00599
In Reply Refer To: Greg Penta
Phone: (978) 318-8862
E-mail: gregory.r.penta@usace.army.mil

FINAL PUBLIC NOTICE

REVOCATION OF THE 2015 GENERAL PERMITS FOR MASSACHUSETTS AND ISSUANCE OF NEW DEPARTMENT OF THE ARMY MASSACHUSETTS GENERAL PERMITS

The New England District, U.S. Army Corps of Engineers, 696 Virginia Road, Concord, Massachusetts 01742-2751, has revoked the state-wide General Permits (GPs) for Massachusetts issued on February 4, 2015 and replaced them with new Massachusetts GPs. The February 2015 GPs were revoked on April 16, 2018 pursuant to the Corps regulations at 33 CFR 325.7(e). The new GPs were issued on April 16, 2018 pursuant to 33 CFR 320 - 332 (see 33 CFR 325.5(c)(1)). The new GPs will continue to authorize activities in waters of the U.S. within the boundaries of, and off the coast of the Commonwealth of Massachusetts, excluding work within the boundaries of Indian tribal lands, that are subject to Corps jurisdiction pursuant to Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research and Sanctuaries Act. You can view the new GPs at: www.nae.usace.army.mil/missions/regulatory >> State General Permits >> Massachusetts. They are also attached to this notice.

Background

The Corps published two public notices to announce the proposed actions and request comments on June 7, 2016 and September 15, 2017. The Corps is issuing new GPs and revoking the 2015 GPs in advance of their February 4, 2020 expiration date in order to improve the GPs by making them more user-friendly and result in less Regulatory burden for the regulated public and the Corps while maintaining the same level of protection for the aquatic environment and the public interest. The new GPs retain the function and utility of the existing GPs, continue the expedited review process for our Regulatory Program in Massachusetts, and will not result in significant substantive changes to how activities in waters of the U.S. are regulated in Massachusetts. The new GPs have an expiration date of April 5, 2023, which coincides with the expiration date of the 401 Water Quality Certification.

Activities authorized under the February 2015 GPs

The February 2015 GPs were revoked on April 16, 2018. As a result:

- For activities self-verified under the 2015 GPs, the Corps must have received the Self-Verification Notification Form no later than April 16, 2018, and these activities must commence (i.e., be under construction) or be under contract to commence before February 4, 2020. Permittees have until February 4, 2021 to complete the activity under the terms and conditions of the 2015 GPs. The permittee must be able to document to the Corps satisfaction that the project was under construction or under contract by the appropriate date.
- Activities that required a preconstruction notification (PCN) and were verified by the Corps in writing under the 2015 GPs must commence (i.e., be under construction) or be under contract to commence before February 4, 2020. Permittees have until February 4, 2021 to complete the activity under the terms and conditions of the 2015 GPs. The permittee must be able to document to the Corps satisfaction that the project was under construction or under contract by the appropriate date.

Noteworthy changes and clarifications

General:

1. The 2015 GPs were derived from the formerly proposed New England GPs. The New England GPs placed the GPs and general conditions at the front of the document, and state-specific terms and conditions in an appendix. The new GPs place terms and conditions unique to Massachusetts with the GPs and general conditions where appropriate.
2. Non-tidal SAS. Thresholds now exist in several GPs that require a PCN or individual permit (IP) for impacts to non-tidal SAS (consisting of riffle and pool complexes or vegetated shallows).
3. Temporary fill. Several GPs now authorize temporary fill, including unlimited fill for construction mats (see the references to Footnote 1), provided that impacts are avoided and minimized. Time limits for temporary fill were moved from GP 14 to General Condition 14(a).
4. Endangered species. Several GPs now provide limitations including time of year (TOY) restrictions for work in critical habitat for endangered species. See GPs 1, 5, 7, 11, 14, 19, 23, and GCs 10(b)(ii) and 11(d).
5. Time of year restrictions. See #4 above for TOY restrictions related to endangered species. Time of year restrictions not related to endangered species, but provided for other aquatic species, that are associated with: dredging are in GP 5; sedimentation and turbidity are in GCs 9 and 16(a); pile removal are in GC 11(c); and upstream fish passage are in GC 16(b).

Specific:

6. General Permit 1, Maintenance. All stream crossing work authorized under GP 1, except for minor repairs, requires a PCN or IP.
7. General Permit 2, Moorings. New or relocated moorings now require a PCN if they are placed within or impact tidal vegetated shallows (e.g., eelgrass). We clarified that a PCN is required if they are located within a Corps Federal navigation project (FNP) or the FNP buffer zone.

8. General Permit 3, Structures in Navigable Waters of the U.S. Shore outhauls now require a PCN.
9. General Permit 5, Dredging. The 2015 GPs required an IP for “Maintenance dredging with $>1/2$ acre of impacts to tidal SAS or intertidal areas”, but we increased this limit to “Maintenance or improvement dredging and/or disposal with >1 acre of impacts to SAS”. Improvement dredging of any area is now eligible under this GP with a PCN provided there are ≤ 1 acre of SAS impacts. Previously we treated improvement dredging the same as new dredging and it was subject to the new dredging limits.
10. General Permit 7, Bank and Shoreline Stabilization. These activities now require a PCN if they are located in tidal waters.
11. General Permits 8 – 10. Stream and wetland crossings are now eligible for authorization under GPs 8 - 10. The notes that that stream and wetland crossings include permanent and temporary crossings, including those built with construction mats; and modifications (including sliplining), replacements or extensions to existing crossings. The 2015 GPs limited the authorization for stream crossings to GP 10 (and a narrow scope for maintenance under GP 1, which was narrowed further). Conditions for stream crossings are located throughout the General Conditions section including a new GC titled, “19. Stream and Wetland Crossings”.
12. General Permit 14, Temporary Construction, Access, and Dewatering. As mentioned above, several GPs now authorize temporary fill, including unlimited fill for construction mats provided that impacts are avoided and minimized. This GP authorizes this and other temporary activities. Time limits for temporary fill were moved from GP 14 to GC 14(a).
13. General Permit 22, Aquaculture. Several activities now require a PCN due to endangered species. Private sites >10 acres or municipal areas >25 acres now require an IP.
14. General Permit 23, Aquatic Habitat Restoration, Enhancement, and Establishment Activities. Cultch placement in SAS previously required a PCN. All cultch placement now requires a PCN.
15. Former General Permit 23, Previously Authorized Activities. We deleted this GP.
16. General Condition 10, Federal Threatened and Endangered Species. Per GC 10(b), non-Federal permittees must check <http://ecos.fws.gov/ipac> and submit a PCN if any listed species or designated critical habitat might be affected or if the activity is located in designated critical habitat. However, General Condition 10(b) now provides SV eligibility for certain activities that will not affect certain bird species. General Condition 10(c) now states, “Unless it is required elsewhere in this document, a PCN is not required if: (i) another (lead) Federal agency has completed all required §7 consultation; or (ii) a non-Federal representative designated by the Corps in writing has completed all required §7 informal consultation”.
17. General Condition 11, Pile Driving and Removal. A PCN is now required for the installation or removal of structures with jetting techniques, or the removal of >100 piles from January 15 to November 15. The PNC requirements for installing piles in GC 11(d) were changed.
18. General Condition 16, Soil Erosion and Sediment Controls. We added time of year restrictions and conditions that will help to reduce turbidity and sedimentation, protect upstream fish passage, and

protect winter flounder spawning and rearing habitat. We defined “greater than minimal turbidity and sedimentation”.

19. General Condition 23, Vernal Pools. We modified this condition.

20. General Condition 24, Coral Reefs. We added this condition to protect coral reefs.

21. General Condition 28, Stormwater Treatment or Detention Systems. Stormwater treatment or detention systems in waters of the U.S are currently not authorized under GP 8. This condition requires an IP for all GPs when these systems are located in waters of the U.S.

22. General Condition 29, Tide Gates. General Permit 10 in the 2015 GPs required an IP for new tide gates. This new GC ensures that an IP is required for all new tide gates conveying water between waters of the U.S. Tide gates on discharge pipes conveying stormwater and/or industrial NPDES-permitted discharges from waters that are not waters of the U.S. may be authorized under GPs 1 and 9.

23. Section V, Self-Verification Notification Form. This form contains changes, including a requirement for project plans drawn to scale and not larger than 11” x 17”.

24. Section VI, Content of Pre-Construction Notification. We updated this form.

25. Section VII, Definitions and Acronyms. We updated definitions and added new definitions.

26. Section VIII, Contacts and Tribal Areas of Concern. We updated contacts and the area of concern for the Stockbridge-Munsee Mohican Tribe.

27. Section IX, Historic Property Notification Form. We updated this form.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires all federal agencies to consult with the National Marine Fisheries Service (NMFS) on all actions, or proposed actions, permitted, funded, or undertaken by the agency, that may adversely affect Essential Fish Habitat (EFH). The Corps has and continues to consult with NMFS on activities permitted under the GPs. For SV eligible activities, the Corps has been working with NMFS and expects to receive a statement of General Concurrence from NMFS in accordance with the requirements of 50 CFR 600.920(f) upon issuance of these GPs as the Corps has determined that activities authorized under the GPs in tidal waters and non-tidal diadromous streams will likely result in no more than minimal adverse effects to EFH individually and cumulatively. For activities requiring a PCN, the Corps will consult with NMFS in accordance with the requirements at 50 CFR 600 Subpart K.

National Historic Preservation Act

The Corps has determined that General Condition 7, Historic Properties, ensures that all activities authorized by the GPs comply with Section 106 of the NHPA. General Condition 7 states, “In cases where the Corps determines that the activity may have the potential to cause effects to properties listed,

or eligible for listing, in the National Register of Historic Places (NRHP), the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied. Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the NHPA. Non-federal permittees must submit a PCN to the Corps if the activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the NRHP, including previously unidentified properties. All PCNs shall include information on historic properties. Based on the information submitted in the PCN and the Corps identification efforts, the Corps shall determine whether the proposed GP activity has the potential to cause effects on the historic properties. Section 106 consultation is required when the Corps determines that the activity has the potential to cause effects on historic properties.

Endangered Species

The Corps has determined that General Condition 10, Federal Threatened and Endangered Species, ensures that all activities authorized by the GPs comply with Section 7 of the ESA. GC 10 states, “No activity is authorized under any GP which: (i) Is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species (i.e., listed species) or a species proposed for such designation, as identified under the Federal Endangered Species Act of 1973, as amended (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species; or (ii) “May affect” a listed species or critical habitat unless consultation under §7 of the ESA addressing the effects of the proposed activity, has been completed. Non-Federal permittees must check <http://ecos.fws.gov/ipac> and submit a PCN if any listed species or designated critical habitat might be affected or if the activity is located in designated critical habitat. However, there are exceptions for the northern long-eared bat, roseate tern, piping plover and red knot. Federal agencies should follow their own procedures for complying with the requirements of the ESA, but Federal permittees and non-Federal representatives must provide the Corps with the appropriate documentation to demonstrate compliance with those requirements. The Corps will review the documentation and determine whether it is sufficient to address ESA compliance for the GP activity, or whether additional ESA consultation is necessary.

Section 401 Water Quality Certification (WQC)

State certification pursuant to Section 401 of the Clean Water Act, or waiver thereof, is required from the state prior to the issuance of GPs authorizing activities that may result in a discharge into waters of the U.S. On April 5, 2018, the Massachusetts Department of Environmental Protection issued a conditional WQC, which is located at www.nae.usace.army.mil/missions/regulatory >> State General Permits >> Massachusetts.

Coastal Zone Management (CZM) Consistency

The Commonwealth of Massachusetts has a Federally-approved Coastal Zone Management (CZM) Program. Section 307(c)(1) of the Federal CZM Act of 1972, as amended, requires the Corps to provide a consistency determination and receive state concurrence prior to the issuance, reissuance, or expansion of activities authorized by a GP that authorizes activities within a state with a Federally-approved Coastal Management Program when activities that would occur within, or outside, that state’s coastal zone will affect land or water uses or natural resources of the state’s coastal zone. In a letter dated April 5, 2018, the Massachusetts Office of CZM wrote, “we concur with your certification and find that the activity as proposed is consistent with the CZM enforceable program policies.”

CENAE-R
FILE NO. NAE-2016-00599

Outreach

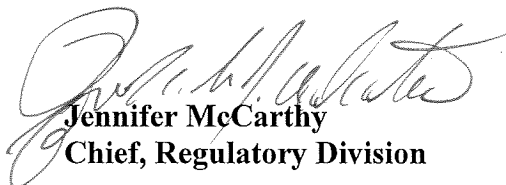
The Corps will conduct outreach webinars for stakeholders. All webinars are open to those who wish to attend, though during each webinar we will focus on aspects of the MA GPs that may be of interest to particular stakeholders.

<u>Focus</u>	<u>Date and Time</u>	
inland and coastal activities	Tue. 5/01/18	1:00 p.m. – 3:00 p.m.
coastal activities	Wed. 5/02/18	1:00 p.m. – 3:00 p.m.
inland activities	Thr. 5/03/18	1:00 p.m. – 3:00 p.m.
inland and coastal activities	Wed. 5/09/18	1:00 p.m. – 3:00 p.m.
utility and transportation activities	Thr. 5/10/18	1:00 p.m. – 3:00 p.m.

Webinar Info

1. To access the visual portion of the webinar:
 - a. Go to <https://usace.webex.com>
 - b. Enter meeting number: 961 550 519
 - c. Enter security code/password: 0416
 - d. Enter name
 - e. Enter email
2. To access the audio portion of the webinar: In the “Audio Connection” box, select the “Call Me” feature and you will get a phone call connecting you (preferred), or select “I Will Call In” and follow the directions. (Note, if the Audio Connection box is not open after you log in, select “Connect to Audio”.)

Please contact Mr. Greg Penta at (978) 318-8862 or gregory.r.penta@usace.army.mil for more information or a copy of the MA GPs.


Jennifer McCarthy
Chief, Regulatory Division

If you would prefer not to continue receiving Public Notices by email, please contact Ms. Tina Chaisson at (978) 318-8058 or e-mail her at bettina.m.chaisson@usace.army.mil. You may also check here () and return this portion of the Public Notice to: Bettina Chaisson, Regulatory Division, U.S. Army Corps of Engineers, 696 Virginia Road, Concord, MA 01742-2751.

NAME: _____
ADDRESS: _____
PHONE: _____

Applicant: General Public in Massachusetts

Effective Date: April 16, 2018

Expiration Date: April 5, 2023

Department of the Army General Permits for the Commonwealth of Massachusetts

The New England District of the U.S. Army Corps of Engineers (Corps) hereby issues General Permits (GPs) for activities subject to Corps jurisdiction in waters of the U.S., including navigable waters, within the boundaries of, and off the coast of, the Commonwealth of Massachusetts, excluding work within the boundaries of Indian tribal lands. These GPs are issued in accordance with Corps regulations at 33 CFR Parts 320-332 (see 33 CFR 325.2(e)(2)). The GPs will protect the aquatic environment and the public interest while effectively authorizing activities that have no more than minimal individual and cumulative adverse environmental effects. This document supersedes the February 4, 2015 GPs.

This GP document contains the following sections:	<u>Page</u>
I. General Criteria	1
II. Jurisdiction/Authorities to Issue Permits	2
III. Eligible Activities	3
IV. General Conditions	19
V. Self-Verification Notification Form	34
VI. Content of Preconstruction Notification	36
VII. Definitions and Acronyms	40
VIII. Contacts and Tribal Areas of Concern	47
IX. Historic Property Notification Form	49

I. GENERAL CRITERIA

1. See Section II to determine if the activity requires Corps authorization, and [Sections III](#) and [IV](#) to determine if the activity may be eligible for authorization under the GPs, specifically whether it is eligible for self-verification (SV) or a preconstruction notification (PCN) or an individual permit (IP) is required.
2. In order for activities to qualify for these GPs, they must comply with all applicable GP eligibility criteria and general conditions in [Section IV](#).
3. Project proponents are encouraged to contact the Corps with questions at any time. Pre-application meetings (see 33 CFR 325.1(b)) are encouraged to facilitate early review and help streamline the permit process by alerting the applicant to potential obstacles that may arise during the evaluation (e.g., historic properties general condition (GC) 7 and endangered species (GC 10)).
4. Regulated activities that are not authorized by these GPs require IPs (see 33 CFR 325.5(b)) and proponents must submit an application directly to the Corps. (Projects that require an IP will also require an individual 401 Water Quality Certification (WQC) from the Massachusetts Department of Environmental Protection (MassDEP) and Coastal Zone Management (CZM) individual consistency concurrence from the Massachusetts Office of CZM.) These GPs do not affect the Corps IP review process or activities exempt from Corps permit requirements. The Corps retains discretionary authority on a case-by-case basis to elevate a SV to PCN or IP, or a PCN to IP based on concerns for the aquatic environment or for any other factor of the public interest (33 CFR 320.4(a)). Whenever the Corps notifies an applicant that a PCN or IP is required, no work in Corps jurisdiction may be conducted until the Corps issues the required authorization in writing indicating that work may proceed.

5. How to Obtain/Apply for Authorization

a. Self-verification (Self-Verification Notification Form (SVNF) required):

The project proponent may proceed with activities authorized under these GPs that are eligible for SV without submitting a PCN to the Corps provided the prospective permittee has:

i. Verified that the activity will comply with all applicable terms and conditions of the GPs and ensured that a PCN is not required. Consultation with the Corps and/or other relevant Federal and State agencies may be necessary to ensure compliance with the applicable GCs in [Section IV](#) and related Federal laws such as 33 U.S.C. 408 (GC 5), the National Historic Preservation Act (GC 7), the Endangered Species Act (GC 10) and the Wild and Scenic Rivers Act (GC 8). The Corps can confirm that SV eligible activities are authorized under the GPs upon request.

ii. Submitted the SVNF ([Section V](#)) to the Corps unless otherwise specified. By submitting the SVNF, you are self-verifying that your project meets the terms and conditions of the applicable GPs.

b. Preconstruction Notification (application required):

i. For activities that do not qualify for SV or when it is stated that a PCN is required, the permittee must submit a PCN to obtain written verification from the Corps before starting work in Corps jurisdiction. Applicants must include the information in [Section VI](#) to ensure the application is complete and to expedite project review. Applications should be emailed to cenae-r@usace.army.mil or to the Corps project manager if one has been assigned. If the Corps determines that the PCN activity qualifies for authorization under these GPs, the Corps will send a verification letter to the applicant. If the Corps determines that the activity does not qualify for authorization under these GPs, or that additional information is required, the Corps will notify the applicant in writing.

ii. Emergency Situations: Contact the Corps in the event of an emergency situation for information on the application and approval process. Emergency situations are limited to sudden, unexpected occurrences that could potentially 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 is subject to the same terms and conditions of these GPs as non-emergency work, and similarly, must qualify for authorization under the GPs; otherwise an IP is required. The Corps will work with all applicable agencies to expedite verification according to established procedures in emergency situations.

II. JURISDICTION/AUTHORITIES TO ISSUE PERMITS

1. The following regulated activities require authorization under the [Corps Regulatory Program](#):

a. The construction of any structure in, over or under any navigable water of the United States (U.S.), the excavating or dredging from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters. The Corps regulates these activities under Section (§) 10 of the Rivers and Harbors Act of 1899. See 33 CFR 322;

b. The discharge of dredged or fill material into waters of the U.S. The Corps regulates these activities under §404 of the Clean Water Act (CWA). See 33 CFR 323; and

c. The transportation of dredged material for the purpose of disposal in the ocean. The Corps regulates these activities under §103 of the Marine Protection, Research and Sanctuaries Act. See 33 CFR 324.

2. Related laws: 33 CFR 320.3 includes a list of related laws, including but not limited to: §401 and §402 of the CWA, §307(c) of the CZM Act of 1972, the National Historic Preservation Act of 1966, the Endangered Species Act, the Fish and Wildlife Act of 1956, the Marine Mammal Protection Act of 1972, the Magnuson-Stevens Fishery Conservation and Management Act, and §7(a) of the Wild and Scenic Rivers Act.

III. ELIGIBLE ACTIVITIES

The terms “navigable waters of the U.S.” and “waters of the U.S.” are used frequently throughout this document and it is important that the reader understand these terms, which are defined in [Section VII](#).

The area thresholds stated in GPs 1, 8-14, 16-20 and 23 apply when there is a discharge of dredged or fill material or a discharge associated with excavation in waters of the U.S. Unless otherwise stated, the total temporary and permanent impact area is used to determine if a single and complete project is eligible for SV or requires a PCN. An IP is required if the total permanent impact area exceeds the PCN/GP threshold.

Permanent impacts mean 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. Temporary impacts include, but are not limited to, waters of the U.S. that are temporarily filled, flooded, excavated, or drained because of the regulated activity. Temporary impacts are usually associated with construction activities and often involve the placement of cofferdams and construction mats. These fills are removed when construction is completed. Pilings and associated structures do not ordinarily constitute a discharge of fill material. Impacts resulting from activities eligible for exemptions under §404(f) of the CWA are not considered when calculating the impact area.

General Permits

1. Maintenance
2. Moorings
3. Structures in Navigable Waters of the U.S.
4. Aids to Navigation, and Temporary Recreational Structures
5. Dredging, Disposal of Dredged Material, Beach Nourishment, and Rock Removal and Relocation
6. U.S. Coast Guard Approved Bridges
7. Bank and Shoreline Stabilization
8. Residential, Commercial and Institutional Developments, and Recreational Facilities
9. Utility Line Activities
10. Linear Transportation Projects and Stream Crossings
11. Mining Activities
12. Boat Ramps and Marine Railways
13. Land and Water-Based Renewable Energy Generation Facilities and Hydropower Projects
14. Temporary Construction, Access, and Dewatering
15. Reshaping Existing Drainage Ditches, New Ditches, and Mosquito Management
16. Response Operations for Oil and Hazardous Substances
17. Cleanup of Hazardous and Toxic Waste
18. Scientific Measurement Devices
19. Survey Activities
20. Agricultural Activities
21. Fish and Wildlife Harvesting and Attraction Devices and Activities
22. Aquaculture Activities
23. Aquatic Habitat Restoration, Establishment and Enhancement Activities

GP 1. Maintenance (Authorities: §§10 and 404) Authorized are: (a) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified in the original permit or the most recently authorized modification (see Note 1). Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are also eligible. This GP also authorizes the removal of previously authorized structures or fills. 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. This also authorizes the removal of accumulated sediment and debris within, and in the immediate vicinity of, the structure or fill. This also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided it is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, the Corps may waive the two-year limit in writing provided the permittee can demonstrate funding, contract, or other similar delays; (b) The removal of accumulated sediments and debris outside the immediate vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.). All dredged or excavated materials must be deposited and retained in an area that has no waters of the U.S. unless otherwise specifically approved by the Corps under separate authorization; and (c) Temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the maintenance activity.

Not authorized under GP 1 (IP required): (a) Permanent impacts that are >1 acre in non-tidal waters of the U.S.; >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; (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 shallows¹; (c) Stream crossing modifications (including sliplining), replacements or extensions (see GPs 8 - 10); (d) New stream channelization or stream relocation projects (e.g., those in response to storm or flood events); or (e) Maintenance dredging, beach nourishment or beach restoration (see GP 5).

Self-Verification Eligible ¹	PCN Required ¹
Activities that do not require a PCN or an IP.	<ol style="list-style-type: none"> 1. Minor deviations result in expansions (e.g., structures) or new permanent or temporary impacts (i.e., outside of the previously authorized footprint) in waters of the U.S. This includes bank or shoreline stabilization in front of existing structures; or 2. For authorized activity (b) above, the removal of sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend >200 feet in any direction from the structure; or 3. Impacts occur in special aquatic sites (SAS) other than non-tidal wetlands; or 4. Stream crossing work that does not require an IP. Minor repairs are SV eligible. 5. Dam and flood control or levee repair, rehabilitation, or replacement involves: <ol style="list-style-type: none"> (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; or (c) any modification that changes the character, scope, or size of the original fill design; or 6. The discharge of more than de minimis (i.e., inconsequential) quantities of accumulated bottom sediment occur from or through a dam into downstream waters (see Note 2); or 7. Work on tide gates without a Corps-approved operation and maintenance plan or changes affecting the hydraulic regime; or 8. Repair or replacement of currently-serviceable tide gates through the use of duckbill, flap gate or manual check valves unless installed on existing outfall discharge pipes conveying

¹ Temporary construction mats placed in an area of any size in non-tidal waters necessary to conduct activities do not count towards the SV or PCN/GP thresholds. Temporary construction mats in tidal SAS or >5000 SF in tidal waters require a PCN, but mats placed in an area of any size do not count towards the PCN/GP area thresholds. This only applies to temporary construction mats, not other temporary fill. See GCs 3(a), 13 and 14.

	<p>stormwater and/or industrial NPDES-permitted discharges from waters that are not waters of the U.S.; or</p> <p>9. 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: (a) ≤5 feet waterward from the ordinary high water mark (OHW) or high tide line (HTL) and in the dry; or (b) from Sep. 1 to Oct. 14. This is to protect endangered species; or</p> <p>10. Activities that do not require an IP. Activities that do not require a PCN or an IP may be SV eligible.</p>
<p>Notes:</p> <p>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 Corps permits may have included authorization to maintain the activity, in which case authorization under this GP is not necessary.</p> <p>2. See Corps Regulatory Guidance Letter No. 05-04 for more info.</p>	

GP 2. Moorings (Authority: §10)

New moorings and mooring fields; the relocation of previously authorized² moorings; expansions, boundary reconfigurations or modifications of previously authorized mooring fields; and maintenance and replacement of moorings.

Not authorized under GP 2 (IP required): (a) Moorings or mooring fields converted to or associated with a new boating facility³; (b) Moorings in a Corps [Federal anchorage](#) that are classified as a boating facility³ except municipal-operated mooring fields; or (c) Moorings in a Corps [Federal channel](#).

Self-Verification Eligible	PCN Required
<p>1. New or relocated moorings that meet all of the following terms:</p> <ul style="list-style-type: none"> a. Authorized by a local harbormaster/municipality under MGL Chapter 91 §10A; and b. Single boat, single-point and non-commercial; and c. Not associated with a boating facility³; and d. Neither placed within nor impact tidal vegetated shallows (e.g., eelgrass); and e. Attached to boats that do not contact the substrate during any tidal cycle; and f. Not located within a Corps Federal navigation project (FNP) or the FNP buffer zone. <p>2. Existing, authorized moorings are converted from traditional moorings to low impact mooring technology (see note below) and/or helical anchors.</p> <p>3. Maintenance and replacement of authorized² moorings.</p>	<p>1. New mooring fields; or expansions, boundary reconfigurations or modifications of existing, authorized mooring fields; or</p> <p>2. Moorings that are not SV eligible and do not require an IP. See Note 2.</p>
<p>Notes:</p> <p>1. Low impact mooring technology prevents any part of the tackle from dragging on the bottom during the tidal cycle.</p> <p>2. Locating new individual moorings in tidal vegetated shallows shall be avoided to the maximum extent practicable. If tidal vegetated shallows cannot be avoided, plans should show low impact mooring technology that prevent moorings chains from resting or dragging on the bottom substrate at all tides and helical anchors, or equivalent SAS protection systems, where practicable. For moorings that appear to impact tidal vegetated shallows, the Corps may require an eelgrass survey.</p>	

² For all GPs, “authorized” means authorized by the Corps in writing or by 33 CFR 330.3, not a state or municipality, unless otherwise stated. An SVNF was not required before January 21, 2010.

³ Boating facilities provide for a fee, rent or sell mooring or docking space, such as marinas, yacht clubs, boat clubs, boat yards, dockominiums, town facilities, land/home owners associations, etc. 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 3. Structures in Navigable Waters of the U.S. (Authority: §10)	
New, expansions, reconfigurations or modifications of structures in navigable waters of the U.S. including pile and pole-supported piers, floats, stairs, shore outhauls, and boat and float lifts.	
<u>Not authorized under GP 3 (IP required):</u> (a) Structures associated with a new boating facility; (b) Structures in a Corps Federal anchorage or channel; or (c) Artificial reefs	
Self-Verification Eligible	PCN Required
<p>1. Private, non-commercial piers, floats and lifts that meet all of the following terms:</p> <ul style="list-style-type: none"> a. Piers span ≤ 75 feet over salt marsh and are ≤ 4 feet wide and ≥ 4 feet above the marsh substrate (the height is measured from the marsh substrate to the bottom of the lowest longitudinal support); and b. Floats and lifts in tidal waters and non-tidal navigable waters of the U.S. are ≥ 18 inches above the substrate during all tidal cycles. Skids can only be used in areas where piles are not feasible and on sandy or hard bottom substrates; and c. Piers and floats in: (i) Tidal waters total ≤ 600 SF combined; and (ii) Non-tidal navigable waters of the U.S. total ≤ 300 SF combined; and d. Piers, floats and lifts: (i) Are ≥ 25 feet from previously mapped or existing vegetated shallows, or riparian property line extensions; and (ii) Extend $\leq 25\%$ of the waterway width or ≤ 75 feet waterward from OHW in non-tidal navigable waters of the U.S. or mean high water (MHW). See Note 1. <p>2. Fenders and similar structures.</p>	<p>1. Shore outhauls; or</p> <p>2. Expansions, modifications, or new reconfiguration zones at any authorized boating facility; or</p> <p>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.; or</p> <p>4. Miscellaneous structures; or</p> <p>5. Structures that are not SV eligible and do not require an IP.</p>
<p>Notes:</p> <p>1. See www.nae.usace.army.mil/missions/regulatory/useful-documents-forms-and-publications >> Structure Placement in Navigable Waterways for guidance.</p> <p>2. GC 11, Pile Driving and Removal, is particularly relevant.</p>	

GP 4. Aids to Navigation and Temporary Recreational Structures (Authority: §10)	
<p>(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, chapter I, subchapter C, part 66; and</p> <p>(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 6.</p>	
Self-Verification Eligible	PCN Required
<p>1. Aids to navigation and regulatory markers approved by and installed in accordance with the requirements of the USCG.</p> <p>2. Temporary buoys, markers and similar structures that are: (a) placed for recreational use during specific events and removed within 30 days after event; (b) placed during winter events on ice and removed before spring thaw; (c) authorized by the local harbormaster; (d) Not located within an FNP; and (e) Not located in SAS.</p>	<p>Activities that are not SV eligible.</p>
<p>Note: An SVNf is not required for work authorized under SV #1 above.</p>	

<p>GP 5. Dredging (Authority: §10; navigable waters of the U.S.), Disposal of Dredged Material (Authorities: §§10, 404 & 103; tidal waters of the U.S.), Beach Nourishment (Authorities: §§10 & 404; tidal and non-tidal waters of the U.S.), Rock Removal (Authority: §10, navigable waters of the U.S.) and Rock Relocation (Authorities: §§10 & 404; tidal and non-tidal waters of the U.S.)</p> <p>(a) New, maintenance and improvement dredging, including: (i) Return water from an upland contained dredged material disposal area; and (ii) Disposal of dredged material at an upland, confined aquatic disposal cell, beach nourishment, nearshore, designated open water or ocean water disposal site, provided the Corps finds the dredged material to be suitable for such disposal; and (b) Beach nourishment from upland sources.</p> <p><u>Not authorized under GP 5 (IP required):</u> (a) New dredging >½ acre; ≥10,000 CY; >1000 SF of impacts to intertidal areas, saltmarsh, mud flats, riffle and pool complexes, or non-tidal vegetated shallows; or >100 SF of impacts to tidal vegetated shallows; (b) Maintenance or improvement dredging and/or disposal with >1 acre of impacts to SAS; (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.</p>	
Self-Verification Eligible ¹	PCN Required ¹
<p>1. Maintenance dredging of previously dredged areas, with upland disposal, that meet all of the following terms:</p> <ul style="list-style-type: none"> a. Dredged area ≤½ acre; and b. Not located in right whale critical habitat (see Note 1), tidal waters from Mar 16 to Oct 31, 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; and c. Not located in: (i) Tidal waters from Jan 15 to Oct 31; (ii) The Connecticut River from the MA/NH border to the Turners Falls Dam from Mar 15 to Nov 15; (iii) The Merrimack River from the MA/NH border to the Essex Dam from Mar 1 to Nov 15; or (iv) The Charles River from the Watertown Dam to the Amelia Earhart Dam from Feb 15 to Nov 15. However, the time-of-year restriction(s) stated in Appendix B of the MA DMF Technical Report TR-47 (see Note 2) can apply instead if they are provided for a specific waterbody and less restrictive. This is to protect EFH and other species; and d. No impacts to tidal SAS, intertidal areas, areas located within 25' of salt marsh or 100' of vegetated shallows, or areas containing shellfish (an area contains shellfish unless: (i) it is verified that minimal shellfish are present per the local shellfish constable or an actual survey; or (ii) it is not a shellfish suitability area per the MassGIS shellfish suitability maps (see Note 3)); and e. No return water from upland disposal areas. <p>2. Boulder relocation with ≤100 SF of impacts, no impacts to SAS and relocated to a similar depth and substrate.</p>	<p>1. Maintenance dredging where the primary purpose is sand mining for beach nourishment; or</p> <p>2. New dredging and associated disposal <1/2 acre or <10,000 cubic yards; or</p> <p>3. Improvement dredging; or</p> <p>4. Beach nourishment in waters of the U.S. not associated with dredging; or</p> <p>5. Activities that are not eligible for SV and do not require an IP.</p>
<p>Notes:</p> <p>1. See www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit >> right whale critical habitat. The approximate boundaries are from the MA/NH border to Chatham.</p> <p>2. See www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit >> MA DMF Technical Report TR-47.</p> <p>3. See www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit >> MassGIS shellfish suitability maps.</p> <p>4. Compensatory mitigation is generally required for impacts to tidal SAS and intertidal areas resulting from new dredging.</p> <p>5. Contact the Corps if a ten-year authorization to maintain an area is desired.</p>	

GP 6. 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 §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 6: Causeways and approach fills (see GP 10).

Self-Verification Eligible	PCN Required
Discharges of dredged or fill material incidental to the construction of bridges.	
Note: As with all other GPs, a PCN may be required if stated in the General Conditions section.	

GP 7. Bank and Shoreline Stabilization (Authorities: §§10 & 404)

Bank and shoreline stabilization activities in waters of the U.S. necessary for erosion control or prevention, such as vegetative stabilization, sills, rip rap, revetment, gabion baskets, stream barbs, and bulkheads, or combinations of techniques (e.g., living shorelines), provided the activity meets all of 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.; and (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).

Not authorized under GP 7 (IP required): (a) Bank stabilization >500 feet in total length including both stream banks unless the Corps waives this criterion by making a written determination concluding that the discharge will result in no more than minimal adverse effects; (b) Stream channelization or relocation activities; or (c) Breakwaters, groins or jetties.

Self-Verification Eligible ¹	PCN Required ¹
Activities in non-tidal waters that meet all of the following terms: a. ≤100 feet in length including both stream banks; or ≤100 feet in length on each side of the stream bank when necessary to protect transportation infrastructure; and b. ≤1 cubic yard of fill per linear foot average along the bank waterward of the plane of OHW; and c. The slope of the structure is more gradual than 1V:3H in lakes/ponds; and 1V:1H in non-tidal streams; and d. No impacts to SAS.	1. Activities in non-tidal waters that are: a. >100 feet to ≤500 feet in length including both stream banks; or >100 feet in total length on each side of the stream bank and ≤500 feet including both stream banks when necessary to protect transportation infrastructure; or b. >1 cubic yard of fill per linear foot average along the bank waterward of the plane of OHW; or c. The slope of the structure is steeper than 1V:3H in lakes/ponds; and 1V:1H in non-tidal streams; or d. Impacts to SAS; or 2. The activity is located in tidal waters; or 3. Bulkheads, seawalls or similar structures for maritime activities; or 4. 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: (a) <5 feet waterward from OHW or HTL and in the dry ; or (b) from Sep. 1 to Oct. 14. This is to protect endangered species; or 5. Activities that are not eligible for SV and do not require an IP.

Note: See GP 1 for information on the replacement or maintenance of existing, currently serviceable structures.

GP 8. Residential, Commercial and Institutional Developments and Recreational Facilities (Authorities: §404)	
Discharges of dredged or fill material into non-tidal waters of the U.S for the construction or expansion of: (a) Residences and residential subdivisions; (b) Residential, commercial and institutional building foundations and building pads and attendant features such as roads, parking lots, garages, yards, and utility lines; and (c) Recreational facilities.	
Not authorized under GP 8 (IP required): (a) Permanent impacts in non-tidal waters of the U.S. that are >1 acre, or >1000 SF in riffle and pool complexes or vegetated shallows; or (b) Subsurface sewerage disposal systems in waters of the U.S. (see Note 1 below).	
Self-Verification Eligible ¹	PCN Required ¹
Permanent and temporary impacts in non-tidal waters of the U.S. that are: (a) ≤5000 SF; and (b) not located in vegetated shallows or riffle and pool complexes.	1. Permanent and temporary impacts in non-tidal waters of the U.S. that are: (a) >5000 SF; or (b) located in vegetated shallows or riffle and pool complexes; or 2. Stream and wetland crossings (see Note 2) that require a PCN per GC 19(b)-(e); or 3. Stream channelization, relocation, impoundment, or loss of streambed occurs; or 4. Activities that are not SV eligible and do not require an IP.
Notes: 1. Stormwater conveyance components and non-porous, septic effluent pipes that transmit effluent to or between components may be eligible for authorization under GP 9. 2. Stream and wetland crossings include permanent and temporary crossings, including those built with construction mats; and modifications (including sliplining), replacements or extensions to existing crossings.	

GP 9. Utility Line Activities (Authorities: §§10 & 404)

Activities required for: (a) The construction, maintenance, repair or removal of utility lines, including outfall and intake structures, and the associated excavation, backfill, or bedding for the utility lines in tidal and non-tidal waters of the U.S.; (b) The construction, maintenance, or expansion of utility line substation facilities associated with a power line or utility line in non-tidal waters of the U.S.; and (c) The construction or 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 for the construction and maintenance of utility lines, including overhead power lines and utility line substations, in non-tidal waters of the U.S., provided the activity, in combination with all other activities included in one single and complete project, does not cause the permanent loss of greater than 1 acre of non-tidal waters of the U.S. Access roads used solely for construction of the utility line must be removed upon completion of the work (see GC 15).

Not authorized under GP 9 (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 shallows¹; or (c) New tide gates that do not meet SV 3 below.

Self-Verification Eligible ¹	PCN Required ¹
<p>Activities that meet all of the following terms:</p> <ol style="list-style-type: none"> 1. Cumulative permanent and temporary impacts for all single and complete projects associated with the overall project (see Note 2) in non-tidal waters of the U.S. that: (a) total ≤5000 SF; and (b) are not located in vegetated shallows or riffle and pool complexes; and 2. Intake structures that are dry hydrants used exclusively for firefighting activities with no stream impoundments; and 3. 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. 	<ol style="list-style-type: none"> 1. Cumulative permanent and temporary impacts for all single and complete projects associated with the overall project (see Note 2) in non-tidal waters of the U.S. that: (a) total >5000 SF; or (b) are located in vegetated shallows or riffle and pool complexes; or 2. The activity occurs in tidal waters or in, over or under navigable waters of the U.S.; or 3. Access roads involving stream and wetland crossings (see Note 3) that require a PCN per GC 19(b)-(e); or 4. Stream channelization, relocation, impoundment, or loss of streambed occurs; or 5. The utility line is placed within and runs parallel to or along a streambed; or 6. There is a permanent change in preconstruction contours in waters of the U.S.; or 7. Material resulting from trench excavation is temporarily sidecast into waters of the U.S. for >3 months (material must be placed such that it is not dispersed by currents or other forces); or 8. Activities that are not SV eligible and do not require an IP.

Notes:

1. A utility line is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, data, 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.
2. The PCN must describe the locations of the starting point, end point, and all proposed impacts to aquatic resources in between in order to assess the cumulative effects for the overall project.
3. Stream and wetland crossings include permanent and temporary crossings, including those built with construction mats; and modifications (including sliplining), replacements or extensions to existing crossings.
4. Impacts resulting from mechanized pushing, dragging, or other similar activities that redeposit excavated soil material shall be figured into the area limit determination.

GP 10. Linear Transportation Projects and Stream Crossings (Authorities: §§10 & 404)

Activities 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. Any stream channel modification is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project. Access roads constructed above preconstruction contours and elevations in waters of the U.S. must be properly bridged or culverted to maintain surface flows.

Not authorized under GP 10 (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 shallows¹; (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 8); or (d) Tide gates.

Self-Verification Eligible ¹	PCN Required ¹
Cumulative permanent and temporary impacts for all single and complete projects associated with the overall project (see Note 2) in non-tidal waters of the U.S. that: (a) total ≤5000 SF; and (b) are not located in vegetated shallows or riffle and pool complexes.	<ol style="list-style-type: none"> 1. Cumulative permanent and temporary impacts in non-tidal waters of the U.S. for all single and complete projects associated with the overall project (see Note 2) that: (a) total >5000 SF; or (b) are located in vegetated shallows or riffle and pool complexes; or 2. The activity occurs in tidal waters or in, over or under navigable waters of the U.S.; or 3. Stream and wetland crossings (see Note 3) that require a PCN per GC 19(b)-(e); or 4. Stream channelization, relocation, or loss of streambed (see Note 4) including impoundments, occur; or 5. Activities that are not eligible for SV and do not require an IP.

Notes:

1. Discharges of dredged or fill material incidental to the construction of bridges across navigable waters of the U.S. may be authorized under GP 6.
2. The PCN must describe the locations of the starting point, end point, and all proposed impacts to aquatic resources in between in order to assess the cumulative effects of the overall project.
3. Stream and wetland crossings include permanent and temporary crossings, including those built with construction mats; and modifications (including sliplining), replacements or extensions to existing crossings.
4. Loss of streambed does not require a PCN when: a) stream crossings are constructed in accordance with GC 19; or b) bridge piers or similar supports are used.

GP 11. Mining Activities (Authorities: §§10 and 404)

Discharges of dredged or fill material into non-tidal waters of the U.S. for mining activities, except for coal mining and metallic mineral mining activities.

Not authorized under GP 11 (IP required): (a) Permanent impacts >1 acre in non-tidal waters of the U.S.; or (b) Activities in tidal waters.

Self-Verification Eligible ¹	PCN Required ¹
Permanent and temporary impacts in non-tidal waters of the U.S. that are: (a) ≤5000 SF; and (b) not located in vegetated shallows or riffle and pool complexes.	<ol style="list-style-type: none"> 1. Permanent and temporary impacts in non-tidal waters and wetlands that are: (a) >5000 SF; or (b) located in vegetated shallows or streams; or 2. The activity occurs in non-tidal navigable waters of the U.S.; or 3. Stream channelization, relocation, impoundment, loss of streambed, or discharge of tailings into streams occurs; or 4. Activities that are not eligible for SV and do not require an IP.

GP 12. Boat Ramps and Marine Railways (Authorities: §§10 and 404)	
Activities required for the construction of boat ramps and marine railways.	
<u>Not authorized under GP 12 (IP required):</u> (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 5).	
Self-Verification Eligible ¹	PCN Required ¹
Permanent and temporary impacts in non-tidal waters of the U.S. that are: (a) ≤5000 SF; and (b) not located in vegetated shallows or riffle and pool complexes ¹ .	<ol style="list-style-type: none"> 1. Permanent and temporary impacts in non-tidal waters of the U.S. that are: (a) >5000 SF; or (b) located in vegetated shallows or riffle and pool complexes; or 2. The activity occurs in tidal or navigable waters of the U.S.; or 3. Boat ramps are located within 25 feet of property line extensions unless the properties are owned by the same owner. The Corps may require a letter of no objection from the abutter(s); or 4. Activities that are not eligible for SV and do not require an IP.

GP 13. Land and Water-Based Renewable Energy Generation Facilities (Authorities: §§10 and 404), and Hydropower Projects (Authority: §404)	
Structures and work in navigable waters of the U.S. and discharges of dredged or fill material into tidal and non-tidal waters of the U.S. for the construction, expansion, modification or removal of: (a) Land-based renewable energy production facilities, including 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.	
For (a) and (b) above, such facilities include water-based wind or hydrokinetic renewable energy generation projects and infrastructure to collect solar (concentrating solar power and photovoltaic), wind, biomass, or geothermal energy. 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.	
<u>Not authorized under GP 13 (IP required):</u> (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 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 ¹ .	
Self-Verification Eligible ¹	PCN Required ¹
For land-based facilities, permanent and temporary impacts in non-tidal waters of the U.S. that are: (a) ≤5000 SF; and (b) not located in vegetated shallows or riffle and pool complexes.	<ol style="list-style-type: none"> 1. For land-based facilities, permanent and temporary impacts in non-tidal waters of the U.S. that are: (a) >5000 SF; or (b) located in vegetated shallows or riffle and pool complexes¹; or 2. Water-based wind or hydrokinetic renewable energy generation projects, and hydropower projects; or 3. For all activities eligible for authorization under GP 13: a) The activity occurs in tidal waters or in, over or under navigable waters of the U.S.; or b) Stream channelization, relocation, impoundment, or loss of streambed occurs; or 4. Activities that are not eligible for SV and do not require an IP.
Note: 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 9.	

GP 14. 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.	
<u>Not authorized under GP 14 (IP required):</u> (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 (see exception in Note 3 below); (c) Use of cofferdams to dewater wetlands or other aquatic areas to change their use; (d) Temporary stream crossings (see GPs 8 - 10); (e) Structures or fill left in place after construction is completed.	
Self-Verification Eligible	PCN Required
Activities that meet all of the following terms: 1. Impacts in non-tidal waters of the U.S. that are: (a) ≤5000 SF; and (b) not located in vegetated shallows or riffle and pool complexes (see exception in Note 2); and 2. Impacts in tidal waters that are: (a) ≤5000 SF; and (b) not located in SAS; and 3. Structures in navigable waters of the U.S. provided no impacts occur in tidal SAS and they are left in place ≤30 days.	1. Impacts in non-tidal waters of the U.S. that are: (a) >5000 SF; or (b) located in vegetated shallows or riffle and pool complexes (see exception in Note 2); or 2. Impacts in tidal waters of the U.S. that are: (a) >5000 SF; or (b) located in SAS (see Note 3); or 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: (a) <5 feet waterward from OHW or HTL and in the dry ; or (b) from Sep. 1 to Oct. 14. 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. PCNs must include plans to demonstrate this. 2. Temporary construction mats placed in an area of any size in non-tidal waters of the U.S. do not count towards the SV or PCN/GP area thresholds (see GCs 3(a), 13 and 14). This only applies to temporary construction mats, not other temporary fill. 3. Temporary construction mats in tidal SAS or >5000 SF in tidal waters require a PCN, but mats placed in an area of any size do not count towards the PCN/GP area thresholds (see GCs 3(a), 13 and 14). This only applies to temporary construction mats, not other temporary fill.	

GP 15. 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 waters of the U.S., 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.	
<u>Not authorized under GP 15 (IP required):</u> Temporary impacts ¹ ; stream channelization, relocation, impoundments, or loss of streambed.	
Self-Verification Eligible ¹	PCN Required ¹
≤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.); or 2. 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); or 3. Mosquito reduction activities in tidal waters, or those in non-tidal waters that are not SV eligible; or 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 16. Response Operations for Oil and Hazardous Substances (Authorities: §§10 and 404)	
Eligible for authorization are the following activities in waters of the U.S.: (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. SAS should be restored in place at the same elevation.	
Self-Verification Eligible ¹	PCN Required ¹
1. Activities are conducted in accordance with (a) or (b) above that are not planned or scheduled, but an emergency response (see Note 1); and 2. Booms placed in navigable waters of the U.S. for oil and hazardous substance containment, absorption and prevention; and 3. Temporary impacts for spill response training exercises <5000 SF in non-tidal waters of the U.S. and <1000 SF in tidal waters with no impacts to SAS; and 4. Temporary structures in tidal waters with no impacts to SAS 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 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 Corps at (978) 318-8338 before or as soon as possible after the work authorized under GP 16(a) - (c) commences for the Corps to address the effects under the Federal Endangered Species Act. 2. Permittees have until two weeks following commencement of the activities in GP 16 to submit the SVNf. However, an SVNf need not be submitted 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 17. Cleanup of Hazardous and Toxic Waste (Authorities: §§10 and 404)	
Specific activities in waters of the U.S. to effect 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. The SAS should be restored in place at the same elevation to the maximum extent practicable.	
Self-Verification Eligible ¹	PCN Required ¹
Permanent and temporary impacts in non-tidal waters of the U.S. that are: (a) ≤5000 SF; and (b) not located in vegetated shallows or riffle and pool complexes.	1. Permanent and temporary impacts in non-tidal waters of the U.S. that are: (a) >5000 SF; or (b) located in vegetated shallows or riffle and pool complexes; or 2. The activity occurs in tidal or navigable waters of the U.S.; or 3. Stream channelization, relocation, impoundment, or loss of streambed occurs; or 4. The activity involves establishing new disposal sites or expanding existing sites used for the disposal of hazardous or toxic waste in waters of the U.S.; or 5. Activities that are not eligible for SV and do not require an IP.
Notes: 1. Activities undertaken entirely on a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site by authority of CERCLA as approved or required by EPA, are not required to obtain permits under §404 of the CWA or §10 of the Rivers and Harbors Act. 2. Permittees have until two weeks following commencement of the activities in GP 17 to submit the SVNf.	

<p>GP 18. Scientific Measurement Devices (Authorities: §§10 and 404) Scientific measurement devices in waters of the U.S. 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.</p> <p><u>Not authorized under GP 18 (IP required):</u> (a) Permanent impacts that are >5000 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; >5000 SF in saltmarsh, mud flats, or riffle and pool complexes; or >1000 SF in vegetated shallows¹.</p>	
Self-Verification Eligible ¹	PCN Required ¹
Temporary measuring devices and associated structures (e.g., anchors, buoys, etc.) in tidal and non-tidal waters of the U.S. provided: (a) in non-tidal waters of the U.S. permanent impacts are ≤1000 SF, temporary impacts are ≤5000 SF, and no impacts occur in riffle and pool complexes or vegetated shallows; and (b) no impacts in tidal waters.	<ol style="list-style-type: none"> 1. In non-tidal waters of the U.S., permanent impacts are >1000 SF, temporary impacts are >5000 SF, or impacts occur in riffle and pool complexes or vegetated shallows; or 2. Impacts occur in tidal waters; or 3. Biological sampling devices, weirs or flumes, or the activity restricts or concentrates movement of aquatic organisms; or 4. Devices that are not eligible for SV and do not require an IP.
<p>Note: An SVNf need not be submitted for temporary measuring devices with a footprint of <10 square feet, with a profile of <3 feet high measured from the substrate, and located in water deeper than -10 feet MLW.</p>	

<p>GP 19. Survey Activities (Authorities: §§10 and 404) Survey activities in waters of the U.S. 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.</p> <p><u>Not authorized under GP 19 (IP required):</u> (a) Permanent impacts that are >1 acre in tidal and non-tidal waters of the U.S.; >1000 SF in tidal saltmarsh, mud flats, or riffle and pool complexes; or >100 SF in tidal vegetated shallows¹; 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 shallows¹.</p>	
Self-Verification Eligible ¹	PCN Required ¹
<ol style="list-style-type: none"> 1. Permanent impacts that are ≤1000 SF and temporary impacts that are ≤5000 SF¹ in non-tidal waters of the U.S. provided no impacts occur in riffle and pool complexes or vegetated shallows; and 2. Survey activities including temporary structures in tidal waters provided no impacts occur; and 3. Temporary structures in navigable waters of the U.S. 	<ol style="list-style-type: none"> 1. In non-tidal waters of the U.S., permanent impacts are >1000 SF, temporary impacts are >5000 SF, or impacts occur in riffle and pool complexes or vegetated shallows; or 2. Impacts occur in tidal waters; or 3. Exploratory trenching (see Note 2) occurs in waterways (e.g., streams, tidal waters); or 4. Activities associated with the recovery of historic resources, and the drilling and discharge of excavated material from test wells for oil and gas exploration; or 5. 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; or 6. Activities that are not eligible for SV and do not require an IP.
<p>Notes:</p> <ol style="list-style-type: none"> 1. An SVNf need not be submitted for wetland delineations, and core sampling conducted for preliminary evaluation of dredge project analysis. 2. For the purposes of GP 19, 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 20. Agricultural Activities (Authority: §404)

Discharges of dredged or fill material in non-tidal waters of the U.S. 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 20 (IP required): (a) Permanent impacts that are >1 acre in non-tidal waters of the U.S.; 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 ¹	PCN Required ¹
Permanent and temporary impacts in non-tidal waters of the U.S. that are: (a) ≤5000 SF; and (b) not located in vegetated shallows or riffle and pool complexes.	1. Permanent and temporary impacts in non-tidal waters of the U.S. that are: (a) >5000 SF; or (b) located in vegetated shallows or riffle and pool complexes; or 2. Activities occur in non-tidal navigable waters of the U.S.; or 3. Stream channelization, relocation, impoundment, loss of streambed, or farm ponds in non-perennial streams occurs; or 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 21. 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 lobster pound nets, crab traps, 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 21 (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 ¹	PCN Required ¹
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; or 2. Devices and activities that are located in tidal SAS; or 3. Devices and activities that do not require an IP. Activities that do not require a PCN or an IP may be SV eligible.

Note: An SVNf need not be submitted for work authorized under GP 21.

GP 22. 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 waters of the U.S. necessary for shellfish seeding, rearing, cultivating, transplanting, and harvesting activities; and (c) Shellfish seeding or brushing the flats projects. The area and any elevated structures within it must be marked in conformance with 33 CFR 64, and the permittee must contact the USCG, First District, Aids to Navigation Branch (617) 223-8347 to coordinate the proper buoy markings for the activity. Buoys shall be deployed and maintained as appropriate. 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.

Not authorized under GP 22 (IP required): (a) 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 $> \frac{1}{2}$ 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, stockpiles, or staging areas, or the deposition of shell material back into waters of the U.S. as waste; (e) Private sites > 10 acres or municipal areas > 25 acres; (f) Rafts and other floating equipment that cover $> 10\%$ of the project area or 20,000 SF, whichever is greater. An area is considered covered with floating equipment if normal navigation through the area is precluded; or (g) Activities, including any vehicular access, that negatively impact coastal or freshwater wetlands, or with more than minimal negative impacts on: (1) Avian resources such as, but not limited to, shore birds, wading birds, or members of the waterfowl group. This is meant to include migratory bird nesting, feeding or resting activities (see 50 CFR 10.13); or (2) Existing or naturally occurring beds or population of shellfish, marine worms or other invertebrates that could be used by humans, other mammals, birds, reptiles, or predatory fish.

Self-Verification Eligible¹: Devices and activities that do not require a PCN or an IP.

PCN Required¹

1. Permanent & temporary impacts in tidal or non-tidal waters of the U.S. including cultch or spat shell; or
2. Structures such as cages, trays, racks, bags, rafts or other floating equipment. However, structures are SV eligible provided a PCN is not required elsewhere in this document and they are: (a) located within the footprint of an existing authorized fixed or floating structure in which case in-water lines, ropes or chains may be used; (b) comprised of floating upweller docks totaling ≤ 640 SF in area; (c) structures (e.g., cages, racks) elevated ≥ 2 feet above the ocean floor with legs within a lease site with ≤ 4 buoys marking the corners and no other lines; or (d) 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; and
3. Research, educational, commercial-viability or experimental aquaculture gear activities for indigenous species; or
4. Activities include a species not previously cultivated in the waterbody; or
5. Kelp or finfish aquaculture; or
6. Land-based hatchery intakes > 3 inches in diameter; or
7. Activities in water depths > 10 feet mean low lower water (MLLW); or
8. Activities with in-water lines, ropes or chains (see exceptions in 2(a), (c) and (d) above); or
9. Activities occur in SAS or involve mechanical or hydraulic dredging;
10. 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; or
11. 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 $\leq \frac{1}{2}$ acre; or
12. Aquaculture facilities < 25 acres applied for by municipalities; or
13. Activities that do not require an IP. Activities that do not require a PCN or an IP may be SV eligible.

Notes: (1) 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.” (2) Aquaculture applicants do not need to notify the SHPO since these projects are unlikely to affect historic or archaeological resources, but must notify the BUAR and applicable tribes per GC 7(c). (3) The MA Shellfish Planting Guidelines are located at www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit.

GP 23. Aquatic Habitat Restoration, Enhancement, and Establishment Activities (Authorities: §§10 and 404)

Activities in waters of the U.S. associated with the restoration, enhancement and establishment of non-tidal and tidal wetlands and riparian areas, the restoration and enhancement of non-tidal streams and other non-tidal open waters; the relocation of non-tidal waters, including non-tidal wetlands and streams, on the project site; the restoration and enhancement of shellfish, finfish and wildlife habitat; 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. To be authorized by this GP, the activity must be planned, designed, and implemented so that it results in aquatic habitat that resembles an ecological reference. An ecological reference may be based on the characteristics of an intact aquatic habitat or riparian area of the same type that exists in the region, or based on a conceptual model developed from regional ecological knowledge of the target aquatic habitat type or riparian area.

Activities authorized by this GP include, but are not limited to: the removal of accumulated sediments; the removal, installation, and maintenance of small water control structures, dikes, and berms, as well as discharges of dredged or fill material to restore appropriate stream channel configurations after small water control structures, dikes, and berms, are removed; the installation of current deflectors; the enhancement, restoration, or establishment of riffle and pool stream structure; the placement of in-stream habitat structures; modifications of the stream bed and/or banks to restore or establish stream meanders; the backfilling of artificial channels; the removal of existing drainage structures, such as drain tiles, and the filling, blocking, or reshaping of drainage ditches to restore wetland hydrology; the installation of structures or fills necessary to establish or re-establish wetland or stream hydrology; the construction of small nesting islands; the construction of open water areas; the construction of oyster habitat over unvegetated bottom in tidal waters; shellfish seeding; activities needed to reestablish vegetation, including plowing or disking for seed bed preparation and the planting of appropriate wetland species; re-establishment of submerged aquatic vegetation in areas where those plant communities previously existed; re-establishment of tidal wetlands in tidal waters where those wetlands previously existed; mechanized land clearing to remove non-native invasive, exotic, or nuisance vegetation; and other related activities. Only native plant species may be planted at the site.

Not authorized under GP 23 (IP required): Stream channelization activities or artificial reefs.

Self-Verification Eligible ¹	PCN Required ¹
<p>1. Permanent or temporary impacts in non-tidal waters of the U.S. that are ≤5000 SF; and</p> <p>2. Eelgrass or salt marsh planting and transplanting ≤100 SF in tidal waters; and</p> <p>3. Shellfish seeding without cultch or spatbed-shell.</p> <p>Activities 1 and 2 above must be authorized by a Final Order of Conditions, or 401 WQC if required, in order to be SV eligible.</p>	<p>1. Permanent or temporary impacts in non-tidal waters of the U.S. that are >5000 SF; or</p> <p>2. Permanent or temporary impacts or structures are located in tidal waters of the U.S. including cultch or spatbed-shell placement; or</p> <p>3. Eelgrass or salt marsh planting and transplanting >100 SF in tidal waters; or</p> <p>4. Permanent water impoundments, dam removal or fish ladders; or</p> <p>5. Stream relocation, impoundment, or loss of streambed occurs; or</p> <p>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). See Note 2; or</p> <p>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: (a) <5 feet waterward from OHW or HTL and in the dry; or (b) from Sep. 1 to Oct. 14. This is to protect endangered species; or</p> <p>8. Activities that are not eligible for SV and do not require an IP.</p>
<p>Notes: 1. GC 10 states a PCN is required for any activity that may affect listed species or habitat. This includes beneficial effects. 2. 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.</p>	

IV. GENERAL CONDITIONS:

To qualify for GP authorization, the prospective permittee must comply with the following general conditions, as applicable.

1. Other Permits
2. Federal Jurisdictional Boundaries
3. Mitigation (Avoidance, Minimization, and Compensatory Mitigation)
4. Single and Complete Projects
5. Activities Affecting Structures or Works Built by the United States
6. Navigation
7. Historic Properties
8. Wild and Scenic Rivers
9. Essential Fish Habitat and Fish and Wildlife Resources
10. Federal Threatened and Endangered Species
11. Pile Driving and Removal
12. Utility Line Installation and Removal
13. Heavy Equipment in Waters and Wetlands
14. Temporary Fill
15. Removal of Temporary Fills and Restoration
16. Soil Erosion and Sediment Controls
17. Aquatic Life Movements
18. Management of Water Flows
19. Stream Work and Crossings and Wetland Crossings
20. Floodplains and Floodways
21. Storage of Seasonal Structures
22. Spawning, Breeding, and Migratory Areas
23. Vernal Pools
24. Coral reefs
25. Invasive and Other Unacceptable Species
26. Blasting
27. Suitable Material
28. Stormwater Treatment or Detention Systems
29. Tide gates
30. Water Quality Certification
31. Coastal Zone Management
32. Permit On Site
33. Self-Verification Notification Form
34. Inspections
35. Maintenance
36. Property Rights
37. Transfer of GP Verifications
38. Modification, Suspension, and Revocation
39. Special Conditions
40. False or Incomplete Information
41. Abandonment
42. Enforcement Cases
43. Previously Authorized Activities
44. Duration of Authorization

1. Other Permits. The permittee must obtain the following State approvals, when applicable, prior to the commencement of work in Corps jurisdiction in order for authorizations under these GPs to be valid: WQC (see GC 30) and CZM Consistency Concurrence (see GC 31).

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). Applicants 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 Corps jurisdiction. Note: Waters of the U.S. includes all waters pursuant to 33 CFR 328.3(a), and adjacent wetlands as that term is defined in 33 CFR 328.3(c).
- b. Applicants shall identify all aquatic resources on the project site. They are all presumed to be waters of the U.S. unless an approved jurisdictional determination has been obtained from the Corps that determines otherwise. Wetlands shall be delineated in accordance with the Corps of Engineers Wetlands Delineation Manual and the most recent Northcentral/Northeast Regional Supplement. Vegetated shallow survey guidance 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.

3. Mitigation (Avoidance, Minimization, and Compensatory Mitigation)

- a. Activities must be designed and constructed to avoid and minimize direct, indirect, secondary and cumulative adverse effects, both permanent and temporary, to waters of the U.S. to the maximum extent practicable at the project site (i.e., on site). Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are no more than minimal.
- b. After avoidance and minimization, compensatory mitigation⁴ will generally be required for permanent impacts that require PCNs, and may be required for temporary impacts that require PCNs. Proactive restoration projects, or temporary impact work with no secondary effects, may generally be excluded from this requirement.
- c. Applicants shall consider riparian/forested buffer best management practices (BMPs) for stormwater management, and low impact development (LID) BMPs to reduce impervious cover and manage stormwater, to minimize impacts to the maximum extent practicable.⁵

4. Single and Complete Project

- a. The term “single and complete project” is defined as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. The GPs shall not be used for piecemeal work and shall be applied to single and complete projects.
- b. Proponents must quantify all permanent impacts associated with the single and complete project that have occurred since October 5, 1984 (the date of the original MA GP) and add that to any proposed permanent and temporary impacts to determine if the work is SV eligible or if a PCN is required. Provide that information in the PCN. For real estate subdivisions created or subdivided after October 5, 1984, a

⁴ Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR 332. See also the New England District Compensatory Mitigation Guidance at www.nae.usace.army.mil/missions/regulatory >> Mitigation.

⁵ See the three documents at www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit >> Mitigation. LID BMPs include, but are not limited to: replacing curbs and gutters with swales; using an open space design for subdivisions; using permeable, pervious or porous pavements; constructing bio-retention systems; and/or adding a green roof or rain garden.

PCN is required for any discharge which would cause the aggregate total loss of waters of the U.S. for the entire subdivision to exceed 5,000 square feet.

c. 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.

d. Unless the Corps 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 treated together as constituting one single and complete project.

e. 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 separate 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/total linear project shall be reviewed as one project under PCN or the IP procedures.

5. Activities Affecting Structures or Works Built by the United States

a. If a GP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a Corps federally authorized Civil Works project, the prospective permittee must submit a PCN. The Regulatory Division will assist the proponent with contacting the appropriate Corps district office for work in the vicinity of FNP, Corps properties and/or Corps-controlled easements, flood control projects, etc. An activity that requires §408 permission is not authorized by these GPs until the appropriate Corps district office issues the §408 permission to alter, occupy, or use the Corps project, and the Corps issues a written GP verification.

b. A PCN is required for GP activities within, or with any secondary or indirect adverse environmental effects on, any National Wildlife Refuge, National Forest, National Marine Sanctuary (e.g., Stellwagen Bank), National Park or any other area administered by the National Park Service (e.g., Cape Cod National Seashore), U.S. Fish and Wildlife Service (USFWS) or U.S. Forest Service (USFS).

6. Navigation

a. 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 of the U.S. at or adjacent to the activity authorized herein.

b. Any safety lights and signals prescribed by the USCG, through regulations or otherwise, must be installed and maintained at the permittee’s expense on authorized facilities in navigable waters of the U.S.

c. 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 the Corps, 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.

d. A PCN and §408 permission (see GC 5) is required for all work in, over or under a Corps FNP or its buffer zone.

7. Historic Properties

a. In cases where the Corps determines that the activity may have the potential to cause effects to

properties listed, or eligible for listing, in the National Register of Historic Places (NRHP)⁶, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

b. Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the NHPA. If a PCN is required for the proposed activity, the Federal permittee must provide the Corps with the appropriate documentation to demonstrate compliance with those requirements and the Corps will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under Section 106 may be necessary. The respective Federal agency is responsible for fulfilling its obligation to comply with Section 106.

c. Non-federal permittees must submit a PCN to the Corps if the activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the NRHP, including previously unidentified properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer (SHPO), Board of Underwater Archaeological Resources (BUAR), applicable Tribal Historic Preservation Officers (THPOs)⁷, and the NRHP⁶. Use of the [Historic Property Notification Form](#) (Section IX) to notify the SHPO, BUAR and applicable THPOs⁷ is recommended. The SHPO, BUAR and THPOs are expected to provide comments to the Corps within 30 days of receipt if there are historic properties that need to be addressed.

d. All PCNs shall:

i. Include a copy of the [Historic Property Notification Form](#) and the email or certified mail receipt that was used to send the form to the SHPO (does not accept email), BUAR and applicable THPOs⁷ for their identification of historic properties in their area of concern;

ii. State which historic properties might have the potential to be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties; and

iii. Include any available documentation from the SHPO, BUAR and THPO(s) indicating that there are or are not historic properties affected. The SHPO, BUAR and THPO(s) will contact the Corps within 30 days of receiving the notification if they believe that the activity has the potential to cause effects on historic properties.

e. Based on the information submitted in the PCN and the Corps identification efforts, the Corps shall determine whether the proposed GP activity has the potential to cause effects on the historic properties. Section 106 consultation is required when the Corps determines that the activity has the potential to cause effects on historic properties. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the Corps either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed.

f. Federal and non-Federal applicants shall coordinate with the Corps before conducting any onsite archaeological work (reconnaissance, surveys, recovery, etc.) requested by the SHPO, BUAR and THPOs, as the Corps will determine the permit area for the consideration of historic properties based on 33 CFR 325 Appendix C. This is to ensure that work is done in accordance with Corps requirements.

g. If Federal or non-Federal applicants discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the Corps of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been

⁶ See www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permits >> Historic Properties. The majority of historic properties are not listed on the NRHP and may require identification and evaluation by qualified historic preservation and/or archaeological consultants in consultation with the Corps and the SHPO, BUAR and/or THPO(s).

⁷ [Section VIII](#) provides contact information and each tribe's "area of concern."

completed. The Corps will initiate the Federal, State and tribal coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

h. (c) - (e) above are not applicable when the Corps has approved alternate procedures or another Federal agency is the lead.

8. Wild and Scenic Rivers

a. The following activities in designated river or study river segments in the National Wild and Scenic River (WSR) System require a PCN unless 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:

- i. 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;
- ii. Activities that occur in wetlands within 0.25 miles of WSR segments;
- iii. Activities that have the potential to alter free-flowing characteristics in WSR segments.

b. As of April 16, 2018, the Taunton River, Sudbury/Assabet/Concord Rivers, and Westfield River are designated rivers; and the Nashua River is a study river. The most up to date list and descriptions of the WSR segments are provided at www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit >> Wild and Scenic Rivers.

9. Essential Fish Habitat and Fish and Wildlife Resources. A PCN is required for GPs 1, 6-20 and 23 when an activity may cause greater than minimal [sedimentation or turbidity](#) in streams or tidal waters. The Corps may include specific time-of-year restrictions and/or specific construction techniques or activities. This is to protect Essential Fish Habitat and/or fish and wildlife resources.

10. Federal Threatened and Endangered Species

a. No activity is authorized under any GP which:

i. Is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species (i.e., listed species) or a species proposed for such designation, as identified under the Federal Endangered Species Act of 1973, as amended (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species; or

ii. “May affect” a listed species or critical habitat unless consultation under §7 of the ESA addressing the effects of the proposed activity, has been completed.

b. Non-Federal permittees must check <http://ecos.fws.gov/ipac> and submit a PCN if any listed species or designated critical habitat might be affected or if the activity is located in designated critical habitat. However, an activity is SV eligible (i.e., a PCN is only required if indicated elsewhere in this document) if the IPaC website indicates that only:

- i. Northern long-eared bats (NLEB, *Myotis septentrionalis*) are present, but the activity:
 1. Will not remove trees ≥ 3 inches dbh;
 2. Is not within the “buffer” of a NLEB hibernacula or maternity roost tree shown on the map at www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit/ >> NLEB Locations; and

3. Does not involve work on existing dam riprap or bridges.

ii. The roseate tern (*Sterna dougallii*), piping plover (*Charadrius melodus*) or red knot (*Calidris canutus*) are present, but the activity and all disturbance will occur: (1) >300 feet from the HTL; (2) entirely in a previously developed or urbanized area such as a paved parking lot or road, a harbor or marina with stabilized shoreline (docks, seawalls, etc.), a residential area (contains lawn, ornamental plants, etc.); or (3) between October 1 and April 15 and any alteration or disturbance to beaches, sand dunes, mud flats, sloughs, estuaries, or other tidally influenced areas is temporary and restored to its previous condition before April 15. Contact the Corps with any questions.

- c. Federal agencies should follow their own procedures for complying with the requirements of the ESA. Non-Federal representatives designated by the Corps to conduct informal consultation or prepare a biological assessment should follow the requirements in the designation document(s) and the ESA. Federal permittees and non-Federal representatives must provide the Corps with the appropriate documentation to demonstrate compliance with those requirements. The Corps will review the documentation and determine whether it is sufficient to address ESA compliance for the GP activity, or whether additional ESA consultation is necessary. Unless it is required elsewhere in this document, a PCN is not required if: (i) another (lead) Federal agency has completed all required §7 consultation; or (ii) a non-Federal representative designated by the Corps in writing has completed all required §7 informal consultation.
- d. Verification under these GPs 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 USFWS or the NMFS, the ESA prohibits any person 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.

11. Pile Driving and Removal

- 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 method⁸ 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, their substrate or mudflats. Pile removal work is SV eligible under GP 1. See GC 16(d) for sheet pile removal.
- b. A PCN is required for the installation or removal of structures with jetting techniques.
- c. A PCN is required for the removal of >100 piles from January 15 to November 15.
- d. A PCN is required for the installation of >12 inch-diameter piles or any size steel piles 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, unless they are installed [in the dry](#). Installation of ≥12-inch-diameter piles or any size steel piles in tidal waters, or all piles in the aforementioned river segments, must use a soft start each day of pile driving, building up power slowly from a low energy start-up over a period of 20-40 minutes to provide adequate time for fish and marine mammals to leave the vicinity. The buildup of power should occur in uniform stages to provide a constant increase in output. Bubble curtains can be used to reduce sound pressure levels during vibratory or impact hammer pile driving. This is to protect endangered species.

12. Utility Line Installation and Removal

- a. Subsurface utility lines shall remain subsurface.
- b. 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. The bottom cover associated with the initial installation of utility lines under [navigable waters](#) of the U.S. and FNP's shall be a

⁸ **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.

minimum of 48 inches in soil or a minimum of 24 inches in competent rock unless otherwise specified in a written determination. The maximum depth of dredging in waterways having existing FNPs is generally considered to be the authorized FNP depth plus any allowance for advanced maintenance and the allowable overdepth for dredging tolerances. In waterways that do not have existing FNPs, this depth should be taken as two feet below the existing bottom or maximum depth of proposed dredging, as applicable.

c. The permittee and their contractor shall have onsite and implement the procedures detailed in a frac-out contingency plan for monitoring drilling operations and for the immediate containment, control and recovery/removal of drilling fluids released into the environment should a discharge of material occur during drilling operations.

d. 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 Corps is required if they are to remain in place, e.g., to protect sensitive areas or ensure safety.

e. 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.

13. Heavy Equipment in Waters and Wetlands

a. To the maximum extent practicable, operating heavy equipment within wetlands or mudflats shall be avoided or minimized, measures must be taken to minimize soil or substrate disturbance, and equipment other than fixed equipment (drill rigs, fixed cranes, etc.) shall not be stored, maintained or repaired in wetlands. Where construction requires heavy equipment operation, 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](#)”) that are adequate to support the equipment in such a way as to minimize disturbance of wetland soil and vegetation; or (iii) Be operated on adequately dry or frozen wetlands such that shear pressure does not cause subsidence of the wetlands immediately beneath equipment and upheaval of adjacent wetlands. Construction mats are to be placed in the wetland from the upland or from equipment positioned on swamp 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 Corps authorization. An adequate supply of spill containment equipment shall be maintained on site. Construction mats should be managed in accordance with the Construction Mat BMPs at www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit.

b. Construction equipment such as barges in tidal waters shall provide clearance above the substrate to avoid impacts to SAS.

14. Temporary Fill

a. Temporary fill, which includes construction mats and corduroy roads, shall be entirely removed as soon as it is no longer needed to construct the authorized work. Temporary fill shall be placed in its original location, or disposed of at an upland site and suitably contained to prevent its subsequent erosion into waters of the U.S. A PCN is required for: (i) all temporary fill that is in place for >2 years; or (ii) construction mats and corduroy roads filling >5000 SF that are in place for: (1) >1 year when installed during the growing period; or (2) any portion of more than one growing period when installed outside the growing period. The growing period is from May 1 to October 1 for the purposes of these GPs.

b. A PCN is required for construction mats and corduroy roads that involve underlying fill.

c. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable. Materials must be placed in a location and manner that does not adversely impact surface or subsurface water flow into or out of wetlands. Temporary fill shall be placed on geotextile fabric or other appropriate material laid on the preconstruction wetland grade where

practicable to minimize impacts and to facilitate restoration to the original grade (construction mats are excluded from this requirement).

15. Removal of Temporary Fills and Restoration

- a. Temporary fills/excess materials must be removed in their entirety as soon as they are no longer needed to construct the authorized work. The affected areas must be restored to their preconstruction conditions, functions and elevations, and revegetated as appropriate. Restoration shall typically commence no later than the completion of construction.
- b. For excavated areas, “restored to preconstruction conditions, functions and elevations” means careful removal of existing soil and vegetation, separate topsoil and subsoil stockpiling, soil protection, and replacement back to the original location such that the original soil layering and vegetation schemes are approximately the same, unless otherwise authorized. Plan for natural settling that will occur and ensure that topsoil is void of gravel and subsoil. A minimum of 4 inches of topsoil should be at the surface after the soil has settled. Wetland areas temporarily disturbed shall be stabilized (e.g., seeded or planted). See GC 25 for seed mix and vegetation requirements.
- c. Limit compaction to the minimum needed to promote a successful seedbed. Test soils for compaction. Equipment refusal shall be considered a failure of restoration, in which case the soil should be restored and wetland hydrology must be maintained.
- d. For (a) - (c) above, see the BMPs at www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit >> Restoration of Special Aquatic Sites.
- e. In areas of authorized temporary disturbance, if trees are cut they shall be cut at or above ground level, and not uprooted, in order to prevent disruption to the wetland soil structure and to allow stump sprouts to revegetate the work area, unless otherwise authorized.
- f. Trenches shall be constructed or backfilled so that the trench does not drain waters of the U.S. (e.g., materials or methods that create a French drain effect).

16. Soil Erosion and Sediment Controls

- a. Appropriate soil erosion, sediment and turbidity controls⁹ (hereinafter referred to as “controls”) must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work waterward of OHW or HTL, must be permanently stabilized at the earliest practicable date. Controls shall be capable of preventing erosion; collecting sediment, suspended and floating materials; and filtering fine sediment. Permittees are encouraged to perform work during periods of low-flow or no-flow, or when the stream or tide is waterward of the work, and must plan for unexpected high flows.
- b. A PCN is required for GPs 1, 6-20 and 23 when an activity causes greater than minimal [sedimentation or turbidity](#) in streams (rivers, streams, brooks, etc.) or tidal waters, which may be avoided with the appropriate measures specified in (a) above. For activities that require controls, e.g., cofferdams, in non-tidal streams and tidal waters:
 - i. In non-tidal streams, it is recommended that controls be installed and removed between July 1 and Feb. 28, and not be in place between March 1 and June 30. A PCN is required when controls encroach >25% of the stream width measured from OHW from March 1 to June 30. This is to protect upstream fish passage. Proponents must also maintain safe, timely and effective downstream fish passage throughout the project.

⁹ 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 (e.g., vegetated filter strips, geotextile silt fences and turbidity curtains, 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.

- ii. In tidal waters, controls placed waterward of MHW shall be installed and removed between July 1 and Jan. 14, shall not be in place between Jan. 15 and June 30, and shall not encroach >50% of a tidal stream's width measured from MHW. Otherwise a PCN is required. This is to protect upstream fish passage and winter flounder spawning and rearing habitat.
- c. 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 where suspended solids shall be removed prior to discharge back into waters or wetlands. All discharge points back into waters and wetlands shall use appropriate energy dissipaters and erosion and sedimentation control BMPs.
- d. 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.
- e. The material within sandbags shall not be released during their removal and trenches must be backfilled as soon as practicable to reduce turbidity impact duration.

17. Aquatic Life Movements. 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, beyond the actual duration of construction unless the activity's primary purpose is to impound water. Permanent water impoundments require a PCN. All permanent and temporary crossings of waterbodies (e.g., streams, wetlands) shall be suitably culverted, spanned¹⁰, or otherwise designed and constructed to: (a) maintain low flows to sustain the movement of those aquatic species, which includes maintaining a continuous low flow channel/thalweg through non-tidal structures; (b) preserve hydraulic and ecological connectivity; and (c) prevent bank erosion or streambed scour, both adjacent to and inside, the culvert or span by proper alignment and construction.

18. Management of Water Flows

- a. To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must 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, in which case a PCN is required. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).
- b. Activities that temporarily or permanently impact upstream or downstream flood conditions, or permanently impact wetlands in excess of SV eligible thresholds, require a PCN. See the "Dam Removal and the Wetland Regulations" document at www.nae.usace.army.mil/missions/regulatory/stream-and-river-continuity for guidance to evaluate the impacts of culvert replacement, including the loss of upstream wetlands, which may be offset by the overall benefits of the river restoration.

19. Stream and Wetland Crossings

The following conditions apply to temporary and permanent stream and wetland crossings, including new crossings, and replacement, modifications and expansions/extensions of existing crossings, which are only authorized under GPs 8 - 10. Minor repairs may be SV eligible under GP 1.

¹⁰ For the purposes of this GP, spans are bridges, three-sided box culverts, open-bottom culverts or arches that span the stream with footings landward of bankfull width. The use of bridge piers or similar supports does not prevent a structure from being considered as a span.

a. Stream crossings in tidal streams. A PCN is required for temporary or permanent crossings in tidal streams that are not SV eligible under GP 1 or do not involve construction mat stream crossings built in accordance with the Construction Mat BMPs¹¹, particularly the Wetland/Stream Channel Crossing section. The Corps may use the following criteria to evaluate permanent crossings:

i. Match the velocity, depth, cross-sectional area, and substrate of the existing stream outside the crossing, if it exists, and size crossings such that they do not restrict tidal flow over the full natural tide range seaward of the crossing. The Corps will typically require an engineering study to ensure flooding is not a concern.

ii. Construct crossings in dry conditions.

b. Modifications to existing, authorized permanent stream crossings in non-tidal streams. A PCN is not required for modifications to these crossings for the purpose of improving passage and flow if they are authorized in writing by a Final Order of Conditions, or 401 WQC if required, or they comply with 19(c) below. However, a PCN is required if stated elsewhere in this document or any activity:

i. Involves sliplining (retrofitting an existing culvert by inserting a smaller diameter pipe), culvert relining or invert lining;

ii. Decreases the diameter of the crossing;

iii. Decreases the friction coefficient; or

iv. Increases velocity.

c. New, replacement, modifications and expansions/extensions of existing, permanent stream crossings in non-tidal streams. A PCN is not required for these crossings provided the following conditions are met and a PCN is not required elsewhere in this document:

i. Design and construct the crossing in accordance with the USFS stream simulation manual¹².

ii. Span¹⁰ streams or size culverts or pipe arches such that they are at least 1.2 times bankfull width of the reference reach¹³. Spans are strongly preferred as they avoid or minimize disruption to the streambed, and avoid entire streambed reconstruction and maintenance inside culverts or pipe arches (see v, vi & viii below), which may be difficult in smaller structures. In many cases bankfull width is not necessarily interchangeable with the elevation of OHW.

iii. Embed culverts or pipe arches below the grade of the streambed. This is not required when ledge/bedrock prevents embedment, in which case spans¹⁰ are required. The following depths are required to prevent streambed washout, and ensure compliance and long-term success:

1. ≥ 2 feet for box culverts and pipe arches¹⁴, or

2. ≥ 2 feet and at least 25% for round pipe culverts¹⁴.

¹¹ See www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit.

¹² See www.nae.usace.army.mil/missions/regulatory/stream-and-river-continuity for the USFS stream simulation manual titled "Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings. Section 5.3.3 Headcutting Potential and 6.2 Design of the Stream-Simulation Channel Bed are particularly relevant. Chapter 6.1 is relevant for proper alignment and construction to prevent bank erosion or streambed scour. Sections 7.5.2.3 Construction Methods and 8.2.11 Stream-Simulation Bed Material Placement both show important construction steps.

¹³ The following guides located at www.nae.usace.army.mil/missions/regulatory/stream-and-river-continuity may assist in identifying bankfull width and the reference reach: (a) the USFS stream simulation manual (pages 5-20 and 5-76 are particularly relevant); (b) "Stream Channel Reference Sites: An Illustrated Guide to Field Technique" (Harrelson, et al. 1994); (c) "A Guide to Identification of Bankfull Stage in the Northeastern United States"; and (d) General Standard 3, page 10, of the Massachusetts River and Stream Crossing Standards, revised March 1, 2011.

¹⁴ These minimum embedment depths should be sufficient for many culverts. However, circumstances may dictate a need for deeper substrates that are based on site specific analysis. These include high gradient streams and streams experiencing instability or with potential instability that could result in future adjustments to channel elevation. In these cases long profiles and calculations of potential channel adjustments should be used to determine embedment depth. Deeper embedment depths may be also needed if there are elements of the constructed stream bed that are >15 inches in diameter.

iv. Match the culvert gradient (slope) with the anticipated stream channel profile that will form after the channel readjusts to post-crossing-replacement conditions.

v. Construct crossings with a natural bottom substrate within the structure matching the characteristics of the substrate in the natural stream channel and the banks (mobility, slope, stability, confinement, grain and rock size) at the time of construction and over time as the structure has had the opportunity to pass substantial high flow events.

vi. Construct crossings with appropriate bed forms and streambed characteristics so that water depths and velocities are comparable to those found in the natural channel at a variety of flows at the time of construction and over time. In order to provide appropriate water depths and velocities at a variety of flows and especially low flows, it is usually necessary to reconstruct the streambed (sometimes including a low flow channel), or replicate or preserve the natural channel within the structure. Otherwise, the width of the structure needed to accommodate higher flows will create conditions that are too shallow at low flows. The grain and rock size, and arrangement of streambed materials within the structure should be in accordance with (v) above. Flows could go subsurface within the structure if only large material is used without smaller material filling the voids.

vii. Openness >0.82 feet (0.25 meters). Openness is the cross-sectional area of a structure opening divided by its crossing length when measured in consistent units (e.g. feet). For a box culvert, openness = (height x width)/length. For crossing structures with multiple cells or barrels, openness is calculated separately for each cell or barrel. At least one cell or barrel must meet the appropriate openness standard. The embedded portion of a culvert is not included in the calculation of cross-sectional area for determining openness.¹⁵ Openness >0.82 feet is recommended to make the structure more likely to pass small, riverine wildlife such as turtles, mink, muskrat and otter that may tend to avoid structures that appear too constricted. This openness standard is too small to accommodate large wildlife such as deer, bear, and moose. Structures that meet this openness standard are much more likely than traditional culverts to pass flood flows and woody debris that would otherwise obstruct water passage. It is likely that most structures that meet all the other general standards will also meet this openness standard. However, for some very long structures it may be impractical or impossible to meet this standard.

viii. Construct banks on each side of the stream inside the crossing that match the horizontal profile of the existing stream and banks outside the crossing. To prevent failure, all constructed banks should have a height to width ratio of no greater than 1:1.5 (vertical:horizontal) unless the stream is naturally incised. Tie the banks into the up and downstream banks and configure them to be stable during expected high flows. Use materials that match the up and downstream banks (avoid the use of angular riprap and armored slopes).

d. Temporary crossings in non-tidal streams. The following conditions must be met for temporary crossings (e.g., spans, culverts, construction mats or fords) in non-tidal streams to be SV eligible:

i. All temporary crossings:

1. Avoid excavating the stream or embedding crossings.

2. Impacts to the streambed or banks require restoration to their original condition. See the USFS stream simulation manual for restoration methods¹². Use geotextile fabric and bedding as appropriate to ensure restoration to the original grade.

ii. Culverts:

1. The water height should be no higher than the top of the culvert's inlet and the culvert shall be large enough to pass debris.

2. Install energy dissipating devices downstream if necessary to prevent scour.

iii. Stream fords: Equipment may ford streams when it is not feasible to construct a span or culvert (e.g., streams having no or low banks, emergency situations); the natural stream bed and banks consist of ledge, rock or sand that prevents disturbance and turbidity; and there is a stable, gradual approach.

¹⁵ The [Openness Ratio Spreadsheet](#) shows how to calculate the open area for embedded pipe culverts to meet the 0.82 standard for openness. See www.nae.usace.army.mil/missions/regulatory/stream-and-river-continuity.

iv. Spans: Anchor spans where practicable so they do not wash out during high water. A typical span method is provided at www.nae.usace.army.mil/missions/regulatory/stream-and-river-continuity >> Skidder Bridge Fact Sheet.

v. Construction mats: Build construction mat stream crossings in accordance with the Construction Mat BMPs, particularly the Wetland/Stream Channel Crossing section.

e. **Wetland Crossings.** To assist in meeting the requirements in GCs 17 and 18, culverts or spans¹⁰ shall be placed at least every 50 feet with an opening at least 2-feet high and 3-feet wide at ground level where practicable. Closed bottom culverts shall be embedded at least 6 inches with a natural bottom. In the case of non-compliance, the permittee shall take necessary measures to correct wetland damage due to lack of hydraulic and ecological connectivity.

20. Floodplains and Floodways

- a. Appropriate measures must be taken to minimize flooding to the maximum extent practicable.
- b. Activities within 100-Year Floodplains must comply with applicable Federal Emergency Management Agency (FEMA)-approved State and/or local floodplain management permitting requirements.

21. Storage of Seasonal Structures. Seasonal or recreational structures such as pier sections, floats, aquaculture structures, 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 landward of MHW or OHW and not in wetlands, tidal wetlands or mudflats. These seasonal structures may be stored on the fixed, pile-supported portion of the structure that is waterward of MHW or OHW.

22. Spawning, Breeding, and Migratory Areas

- a. Direct, indirect and secondary adverse effects in spawning areas shall be avoided and minimized 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.
- b. Activities in waters of the U.S. that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable. The permittee 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 permittee should contact the appropriate local office of the USFWS to determine if such “take” permits are required for a particular activity.

23. Vernal Pools

- a. For projects requiring a PCN, vernal pools must be identified on the plan showing aquatic resource delineations.
- b. A PCN is required if a discharge of dredged or fill material is proposed in a vernal pool located within Federal jurisdictional boundaries.
- c. Adverse impacts to vernal pools should be avoided and minimized to the maximum extent practicable.

24. Coral Reefs. Impacts to coral reefs are not authorized under these GPs. Coral reefs consist of the skeletal deposit, usually of calcareous or siliceous materials, produced by the vital activities of anthozoan polyps or other invertebrate organisms present in growing portions of the reef.

25. Invasive and Other Unacceptable Species¹⁶

- a. The introduction or spread of invasive or other unacceptable plant or animal species on the project

¹⁶ See www.nae.usace.army.mil/missions/regulatory/mitigation. The June 2009 “Corps of Engineers Invasive Species Policy” provides policy, goals and objectives and is located at www.nae.usace.army.mil/missions/regulatory/invasive-species. Additional information can be found at: www.eddmaps.org/ipane.

site or areas adjacent to the project site caused by the site work shall be avoided to the maximum extent practicable. For example, construction mats and equipment shall be thoroughly cleaned and free of vegetation and soil before and after use. The introduction or spread of invasive plant or animal species on the project site caused by the site work shall be controlled.

b. No cultivars, invasive species or other unacceptable plant species may be used for any mitigation, bioengineering, vegetative bank stabilization or any other work authorized by these GPs. Seed mixes and vegetation shall include only plant species native to New England and shall not include any species listed in Appendix D, “Invasive and Other Unacceptable Plant Species,” of the “New England District Compensatory Mitigation Guidance”¹⁶. This list may be updated periodically.

26. Blasting. Blasting in waters of the U.S. associated with work such as dredging, trenching, pile installation, etc. is not authorized under these GPs.

27. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see §307 of the CWA).

28. Stormwater Treatment or Detention Systems. Stormwater treatment or detention systems in waters of the U.S. are not authorized under these GPs and require an IP. Stormwater conveyance components and non-porous, septic effluent pipes that transmit effluent to or between components may be SV eligible under GP 9.

29. Tide Gates. New tide gates conveying water between waters of the U.S. are not authorized under these GPs and require an IP. Tide gates on discharge pipes conveying stormwater and/or industrial NPDES-permitted discharges from waters that are not waters of the U.S. may be authorized under GPs 1 and 9.

30. Water Quality Certification

a. Any activity under these GPs that requires authorization under §404 of the CWA for the discharge of dredged or fill material into waters of the U.S. also requires applicants to obtain a §401 water quality certification (WQC) from the State (hereinafter referred to as “§401 WQC”) or a Final Order of Conditions from the town or city which serves as the WQC. In Massachusetts, the MassDEP has authority to issue or deny §401 WQC. Activities authorized under these GPs must comply with all conditions set forth in the April 5, 2018 conditional WQC for these GPs (located at www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit/) or in an Individual §401 WQC. Authorization under the GPs is not valid and no work may commence in Corps jurisdiction until the MassDEP has issued or waived §401 WQC.

b. If a §401 WQC is issued for work that is different from that in the Corps authorization, the Corps authorization is not valid and the permittee must contact the Corps to allow the Corps to resolve the discrepancy.

31. Coastal Zone Management

a. Each activity under these GPs within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs. The Massachusetts Office of Coastal Zone Management (MA CZM) administers the [Massachusetts CZM program](#).

b. For SV eligible activities, MA CZM has agreed with the Corps consistency determination and therefore these activities do not require any additional MA CZM Federal consistency review.

c. For PCN activities in the coastal zone, authorization under these GPs becomes valid only after MA CZM determines that the activity is consistent with the MA CZM program. The Corps will typically coordinate review with MA CZM and then notify applicants if MA CZM determines that the activity is

consistent with the MA CZM program or if an individual consistency concurrence is required. If the MA CZM consistency concurrence is for work different from that in the Corps authorization, the Corps authorization is not valid and the permittee must contact the Corps to allow the Corps to resolve the discrepancy.

32. Permit On Site. The permittee shall ensure that any contractor(s) and or workers executing the activities authorized by this GP(s) have knowledge of the terms and conditions of this authorization and any modification(s), and that a copy of this GP document and any accompanying verification letter and attached plans are at the site of the authorized work throughout the period(s) of time the work is underway.

33. Self-Verification Notification Form. For those activities that do not require PCNs and are eligible for self-verification, permittees must complete and submit the [SVNF](#) to the Corps for work authorized by these GPs unless otherwise stated. See the SVNF for submittal requirements and timing.

34. Inspections. The permittee shall allow the Corps to inspect the authorized activities and mitigation parcels at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of the applicable GP(s) and any written verification from the Corps. To facilitate these inspections, the permittee shall complete and return to the Corps the following forms:

- For Self-Verification: The SVNF. See GC 33.
- For PCN: The Work-Start Notification Form, Compliance Certification Form, and/or Mitigation Work-Start Notification Form whenever these forms are provided with a verification letter.

35. Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable general conditions and activity-specific special conditions provided in a written verification from the Corps. This does not include maintenance of dredging, related disposal, or beach nourishment projects unless specified in a written authorization from the Corps.

36. Property Rights. 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.

37. Transfer of GP Verifications. If the permittee sells the property associated with a GP verification, the permittee may transfer the GP verification to the new owner by submitting a letter to the Corps to validate the transfer. A copy of the GP verification must be attached to the letter, the letter must contain the name, address and phone number of the transferee (new owner), include the following statement and signature, and be mailed to: Regulatory Division, U.S. Army Corps of Engineers, New England District, 696 Virginia Road, Concord, MA 01742-2751:

“When the structures or work authorized by these GPs are 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 new owner(s) of the property.

Transferee Printed Name

Transferee Signature Date

38. Modification, Suspension, and Revocation. These GPs or any work authorized under these GPs may be either modified, suspended, or revoked, in whole or in part, pursuant to the policies and procedures of 33 CFR 325.7. Any such action shall not be the basis for any claim for damages against the U.S.

39. Special Conditions. The permittee must comply with any special conditions added by the Corps to this GP. Failure to comply with all applicable terms and conditions of the authorization, including special conditions, constitutes a permit violation and may subject the permittee to criminal, civil or administrative penalties and/or an ordered restoration, and/or the permit may be modified, suspended or revoked by the Corps.

40. False or Incomplete Information. If the Corps 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 permittee, the Corps may determine that the GP authorization is not valid and modify, suspend or revoke the authorization. In such cases, the U.S. Government may institute legal proceedings.

41. Abandonment. If the permittee abandons or decides to abandon the activity authorized under these GPs, the work must be removed and the area restored to the maximum extent practicable unless a GP or IP specifically authorizes the abandonment.

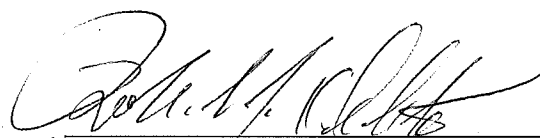
42. Enforcement cases. These GPs do not apply to any existing or proposed activity in Corps jurisdiction associated with an ongoing Corps or EPA enforcement action, until such time as the enforcement action is resolved or the Corps or EPA, as appropriate, determines that the activity may proceed independently without compromising the enforcement action.

43. Previously Authorized Activities

- a. Activities that were authorized and completed in accordance with previous GPs or nationwide permits are not affected by these GPs and continue to be authorized in accordance with the original terms and conditions of those authorizations, including their terms, general conditions, expiration date, 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 this GP.

44. Duration of Authorization

- a. These GPs expire on April 5, 2023. Activities authorized under GPs 1 - 23 that have either commenced (i.e., are under construction) or are under contract to commence before these GPs expire will have until April 5, 2024 to complete the activity under the terms and conditions of the current GPs. The permittee must be able to document to the Corps' satisfaction that the project was under construction or under contract by the appropriate date. If work is not completed within the one year extended timeframe nor SV eligible under any subsequently issued GPs, the permittee must contact the Corps to discuss obtaining a separate Corps authorization to complete the work.
- b. Activities completed under these GPs will continue to be authorized unless special conditions require removal of the authorized work and restoration of the affected area after a specified time period.


 DISTRICT ENGINEER 4/10/18
 DATE

V: Self-Verification Notification Form

(for all tidal and non-tidal projects subject to Corps jurisdiction)

Complete **all** fields (write “none” if applicable) below or use the fillable form at www.nae.usace.army.mil/missions/regulatory/state-general-permits/massachusetts-general-permit. Before work within Corps jurisdiction commences, and unless otherwise specified, email this form, a location map, and project plans drawn to scale and not larger than 11” x 17”, to cenae-r@usace.army.mil, (978) 318-8303 (fax), or “Regulatory Division, U.S. Army Corps of Engineers, New England District, 696 Virginia Road, Concord, MA 01742-2751”. The Corps will acknowledge receipt of this form in writing. Please call (978) 318-8338 with questions.

Permittee: _____
 Address, City, State & Zip: _____
 Phone(s) and Email: _____

Contractor (write none if same as permittee): _____
 Address, City, State & Zip: _____
 Phone(s) and Email: _____

Prior Corps File or Permit Numbers(s): _____
 Project Location (provide detailed description if necessary): _____

Address, City, State & Zip: _____
 Latitude/Longitude Coordinates (if address doesn’t exist): _____
 Waterway Name: _____

Work will be done under the following activity(s) in Section III, Eligible Activities (check all that apply):

1_____	5_____	9_____	13_____	17_____	21_____
2_____	6_____	10_____	14_____	18_____	22_____
3_____	7_____	11_____	15_____	19_____	23_____
4_____	8_____	12_____	16_____	20_____	

Project Purpose: _____

Work Description: _____

(continued on next page)

Aggregate total wetland impact area:	temporary_____SF	permanent_____SF
Aggregate total waterway impact area:	temporary_____SF	permanent_____SF
Aggregate total area of structures (e.g., floats, pile-supported structures)	temporary_____SF	permanent_____SF

Does your project include any indirect or secondary impacts? (See General Condition 3.)

Yes_____ No_____

If yes, describe here: _____

Proposed Work Dates: Start: _____ Finish: _____

Your name/signature below, as permittee, confirms that: a) your project meets the self-verification criteria; and b) you accept and agree to comply with the applicable terms and conditions in the General Permits for Massachusetts.

Permittee Printed Name: _____

Permittee Signature: _____ Date: _____

VI: Content of Preconstruction Notification

Applications should be emailed to cenae-r@usace.army.mil or to the Corps project manager if one has been assigned. In addition to the following required information, the applicant must provide additional information as the Corps deems essential to make a public interest determination including, where applicable, a determination of compliance with the §404(b)(1) guidelines or ocean dumping criteria.

1. Written information required for all projects:

- Corps application form ([ENG Form 4345](#)). The MassDEP WQC, Chapter 91 application form and Notice of Intent cannot be substituted for the form, but can be used supplementally.
- All anticipated direct, indirect and secondary impacts, both permanent and temporary, to waters of the U.S. (in wetlands, and waterward of OHW in inland waters and the HTL in coastal waters) in square feet, acres, or linear feet (for stream and bank impacts), and cubic yards or other appropriate units of measure. The New England District Compensatory Mitigation Guidance is a resource for assessing secondary impacts (see www.nae.usace.army.mil/missions/regulatory/mitigation.aspx).
- For the discharge of dredged or fill material into waters of the U.S., include a statement describing how impacts to waters of the U.S. are to be avoided and minimized. For the remaining impacts, include a statement describing how impacts to waters of the U.S. are to be compensated for or explain why compensatory mitigation should not be required for the proposed impacts.
- For any activity that will alter or temporarily or permanently occupy or use a Corps Federally authorized civil works project, the PCN must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps. See GC 5(a).
- Information on historic properties (see GC 7), including a copy of the [Historic Property Notification Form](#) (Section IX) and the email or certified mail receipt that was used to send the form to the SHPO, BUAR and applicable THPOs.
- Information on Federal threatened or endangered species (see GC 10).
- A restoration plan showing how all temporary fills and structures will be removed and the area restored to pre-project conditions (see GC 15).
- Photographs of wetland/waterway to be impacted. Photos at low tide are preferred for work in tidal waters.
- Invasive Species Control Plan (see GC 25). For sample control plans, see www.nae.usace.army.mil/missions/regulatory/invasive-species.
- Provide discussion of habitat, including type of sediment/soil effected (sand, mudflat, etc), along with presence or absence of wildlife, plants, fisheries, and shellfish. Explain how the applicant has determined the presence or absence of the required wildlife, fisheries, shellfish, information, e.g., divers, surveys, personal observation, online maps, etc.
- Provide a description of the federal wetlands and provide a map of their locations within the project area. Provide an assessment of the impacts expected from the project on the wetlands and wildlife functions.
- Provide historic information of project area, e.g., existing Corps 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 “grandfathering.”
- If the project is located in the floodway, state whether the project will increase the 100-year frequency flood level? How much floodplain storage will be removed from the 100-year floodplain by fill.

For dredging projects, include:

- Date the area was last dredged.
- Whether it is new, improvement or maintenance dredging and the method of handling/transporting.
- Type of dredging equipment to be used and dredging method (e.g. mechanical or hydraulic).
- Grain-size of material to be dredged (e.g., silty sand). Provide any existing sediment grain size and bulk sediment chemistry data from the proposed or nearby projects.
- Information on any recent spills of oil and/or other hazardous materials and on nearby outfalls. Document the information source, e.g., the harbormaster or fire chief.
- Total footprint of the dredged area when characterizing impact to resources.
- Discuss alternatives to open-water disposal.

2. Plans for all projects shall include:

- 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". 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. Show the north arrow and wetland and waterway area impacts. Provide a color locus map and, if necessary, a plan overview of the entire property with a key index to the individual impact sheets.
- Datum in plan and elevation views.
- The horizontal datum shall be in the NAD 83 Massachusetts State Plane Coordinate System (zone is either Mass Mainland or Mass Island) 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.
- Existing and proposed conditions, and plan views and cross sections for all work.
- Limits and area (SF) of temporary and permanent fill to be placed in any wetlands or waterway, including construction access and work areas, cofferdams, bedding, and backfill. Show delineation of all wetlands 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, and perennial, intermittent, and ephemeral streams; on the project site. Use Federal delineation methods and include Corps wetland delineation data sheets (see GC 2) for all wetlands. 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.
- Copies of sections of National Wetland Inventory Maps, marked to show locations and site boundaries. Identify the quad name and year.
- Ebb and flood in tidal waters and direction of flow in non-tidal waters.
- Indicate the relationship of the proposed work site to waters of the U.S., i.e. adjacent wetlands, tidal influence through culverts, etc.
- Total plan of development, including the proposed use of upland and wetland areas.
- Names or numbers of all roads in the site's vicinity.
- Names of adjoining property owners in plan view.
- For typical pipeline cross-sections, the details of the bedding and backfill to be used in wetlands and waterways. Show proposed trench dams and detail for inland projects.
- Adjacent Federal navigation project (FNP) (anchorage or channel) and/or state/local navigation projects, distance to them, the authorized depths of the FNP, and state plane coordinates of seaward end(s) of structures near an FNP.
- The 100, 500-year and regulatory floodway boundaries as shown on the community's current National Flood Insurance Program maps, if applicable.
- A statement regarding how the project proponent has determined the absence or presence of vegetated

shallows, mudflats, or riffles and pools, e.g., personal visual observation, divers, online maps, conversations with local officials, etc.

- Shellfish information. A survey may be required.

2a. Plans for structures shall also include:

- The MLLW, MHW and HTL elevations in tidal waters, and OHW in non-tidal navigable waters.
- Water depths around the project in all views.
- Dimensions of the existing and proposed structures. Show the location and dimensions of existing bulkheads and/or shoreline stabilization on adjacent properties and, if applicable, how the proposed work will tie into existing structures.
- For piers and other structures, the minimal height of structure above the marsh.
- For floats, the methods of securing (piles, bottom anchors) and keeping off substrate (skids, stops).
- 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, reconfiguration zone or aquaculture activity. 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. If no structures exist or are proposed, state this on the project plans.
- The dimensions of the structure or work and extent of encroachment waterward of MHW and from a fixed point on the shoreline or upland.
- Shoreline of adjacent properties.
- In narrow waterbodies, the distance to opposite shoreline, waterway width, and structures across from proposed work.
- For reconfiguration zones, the coordinates of the corners and specify the maximum number of slips and/or moorings within the zone.
- 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.

2b. Plans for projects involving fill shall also include:

- All locations of discharges of dredged or fill material waterward of the HTL or OHW.
- Any historic permanent fill previously authorized by the Corps and the date of authorization.
- The MLLW, MHW and HTL elevations in tidal waters, and OHW elevation in lakes and non-tidal streams.
- Structures, if any, proposed to be erected on the fill.
- Limits of wetlands (label: wetland boundary) and waterways (labels: OHW or HTL) on all views.
- Limits of temporary and permanent fill to be used in any wetlands or waterway, including construction access and work areas, cofferdams, bedding, and backfill.
- Area (SF) of each fill that is waterward of the OHW in non-tidal waters, waterward of the HTL in tidal waters, and in wetlands. State if the fill is permanent or temporary.
- Disposal site of the excess excavated material. If necessary, submit an additional sheet showing the location of the proposed disposal site. Provide quantity of excess excavated material.
- Existing and proposed ground or waterway contours or spot elevations on all views.
- Mitigation areas clearly identifying each area and showing the boundaries and SF of each area.
- Total plan of development, including the proposed use of upland and wetland areas.

2c. Plans for projects involving dredging shall also include:

- The area (SF) and volume (CY) of material to be dredged waterward of MHW for each dredge location.
- Dredge boundaries.
- Bathymetry: existing, proposed and historical (include dates and Corps permits) dredge depths
- 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.
- Whether the dredging is new, maintenance, improvement, or a combination.
- A description of the area to be dredged, i.e. open water, existing channel, wetlands, uplands, etc.
- Location of the disposal site (include locus sheet).
- The methods and areas used to retain or prevent dredged material from running back into the wetland or waterway. Provide the capacity and points of runback, including the overflow route, into the aquatic system.
- For beach nourishment, 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.
- Show the finished top elevation of the disposal site.
- For open-water disposal, explain why inland or beneficial reuse sites are not practicable.
- Identification and description of any potential impacts to Essential Fish Habitat and threatened or endangered species.
- Note: For projects proposing open water, nearshore disposal, or beach nourishment, contact the Corps as early as possible regarding sampling and testing protocols. Sediment testing, including physical (e.g., grain-size analysis), chemical and biological testing may be required. Sampling and testing of sediments without such contact should not occur and if done, would be at the applicant's risk.

VII. Definitions and Acronyms

Definitions

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.

Brushing the Flats: The placement of tree boughs, wooden lath structure, or small-mesh fencing on mud-flats, or any bottom disturbance (e.g., discing, plowing, raking, etc.), to enhance recruitment of shellfish.

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.

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 Effects: The changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual 1) discharges of dredged or fill material, or 2) structures. 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.

Direct Effects: The loss of aquatic ecosystem within the footprint of the discharge of dredged or fill material. Direct effects are caused by the action and occur at the same time and place.

Dredging:

Improvement Dredging: For the purposes of these GPs, this is dredging deeper than previously authorized by the Corps and dredged.

Maintenance Dredging: For the purposes of these GPs, this is dredging from an area previously authorized by the Corps and dredged. The Corps 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 Corps 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 dredging of an area that has never been authorized by the Corps and dredged.

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.

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.

Expansions: Work that increases the footprint of fill, structures 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: These are defined at 33 CFR 323.2(e) and (f). The term fill material is defined as 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.

Federal anchorages: See the definition of “Federal navigation projects.”

Federal channels: See the definition of “Federal navigation projects.”

Federal navigation projects (FNPs): These areas are maintained by the Corps; authorized, constructed and maintained on the premise that they will be accessible and available to all on equal terms; and comprised of Corps 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	Green Harbor	Pollock Rip Shoals, Nantucket
Aunt Lydia’s Cove	Hingham Harbor	Sound
Beverly Harbor	Hyannis Harbor	Provincetown Harbor
Boston Harbor	Ipswich River	Red Brook Harbor
Buttermilk Bay Channel	Island End River (Chelsea, MA)	Rockport Harbor
Canapitsit Channel	Kingston Harbor	Salem Harbor
Cape Cod Canal	Lagoon Pond	Sandy Bay Harbor of Refuge
Chatham Harbor	Little Harbor Woods Hole	Saugus River
Cohasset Harbor	Lynn Harbor	Scituate Harbor
Cross Rip Shoals, Nantucket	Malden River	Sesuit Harbor
Sound	Menemsha Creek	Taunton River
Cuttyhunk Harbor	Merrimack River	Vineyard Haven Harbor
Dorchester Bay and Neponset	Mystic River	Wareham Harbor
River	Nantucket Harbor of Refuge	Wellfleet Harbor
Duxbury Harbor	New Bedford and Fairhaven	Westport River and Harbor
Edgartown Harbor	Harbor	Weymouth Back River
Essex River	Newburyport Harbor	Weymouth Fore and Town
Fall River Harbor	Oak Bluffs Harbor	Rivers
Falmouth Harbor	Pigeon Cove Harbor	Winthrop Harbor
Gloucester Harbor and	Plymouth Harbor	Woods Hole Channel
Annisquam River		

Federal turning basin: See the definition of “Federal navigation projects.”

Flume: An open artificial water channel, in the form of a gravity chute, which leads water from a diversion dam or weir completely aside a natural flow. A flume can be used to measure the rate of flow.

FNP buffer zone: The buffer zone of a Corps FNP is equal to three times the authorized depth of the FNP.

Frac out: During normal drilling 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.

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 Corps 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.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

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.

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: Living shorelines stabilize banks and shores in coastal waters along 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. Living shorelines must have a substantial biological component, either tidal or lacustrine fringe wetlands or oyster or mussel reef structures.

Maintenance: Maintenance does not include any modification that changes the character, scope, or size of the original fill design.

Mechanized land clearing: As a general rule, mechanized land clearing is a regulated activity (see [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.

Mouth: The river mouths referenced in this document can be determined using the maps located at: <http://www.mass.gov/eea/agencies/massdep/water/watersheds/wetlands-maps-mouth-of-coastal-river.html>.

Navigable waters or Navigable waters of the U.S.: See the definition of “waters of the U.S.” below.

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-tidal wetlands: See the definition of “Waters of the U.S.” below.

Ordinary High Water Mark (OHW): 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: See the definition of “single and complete linear project.”

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 project proponent to the Corps 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 project proponent 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.

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 Corps-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.

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.

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.

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 coarse 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.

Secondary effects: These are 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

§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).

Sedimentation and turbidity: For the purposes of this document, “greater than minimal sedimentation or turbidity” is generally not considered to occur from the installation of sheet piles, removal of sheet piles when done in accordance with GC 16, the installation or removal of piles, dredging or excavating in predominantly sand and courser material, and dredged material disposal in the upland (e.g., beach or parking lot) into properly constructed upland contained dredged material disposal area.

Shellfish dredging: Shellfish dredging typically consists of a net on a frame towed behind a boat to capture shellfish and leave the sediment behind. Dredges may skim the surface, utilize hydraulic jets, toothed rakes or suction apparatus.

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.

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.

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: 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.

Stream: The term “stream” in the document means rivers, streams, brooks, etc.

Streambed: The substrate of the stream channel between the OHW marks. 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, waters of the U.S. that are temporarily filled, flooded, excavated, or drained because of the regulated activity.

Tidal wetlands: 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: See the definition of “Sedimentation and turbidity” above.

Utility line: Any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and 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 (*Ruppia 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 go dry 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.

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 (not unlike a dam) and allows water to flow over the top. Weirs are commonly used to alter the flow regime of the river, prevent flooding, measure discharge and help render a river navigable.

Waters of the United States (U.S.)

- **Navigable waters of the United States** are waters subject to section 10 of the Rivers and Harbors Act of 1899. These waters are defined at 33 CFR 329 and identify waters where permits are required for work or structures pursuant to §§9 and 10 of the Rivers and Harbors Act of 1899. They are generally defined in 33 CFR 329.4 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.”

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.

- **Waters of the United States** are defined in 33 CFR 328. These waters include more than navigable waters of the U.S. and are the waters where permits are required for the discharge of dredged or fill material pursuant to §404 of the CWA. Waters of the U.S. include jurisdictional wetlands.
- **Non-tidal wetland:** 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).

- **Tidal wetland:** A tidal wetland is a jurisdictional wetland that is inundated by tidal waters. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the HTL.
- **Waterbody:** For purposes of these GPs, a waterbody is a jurisdictional water of the U.S. 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)). Examples of “waterbodies” include streams, rivers, lakes, ponds, and wetlands.

Acronyms

BMPs	Best Management Practices
BUAR	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

VIII: Contacts and Tribal Areas of Concern

1. Federal

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. Environmental Protection Agency
5 Post Office Square
Suite 100 (OEP05-2)
Boston, Massachusetts 02109-3912
(617) 918-1692 (phone)

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, MA 02109
(617) 223-5191 (phone)
(*Wild and Scenic Rivers*)

Commander (dpb)
First Coast Guard District
Battery Building
One South Street
New York, NY 10004-1466
(212) 514-4331 (phone); (212) 514-4337 (fax)
(*bridge permits*)

Chief, Risk Analysis Branch
FEMA Region 1
U.S. Department of Homeland Security
99 High Street, 6th Floor
Boston, MA 02110
(617) 956-7576

2. State of Massachusetts

Department of Environmental Protection (MassDEP)

DEP Division of Wetlands and Waterways
One Winter Street
Boston, MA 02108
(617) 292-5695

DEP Northeast Region
Wetlands Protection Program
205B Lowell Street
Wilmington, MA 01887
(978) 694-3200

DEP Western Region
Wetlands Protection Program
436 Dwight Street
Springfield, MA 01103
(413) 784-1100

DEP Central Region
Wetlands Protection Program
8 New Bond Street
Worcester, MA 01606
(508) 792-7650

DEP Southeast Region
Wetlands Protection Program
20 Riverside Drive, Route 105
Lakeville, MA 02347
(508) 946-2800

Massachusetts Office of Coastal Zone Management (CZM)

MA Office of Coastal Zone Management
251 Causeway Street, Suite 800
Boston, MA 02114
(617) 626-1200 (phone)

3. Historic Resources:

- a. Massachusetts Historical Commission (MHC)
The Massachusetts Archives Bldg.
220 Morrissey Boulevard
Boston, MA 02125
(617) 727-8470 (phone); (617) 727-5128 (fax)
Area of concern: The entire Commonwealth of Massachusetts
- b. Massachusetts Board of Underwater Archaeological Resources (BUAR)
251 Causeway Street, Suite 800
Boston, MA 02114
(617) 626-1141 (phone); (617) 626-1240 (fax); victor.mastone@state.ma.us
Area of concern: All Massachusetts lakes, ponds, rivers and navigable waters.
- c. Tribal Historic Preservation Officers (THPOs)
- Tribal Historic Preservation Officer
Wampanoag Tribe of Gay Head (Aquinnah)
20 Black Brook Road
Aquinnah, MA 02535
(508) 645-9265, x175 (phone); (508) 645-3790 (fax); bettina@wampanoagtribe.net
Area of concern: The entire Commonwealth of Massachusetts
- Tribal Historic Preservation Officer
Mashpee Wampanoag Tribe
483 Great Neck Road South
Mashpee, MA 02649
(508) 477-0208, x101 (phone); (508) 477-1218 (fax); rpeters@mwtribe.com
Area of concern: The entire Commonwealth of Massachusetts
- Tribal Historic Preservation Officer
Stockbridge-Munsee Mohican Tribal Historic Preservation, New York Office
65 1st Street
Troy, NY 12180
(518) 244-3164 (phone); bonney.hartley@mohican-nsn.gov
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.
- Tribal Historic Preservation Officer
Narragansett Indian Longhouse
4425 South County Trail
Charlestown, RI 02813
(401) 585-0142 (phone); (413) 325-7691 (cell); tashtesook@aol.com, dhnthpo@gmail.com
Area of concern: Boston and its surrounding cities and towns; Lynn; Newton; these cities and towns in Plymouth County (Carver, Duxbury, Hingham, Kingston, Marshfield, Middleborough, Plymouth, Plympton, Scituate); these cities and towns in Norfolk County (Milton, Quincy, Braintree, Randolph, Canton, Sharon and Foxborough); the Blackstone River valley; and the cities and towns west of Worcester (which are those including and west of Ashburnham, Westminster, Princeton, Holden, Paxton, Leicester, Oxford and Webster).

IX: HISTORIC PROPERTY NOTIFICATION FORM

In accordance with General Condition 7, proponents must ensure and document that all potential historic properties within the permit area have been identified. To assist with this effort, proponents may send this form for self-verification activities, but must send this form for PCN activities, to the SHPO, BUAR and applicable THPO(s). You must include any Corps or state waterway agency application forms, plans and a copy of the USGS quadrangle map section that clearly marks the project location. It is recommended that you complete **all** fields (write “none” or “see attached application form” if applicable). The PCN sent to the Corps must include proof of having sent this form, e.g. the email or certified mail receipt that was used to send it, to the SHPO (does not accept email), BUAR and applicable THPOs. Please include any comments or requests received from these agencies with your PCN.

Project Name: _____

Address, City, State & Zip: _____

Project Proponent Name: _____

Address: _____

Phone(s) and Email: _____

Project Location (provide detailed description if necessary) Address, City, State & Zip: _____

Latitude/Longitude Coordinates (if address doesn't exist): _____

Waterway Name: _____

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)

_____	_____
_____	_____
_____	_____
_____	_____

Project Description: _____

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition: _____

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: _____

Does the project include new construction? If so, describe (attach plans and elevations if necessary): _____

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: _____

What is the total acreage of the project area?

Woodland _____ acres

Wetland _____ acres

Floodplain _____ acres

Underwater and/or bottomlands _____ acres

Open space _____ acres

Developed _____ acres

Productive Resources:

Agriculture _____ acres

Forestry _____ acres

Mining/Extraction _____ acres

Total Project Acreage _____ acres

What is the acreage of the proposed new construction? _____ acres

What is the present land use of the project area? _____

Signature of person submitting this form: _____ Date: _____

Name: _____

Address: _____

City/Town/Zip: _____

Telephone: _____

DOCUMENT A00840

**MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER QUALITY CERTIFICATION APPLICATION**

THIS PAGE INTENTIONALLY LEFT BLANK



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, Secretary & CEO
Jonathan L. Gulliver, Highway Administrator



December 6, 2019

Christopher Ross
Massachusetts Department of Environmental Protection
Wetlands and Waterways
20 Riverside Drive
Lakeville, MA 02347

**Subject: Water Quality Certification for Bridge Replacement of
Route 2 (Main Street) over the Green River (Bridge No. W-37-015), Williamstown, MA
Transmittal No. X283960
MassDOT Project No. 605356**

Dear Chris,

The Massachusetts Department of Transportation (MassDOT) Highway Division is submitting this Water Quality Certification application for the proposed bridge replacement on Route 2 (Main Street) over the Green River (#W-37-015) in Williamstown, Massachusetts.

The project proposes to replace the existing bridge, removing the superstructure and substructure. The existing abutments will be cut down and topped with a concrete cap. The new bridge will span over the existing abutments and will have a new center concrete pier. The new structure will have an out-to-out of 58'-10" and a length of 124'-6", with no skew. The hydraulic opening will be wider due to the proposed wider span of the bridge. Land Under Water (LUW) impacts will include: 437 sf of permanent impact, and 6,554 sf of temporary impacts. There are no vegetated wetlands located within the project, so no wetland replication is required.

An Army Corps Pre-Construction Notification permit application is being filed concurrently.

If you have any questions regarding this application, please do not hesitate to contact me at (857) 368-8807 or susan.mcarthur@state.ma.us.

Sincerely,

A handwritten signature in blue ink that reads "Susan McArthur".

Susan McArthur
Wetlands Unit Supervisor, MassDOT Highway Division

Cc: Dan Vasconcelos, ACOE
Town of Williamstown, Conservation Commission

Attachments: Water Quality Certification application package



Enter your transmittal number

X283960

Transmittal Number

Your unique Transmittal Number can be accessed online:

<http://www.mass.gov/eea/agencies/massdep/service/approvals/transmittal-form-for-payment.html>

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: MassDEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application. **Copy 2** must accompany your fee payment. **Copy 3** should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA
02211

*** Note:**
For BWSC Permits,
enter the LSP.

A. Permit Information

BRP WW

1. Permit Code: 4 to 7 character code from permit instructions

Bridge Replacement

3. Type of Project or Activity



or Project Certification

2. Name of Permit Category

B. Applicant Information – Firm or Individual

Massachusetts Department of Transportation, Highway Division

1. Name of Firm - Or, if party needing this approval is an individual enter name below:

2. Last Name of Individual

10 Park Plaza

5. Street Address

Boston

6. City/Town

Susan McArthur

11. Contact Person

3. First Name of Individual

MA

7. State

02116

8. Zip Code

(617) 973 - 7434

9. Telephone #

susan.mcarthur@state.ma.us

12. e-mail address

4. MI

10. Ext. #

C. Facility, Site or Individual Requiring Approval

1. Name of Facility, Site Or Individual

2. Street Address

3. City/Town

4. State

5. Zip Code

6. Telephone #

7. Ext. #

8. DEP Facility Number (if Known)

9. Federal I.D. Number (if Known)

10. BWSC Tracking # (if Known)

D. Application Prepared by (if different from Section B)*

CME Associates, Inc.

1. Name of Firm Or Individual

101 East River Drive, 1st Floor

2. Address

East Hartford

3. City/Town

Carol Rogers

8. Contact Person

CT

4. State

06108

5. Zip Code

(860) 290 - 4100

6. Telephone #

1103

7. Ext. #

9. LSP Number (BWSC Permits only)

E. Permit - Project Coordination

1. Is this project subject to MEPA review? ☐ yes ☒ no
If yes, enter the project's EOEA file number - assigned when an Environmental Notification Form is submitted to the MEPA unit:

EOEA File Number

F. Amount Due

Special Provisions:

1. ☒ **Fee Exempt** (city, town or municipal housing authority)(state agency if fee is \$100 or less).
There are no fee exemptions for BWSC permits, regardless of applicant status.
2. ☐ **Hardship Request** - payment extensions according to 310 CMR 4.04(3)(c).
3. ☐ **Alternative Schedule Project** (according to 310 CMR 4.05 and 4.10).
4. ☐ **Homeowner** (according to 310 CMR 4.02).

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Check Number

Dollar Amount

Date



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

X283960

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

Name

10 Park Plaza

Address

Boston

City/Town

MA

State

02116

Zip Code

Susan McArthur

Contact Person

N/A

Telephone (home)

857-368-8807

(work)

3. Authorized Agent

CME Associates, Inc.

Name

101 East River Drive, 1st Floor

Address

East Hartford

City/Town

CT

State

06108

Zip Code

Carol Rogers

Contact Person

N/A

Telephone (home)

860-290-4100 ext. 1103

(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

X283960
 Transmittal Number #

B. Project Information

1. Project Location:

Approx. 640 Main Street

Address

Williamstown

City/Town

MA

State

01267

Zip Code

Green River

Nearest or Adjacent Waterbody

2. Project Name (if any):

Williamstown - Bridge Replacement, W-37-015, Main Street (State Route 2) over the Green River.

3. a. Describe project purpose:

The purpose of the project is to replace a deficient bridge.

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

X283960
 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 project proposes the removal of the existing bridge, removing the superstructure and substructure, cutting the existing abutments down and placing a concrete cap on top, installing the new bridge which will span over the existing abutments, and replacing the center concrete pier. The new bridge will be a two-span structure with integral abutments, Northeast Extreme Tee (NEXT) F Beams, and a concrete pier.

b. Notice of Intent File number (if any): N/A Project is Bridge Exempt.

5. Identify the loss in square feet of each type of resource area (see Application Instructions for additional information.):

a. Bordering vegetated wetland:	<u>0 - Not present within plan view.</u> square feet
b. Isolated vegetated wetland:	<u>N/A - Not present on site.</u> square feet
c. Land under water:	<u>437 permanent & 6,554 temporary.</u> square feet
d. Total cumulative loss of a. + b. + c.:	<u>6,991</u> square feet
e. Salt marsh:	<u>N/A - Not present on site.</u> 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

To be published.
 Date of Publication

- | | |
|--|---|
| b. Is this project a subdivision or any part of a subdivision? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| c. Is the project categorically subject to MEPA? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| If yes, has final action been taken? | <input type="checkbox"/> Yes <input type="checkbox"/> 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

X283960

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"

Susan McArthur
 Applicant's Signature

Susan McArthur

Print name

Carol L. Rogers

Agent's Signature

Carol Rogers

Print Name

12/5/2019
 Date

Public Notice

Massachusetts Department of Environmental Protection
Division of Wetlands and Waterways
Southeast Region
20 Riverside Drive
Lakeville, MA 02347

Pursuant to 33 U.S.C. 1341 M.G.L. c. 21 §§ 26-53, notice is given of a 401 Water Quality Certification application for the replacement of Bridge No. W-37-015 Route 2 (Main Street) in Williamstown, Massachusetts by the MassDOT Division of Highways, Ten Park Plaza, Room 4260, Boston, MA 02116. The main objectives of this project are to remove the existing bridge and install a new two-span structure with integral abutments, Northeast Extreme Tee (NEXT) F Beams, and replace the existing center concrete pier. Additional information may be obtained from the Massachusetts Highway Department at the above address, Attention Susan McArthur, (857)368-8807. Written comments should be sent to DEP, Division of Wetlands and Waterways, Southeast Regional Office, Attention Christopher Ross, 20 Riverside Drive, Lakeville, MA 02347 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.

Table of Contents:

1. Existing Conditions
2. Proposed Conditions
3. Construction Sequence
4. Wetlands Impacts
5. Wetland Replication
6. Sedimentation Control
7. Water Control Measures
8. Stormwater Management
9. Fisheries and Wildlife/Natural Heritage Endangered Species/Vernal Pools
10. Alternative Analysis
11. Specifications to be included into the contract

Appendices:

1. Project Area Photos
2. Project Location Maps
 - a. USGS Map
 - b. FEMA FIRMette Map
 - c. Environmental Resource Map
3. NHESP Coordination
4. Construction Plans

WATER QUALITY CERTIFICATION – ATTACHMENT A

The Replacement of Route 2 (Main Street) over Green River

Bridge No. W-37-015

Williamstown, Massachusetts

1. Existing Conditions

Bridge No. W-37-015 carries Route 2 (Main Street) over the Green River in the Town of Williamstown, Massachusetts. At this location, Route 2 (Main Street) is classified as an urban principal arterial, situated east of Williams College and adjacent to the Eastlawn Cemetery and Sherman Burbank Memorial Chapel, the Massachusetts Electric Company Substation, and residential properties. Traffic counts were conducted on Route 2 (Main Street) at Bridge No. W-37-015 on September 25, 2017, and found that the average daily traffic was 14,400 vehicles per day with 6% truck traffic.

The existing bridge was built in 1939 to replace the “Walley” bridge that collapsed during the 1938 hurricane and flood event. It is a two-span structure, 56’-2” wide with no skew, with an approximate existing length of 104’-9” and has a pier located in the center of the waterway. The Green River flows from south to north at this location before the confluence with the Hoosic River approximately 3,000 feet to the north. The superstructure is comprised of steel beams, two concrete sidewalks with metal railings, and a reinforced concrete deck. The substructure has two concrete abutments on spread footings with timber piles, three concrete wingwalls on spread footings with timber piles, and one solid concrete pier wall on spread footings with timber piles. The bridge carries two 12-foot travel lanes and 8-foot shoulders, and 6.8-foot sidewalks are located on both sides of the bridge. There are catch basins on both sides of the roadway on the west end of the bridge. One is located within the approach slab and both are currently connected to a closed drainage system. Water, gas, phone and electricity lines are located either on and over the bridge.

The purpose of the project is to address items identified through inspections. The deck is in fair condition with a rating of five (5) and various stringers within the cross-section have a failed paint system with substantial corrosion to the web and flanges. The existing substructure has been assessed to not adequately support the new superstructure. Therefore, a full replacement is proposed for this project.

2. Proposed Conditions

The project proposes the replacement of the existing bridge. This includes removing the superstructure and substructure, cutting the existing abutments down and placing a concrete cap on top, installing the new bridge which will span over the existing abutments, and replacing the center concrete pier. The new bridge will be a two-span structure with integral abutments, Northeast Extreme Tee (NEXT) F Beams, and a concrete pier. The bridge will have an out-to-out of 58’-10”, a length of 124’-6”, and no skew. The low chord of the structure will be reduced from 615.33 to 614.31. However, the hydraulic opening will be wider due to the proposed wider spans. Dumped riprap is proposed to be placed within the space between the western existing and proposed abutments while a smaller amount of riprap is proposed at the two corners of the proposed east wingwall and abutment. Vegetated riprap will be installed at the outlet of an existing drainage pipe located adjacent to the northeast wingwall. The existing drainage pipe will not be modified in any way. Some temporary and permanent impacts to land under water (LUW) will occur as a result of the new concrete pier, proposed riprap, and water control measures. The project will involve staged construction and temporary road closure. The temporary road closure, which will include a 4.4-mile detour. The

proposed detour is attached to this application for reference. All utilities will be relocated, as referenced below in the construction sequencing.

3. Construction Sequence

Main Street is anticipated to remain open with two-way traffic for the majority of the project. Construction will be performed with 2 stages and a post-stage 2. During the stages, two-way traffic will be maintained and at least one sidewalk will be open to accommodate pedestrian traffic.

Stage 1:

1. Water diversion dams and cofferdam will be installed for access under the bridge and pier.
2. The area inside of the cofferdam and water diversion dams will be dewatered.
3. The southern portion of the existing bridge and concrete pier will be demolished, and the existing timber piles will be cut out.
4. The southern pier footing, concrete pier, and bridge structure will be constructed.
5. Channel bottom material will be used to bring the streambed to its original elevation at the pier and the stage 1 portion of the cofferdam/water diversion dam orientation will be adjusted for the limits of stage 2 in-water work.

Stage 2:

1. Construct temporary pedestrian bridge.
2. Dewater the area within the cofferdam and water diversion dams.
3. The northern portion of the existing bridge and concrete pier will be demolished, and the existing timber piles cut out.
4. The northern portion of the pier footing, concrete pier, and bridge structure will be constructed.
5. Once the pier construction is complete and the channel bottom is restored, the temporary cofferdams and water diversion dams will be removed in their entirety.

Post Stage 2:

1. The permanent sidewalk will be constructed on the south side of the structure.
2. The temporary pedestrian bridge will be removed.
3. Disturbed areas will be restored.

The utility relocations will take place in two stages as well:

Stage 1:

1. Temporarily relocate all telephone to north aerial crossing.
2. Install telephone conduit and manhole on south side before stage 1 paving and after drainage installation.
3. Temporarily relocate overhead wires and poles to the south side, except maintain secondary electric from pole ng 2/ vz 117 to ng 1/vz 118 to supply power to homes on the north side.
4. Shut down 8" water main.
5. Install gas from tie in point to angle points prior to installation of stage 1 temporary traffic control (ttc).
6. Install proposed telephone duct prior to stage 1 ttc.
7. After beam installation, complete gas main under bridge and tie ins.

Stage 2:

8. After stage 1 of the bridge is complete, discontinue secondary electric lines on the north side and energize on the south side.
9. Relocate proposed telephone to south side.
10. Open proposed 8" ductile iron insulated water main on south side.
11. Shut down 12" water main on north side.
12. Relocate gas to south side.

Post Stage 2:

13. Open proposed 12" water main inside 16" steel insulated encasement on north side.
14. Relocate permanent overhead utility to north side.

During a portion of stage 1 and 2, the road will be closed, and a detour will be necessary for beam installation. The proposed detour follows Route 2 to the west to Cole Avenue to North Hoosac, which becomes Massachusetts Avenue as you cross into North Adams, to Ashton Avenue to Route 2. The approximate length is 4.4 miles. All the roads have an arterial functional classification except for Ashton Avenue which is classified as a local road. None of the roads have posted bridges.

Demolition of the bridge will include proper shielding to protect the water and land below from demolition debris. Compost filter tube and erosion and sedimentation control barrier will be installed at the limit of disturbance on the roadway approaches. Water control measures will be required for work at the pier. This will be accomplished with braced steel sheeting, steel piles with lagging or an equivalent noted on the plans as "cofferdam" around the pier. Water diversion dams comprising of sandbags, or an equivalent, will be used to confine the work area required to access the pier. The Green River will flow through the western span.

4. Wetland Impacts

A wetland survey of the project area was conducted on May 17, 2017. Based on hydrologic indicators, soil conditions and existing vegetation, the limits of Ordinary High Water Mark (OHWM) was delineated on site in accordance with US Army Corps of Engineers methodology. At the location of the bridge, solely OHW was flagged. Further upstream of the project bridge a narrow riparian bordering vegetated wetland fringe was sampled below the ordinary high water mark. However, this is located outside of the project's limit of disturbance. The Green River is located within Hoosic Watershed and has a drainage area of approximately 42.7 square miles. To minimize impacts to wetland resource area, the project minimizes ground disturbance and utilizes Best Management Practices (BMPs) as well as sedimentation and erosion control measures.

Approximately 437 square feet of LUW will be permanently impacted at the pier. This is a result of the wider and longer concrete pier. There will also be permanent LUW impacts as a result of the dumped riprap proposed to be placed at the wingwalls and abutments. These limits have been delineated on the construction plans. For the construction of the concrete pier water control measures are anticipated. The anticipated limits of the cofferdams and water diversion dams have been shown on the Construction Plan and are estimated to result in approximately 6,554 square feet of temporary impacts to LUW. Impacts are presented within the table below

Wetland Resource Impact Table	
	Land Under Water (sqft)
Temporary	6,554
Permanent	437

Totals	6,991
--------	-------

5. Wetland Replication (if required)

Wetland replication is not required for this project as there are no vegetated wetlands located within the project area.

6. Sedimentation Control

Appropriate sedimentation and erosion controls and required BMPs will be employed and utilized during all phases of construction to minimize as well as avoid additional impacts to the adjacent environmental resource areas. Additional control measures will be employed as necessary. All sedimentation and erosion control measures will be maintained throughout all phases of construction.

7. Water Control Measures

The proposed work at the central pier requires water control measures. A cofferdam will be installed to allow for soil excavation and construction of the proposed pier. This will be accomplished with a fully enclosed cofferdam required for dewatering and water diversion dam. The configuration of the cofferdam will leave approximately 6' of workspace between the existing pier and the cofferdam. A water diversion dam will be utilized to confine the work area for the construction area. Water located within the work area will be pumped to a temporary dewatering and sedimentation basin which will serve to filter out sediments before the pumped water is discharged in an upland area outside of environmentally sensitive resource areas.

8. Stormwater Management

The existing catch basins will be replaced with new 4' deep sump catch basins and will be located along the proposed curbline and connected to the existing drainage system. The existing system was analyzed using Bentley StormCAD V8i to determine the adequacy of the hydraulic grade lines (HGL), as well as gutter flow spread. The analysis proved that the current system is adequate in a 10-year storm. Outlet protection will be accommodated within the riprap lining of the embankment. Existing outlets for the system are proposed to remain in place.

9. Fisheries and Wildlife/Natural Heritage Endangered Species/Vernal Pools

The bridge is mapped within a National Heritage & Endangered Species Program (NHESP) Priority & Estimated Habitat of Rare Species and Wildlife. Additional information from NHESP on specific species and wildlife located in this area is pending response. The project will aim to not diminish the ability of the river to support listed species of concern. BMPs for sedimentation and erosion control have been included in the project. BMPs will be adhered to for all phases of construction to minimize potential impacts to critical resources and protected species.

10. Alternative Analysis

Alternatives considered included solely the replacement of the superstructure. It was determined that leaving the existing abutments in place would not sufficiently support a new superstructure. Therefore, alternatives included full replacement methods. These alternatives included the following:

Two-Span Structure – Conventional Abutments and Pier with Pile Foundations:

Constructing a two-span structure atop conventional abutments was explored as they can be used with any of the appropriate bridge structure types. The abutments and pier can be cast-in-place or precast concrete. Precast elements can ease or speed up construction as well as lower costs. The disadvantages of the conventional abutments are the need for bridge joints, more piles are required, higher expected costs and a large area of excavation is needed. Significant temporary and permanent wetland resources, predominately LUW impacts, would occur for this alternative due to the requirement of additional piles and excavation required of it. Therefore, this alternative was not selected.

Two-Span Structure – Integral Abutments with a Concrete Pier on Piles (Selected Alternative):

A two-span structure on top of integral abutments is the selected substructure alternative as integral abutments have proven to be more economical by reducing material usage and minimizing maintenance by eliminating roadway joints. Integral abutments are also desired when there is limited room for excavation, which is the case with this bridge site. Similar to conventional abutments, precast elements would be proposed where they can ease or speed up construction and lower costs. The disadvantages of integral abutments are that soil and scour conditions control whether or not the required piles will be permitted and not all bridge structure types are applicable.

Single Span Structure:

Conventional or integral abutments were explored to potentially be used for a single-span bridge. The removal of a pier is ideal as it would improve hydraulic efficiency, reduce construction time, and lower costs. The main disadvantage of a single span is a deeper superstructure is required for the longer span, which would reduce the hydraulic opening or raise the vertical roadway profile. Therefore, in order to minimize impacts on the hydraulic opening and roadway profile, a single span structure will not be proposed. Impacts to wetland resources including LUW would be required for the pier removal due to the reduction in the hydraulic opening, permanent impacts to the flow of Green River could occur.

11. Specifications to be included into the contract

- Demo
- Vegetated Riprap



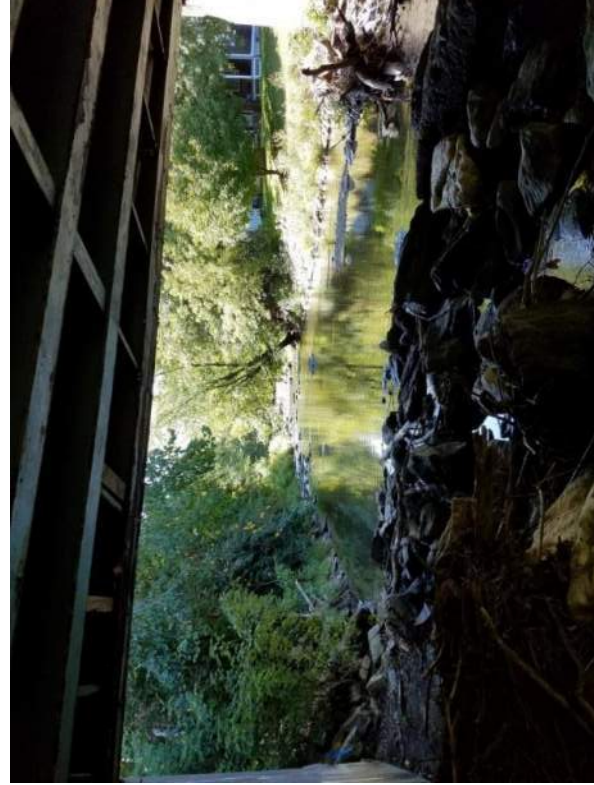
View of Green River from Project Bridge



View beneath bridge



Bridge approach depicting flower pots and bronze medallion



View beneath bridge looking upstream



Flower pots will remain on proposed bridge



South elevation looking downstream



Electrical substation northwest of project bridge



South elevation looking downstream

Project Location Maps:
USGS Map
FEMA Map
Environmental Resource Map

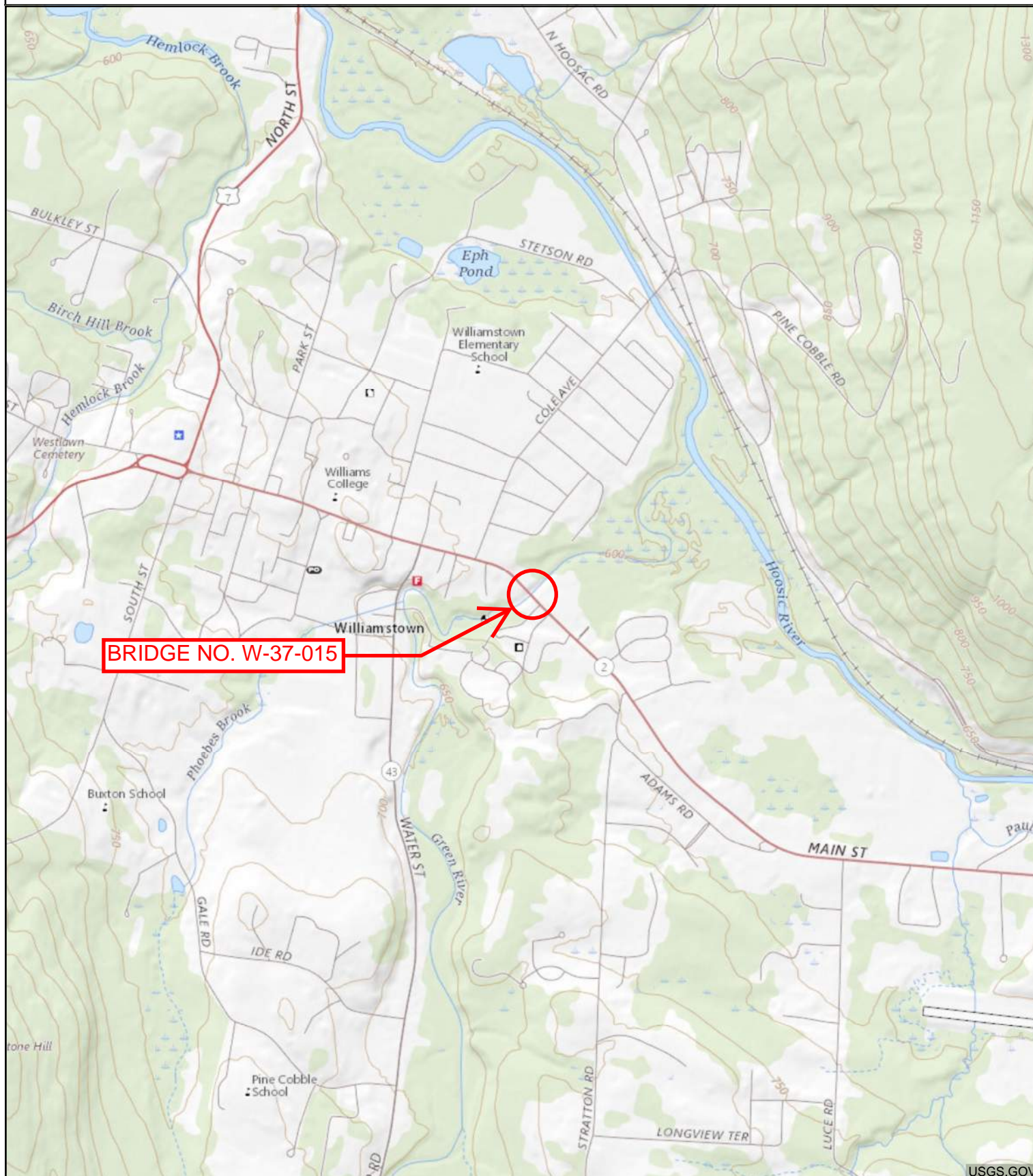


Engineers
Designers
Consultants
Planners
Scientists
101 East River Drive, 1st floor, East Hartford, CT 06108
T 860.290.4100 • www.cmeengineering.com

USGS TOPOGRAPHIC MAP

BRIDGE NO. W-37-015 WILLIAMSTOWN, MA

ROUTE 2 (MAIN STREET) OVER GREEN RIVER



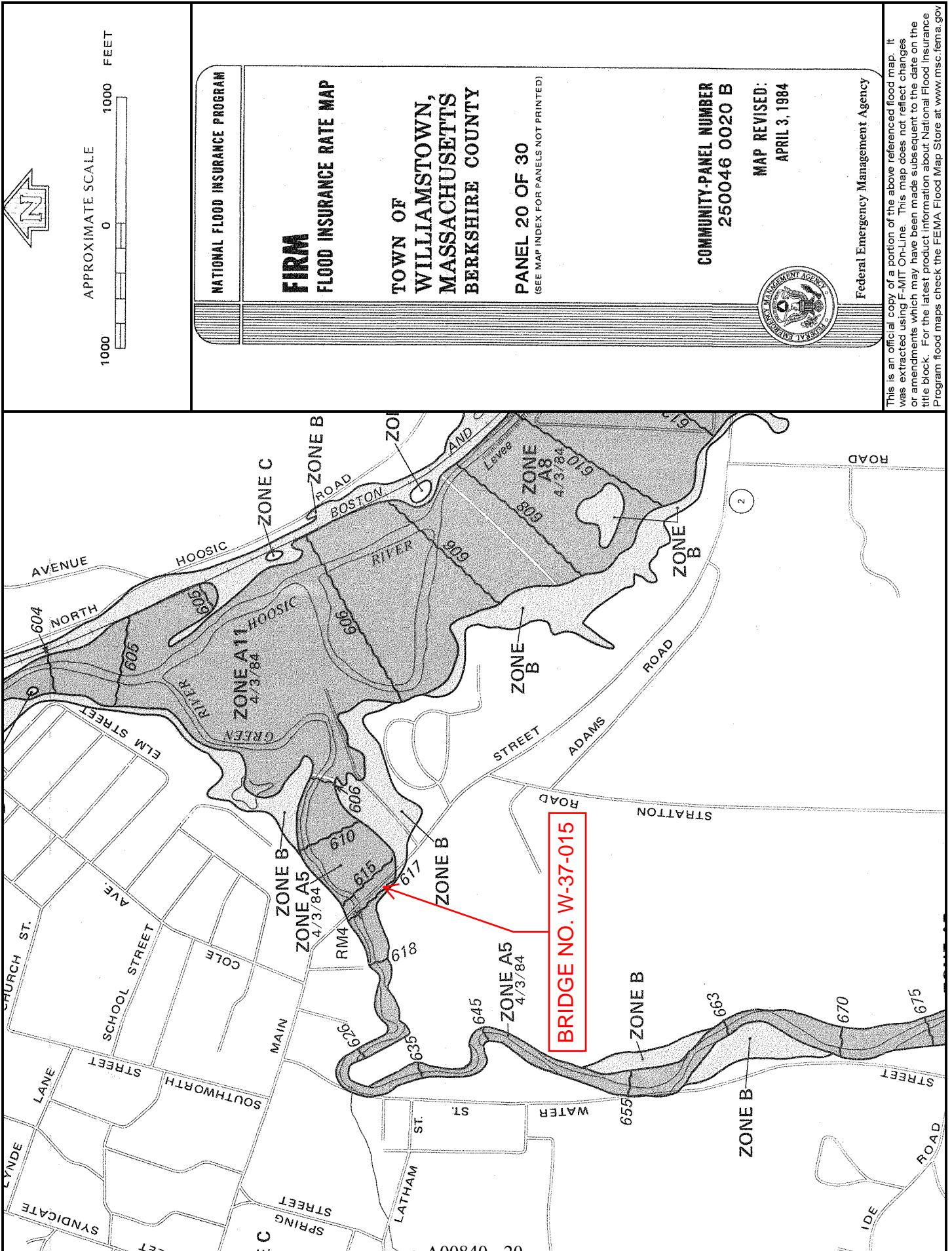
USGS
TOPOGRAPHIC MAP
WILLIAMSTOWN,
MASSACHUSETTS



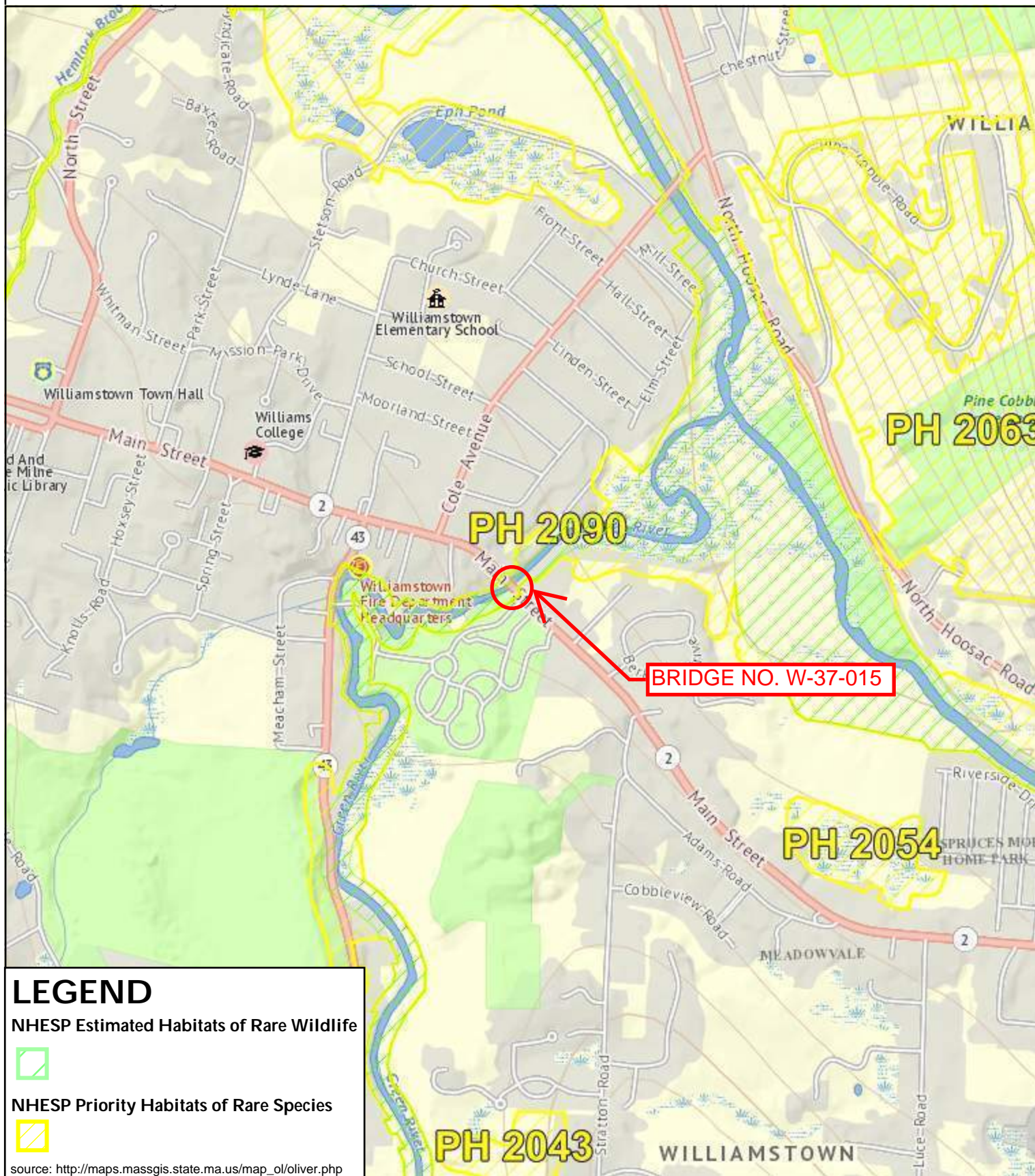
Created December, 2019 A00840 - 19

1 INCH = 2,000 FEET

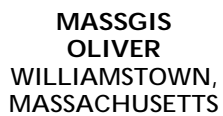




BRIDGE NO. W-37-015 WILLIAMSTOWN, MA
ROUTE 2 (MAIN STREET) OVER GREEN RIVER



source: http://maps.massgis.state.ma.us/map_ol/oliver.php



A horizontal number line with tick marks at 0, 500, 1000, 2000, and 3000. The word "Feet" is written at the right end of the line.

Correspondence from NHESP

Construction Plans

NOTES

- BOUNDARY INFORMATION SHOWN HEREON WAS COMPILED FROM AN ACTUAL FIELD SURVEY CONDUCTED ON OCTOBER 23, 2017 THROUGH JANUARY 24, 2018 BY CME ASSOCIATES, INC.
- THE LOCATION OF UNDERGROUND IMPROVEMENTS OR ENCROACHMENTS, IF ANY EXIST, OR AS SHOWN HEREON, ARE NOT CERTIFIED. THERE MAY BE OTHER UNDERGROUND UTILITIES. THE EXISTENCE OF WHICH ARE UNKNOWN. SIZE AND LOCATION OF ALL UNDERGROUND UTILITIES MUST BE VERIFIED BY THE APPROPRIATE AUTHORITIES. THE UNDERGROUND FACILITIES PROTECTIVE ORGANIZATION MUST BE NOTIFIED PRIOR TO CONDUCTING TEST BORINGS, EXCAVATION AND CONSTRUCTION. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A UTILITY MARK OUT SERVICE.
- THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF AN UP TO DATE ABSTRACT OF TITLE.
- HORIZONTAL COORDINATES, NORTH ORIENTATION AND BEARING RELATIVE TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM, MASSACHUSETTS MAINLAND ZONE, BASED ON THE NORTH AMERICAN DATUM OF 1983, NAD83 (2011) EPOCH 2010.00.
- ELEVATIONS RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988, NAVD 1988, GEOID 12A.
- HORIZONTAL AND VERTICAL CONTROL WERE ESTABLISHED BY THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION IN DEC. OF 2014 UTILIZING GPS AND CONVENTIONAL LEVELING METHODS.

NOTES CONT.

- HORIZONTAL COORDINATE AND ELEVATION UNITS ARE U.S. SURVEY FEET.
- A CONVENTIONAL GPS NETWORK WAS CREATED BY MASSDOT AND USED TO OBTAIN COORDINATES FOR POINTS 1461 AND 1462. MASSDOT COORDINATES FOR THESE POINTS WERE HELD AND USED IN THE FIELD.
- PROPERTY LINES DEPICTED HEREON ARE APPROXIMATE ONLY AND ARE BASED UPON RECORD DEEDS, PLANS, ASSESSORS AND LIMITED ON THE GROUND INSTRUMENT SURVEY. RECORD DEEDS AND PLANS MAY CONTAIN MATHEMATICAL DISCREPANCIES AND INCONSISTENCIES, WHICH WERE NOT RESOLVED WITH THIS SURVEY.
- THIS PLAN DOES NOT SHOW UNWRITTEN OR UNRECORDED EASEMENTS WHICH MAY EXIST. A REASONABLE AND DILIGENT ATTEMPT HAS BEEN MADE TO OBSERVE ANY APPARENT AND VISIBLE USES OF THE LAND. THIS PLAN DOES NOT GUARANTEE THAT NO SUCH EASEMENTS EXIST.
- CONCRETE SIDEWALK REPLACEMENT SHALL BE TO THE NEAREST EXISTING JOINT.
- ALL PROPOSED CBOI'S SHALL HAVE 4' SUMPS UNLESS OTHERWISE SPECIFIED.

WILLIAMSTOWN
ROUTE 2 (MAIN STREET) OVER GREEN RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	1	9

PROJECT FILE NO. 605356

ENVIRONMENTAL PLANS
11-08-2019

TBM
N: 3088160.100
E: 200631.169
EL: 619.578
DH26

END PAVEMENT MILLING AND OVERLAY
BEGIN FULL DEPTH PAVEMENT
12"HEM

STA. 90+55
N: 3088142.051
E: 200636.300
EL: 608.629
RD039

PROF CLEARING AND GRUBBING
FROM BACK OF SIDEWALK TO
TEMP EASEMENT FOR OVERHEAD
WIRE AND POLE RELOCATION

RET DMH
RIM=618.01
A=607.03(24"RCP)
B=606.99

RET DMH
RIM=618.01
A=607.24
B=607.15(24"RCP)

PROF
COMpanion
SEATING

TBM
N: 3088094.037
E: 200691.220
EL: 618.597
RD014

PROF
R&R
BENCH

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

TBM
N: 3088160.100
E: 200631.169
EL: 619.578
DH26

END PAVEMENT MILLING AND OVERLAY
BEGIN FULL DEPTH PAVEMENT
12"HEM

STA. 90+55
N: 3088142.051
E: 200636.300
EL: 608.629
RD039

PROF CLEARING AND GRUBBING
FROM BACK OF SIDEWALK TO
TEMP EASEMENT FOR OVERHEAD
WIRE AND POLE RELOCATION

RET DMH
RIM=618.01
A=607.03(24"RCP)
B=606.99

RET DMH
RIM=618.01
A=607.24
B=607.15(24"RCP)

PROF
COMpanion
SEATING

TBM
N: 3088094.037
E: 200691.220
EL: 618.597
RD014

PROF
R&R
BENCH

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

TBM
N: 3088160.100
E: 200631.169
EL: 619.578
DH26

END PAVEMENT MILLING AND OVERLAY
BEGIN FULL DEPTH PAVEMENT
12"HEM

STA. 90+55
N: 3088142.051
E: 200636.300
EL: 608.629
RD039

PROF CLEARING AND GRUBBING
FROM BACK OF SIDEWALK TO
TEMP EASEMENT FOR OVERHEAD
WIRE AND POLE RELOCATION

RET DMH
RIM=618.01
A=607.03(24"RCP)
B=606.99

RET DMH
RIM=618.01
A=607.24
B=607.15(24"RCP)

PROF
COMpanion
SEATING

TBM
N: 3088094.037
E: 200691.220
EL: 618.597
RD014

PROF
R&R
BENCH

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

TBM
N: 3088160.100
E: 200631.169
EL: 619.578
DH26

END PAVEMENT MILLING AND OVERLAY
BEGIN FULL DEPTH PAVEMENT
12"HEM

STA. 90+55
N: 3088142.051
E: 200636.300
EL: 608.629
RD039

PROF CLEARING AND GRUBBING
FROM BACK OF SIDEWALK TO
TEMP EASEMENT FOR OVERHEAD
WIRE AND POLE RELOCATION

RET DMH
RIM=618.01
A=607.03(24"RCP)
B=606.99

RET DMH
RIM=618.01
A=607.24
B=607.15(24"RCP)

PROF
COMpanion
SEATING

TBM
N: 3088094.037
E: 200691.220
EL: 618.597
RD014

PROF
R&R
BENCH

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

TBM
N: 3088160.100
E: 200631.169
EL: 619.578
DH26

END PAVEMENT MILLING AND OVERLAY
BEGIN FULL DEPTH PAVEMENT
12"HEM

STA. 90+55
N: 3088142.051
E: 200636.300
EL: 608.629
RD039

PROF CLEARING AND GRUBBING
FROM BACK OF SIDEWALK TO
TEMP EASEMENT FOR OVERHEAD
WIRE AND POLE RELOCATION

RET DMH
RIM=618.01
A=607.03(24"RCP)
B=606.99

RET DMH
RIM=618.01
A=607.24
B=607.15(24"RCP)

PROF
COMpanion
SEATING

TBM
N: 3088094.037
E: 200691.220
EL: 618.597
RD014

PROF
R&R
BENCH

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

TBM
N: 3088160.100
E: 200631.169
EL: 619.578
DH26

END PAVEMENT MILLING AND OVERLAY
BEGIN FULL DEPTH PAVEMENT
12"HEM

STA. 90+55
N: 3088142.051
E: 200636.300
EL: 608.629
RD039

PROF CLEARING AND GRUBBING
FROM BACK OF SIDEWALK TO
TEMP EASEMENT FOR OVERHEAD
WIRE AND POLE RELOCATION

RET DMH
RIM=618.01
A=607.03(24"RCP)
B=606.99

RET DMH
RIM=618.01
A=607.24
B=607.15(24"RCP)

PROF
COMpanion
SEATING

TBM
N: 3088094.037
E: 200691.220
EL: 618.597
RD014

PROF
R&R
BENCH

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

TBM
N: 3088160.100
E: 200631.169
EL: 619.578
DH26

END PAVEMENT MILLING AND OVERLAY
BEGIN FULL DEPTH PAVEMENT
12"HEM

STA. 90+55
N: 3088142.051
E: 200636.300
EL: 608.629
RD039

PROF CLEARING AND GRUBBING
FROM BACK OF SIDEWALK TO
TEMP EASEMENT FOR OVERHEAD
WIRE AND POLE RELOCATION

RET DMH
RIM=618.01
A=607.03(24"RCP)
B=606.99

RET DMH
RIM=618.01
A=607.24
B=607.15(24"RCP)

PROF
COMpanion
SEATING

TBM
N: 3088094.037
E: 200691.220
EL: 618.597
RD014

PROF
R&R
BENCH

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

TBM
N: 3088160.100
E: 200631.169
EL: 619.578
DH26

END PAVEMENT MILLING AND OVERLAY
BEGIN FULL DEPTH PAVEMENT
12"HEM

STA. 90+55
N: 3088142.051
E: 200636.300
EL: 608.629
RD039

PROF CLEARING AND GRUBBING
FROM BACK OF SIDEWALK TO
TEMP EASEMENT FOR OVERHEAD
WIRE AND POLE RELOCATION

RET DMH
RIM=618.01
A=607.03(24"RCP)
B=606.99

RET DMH
RIM=618.01
A=607.24
B=607.15(24"RCP)

PROF
COMpanion
SEATING

TBM
N: 3088094.037
E: 200691.220
EL: 618.597
RD014

PROF
R&R
BENCH

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

PROF
R&R
F&G

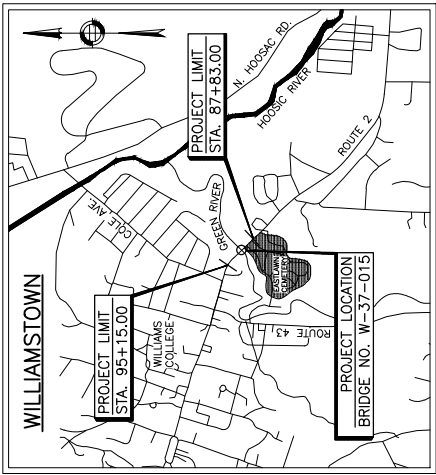
PROF
R&R
F&G



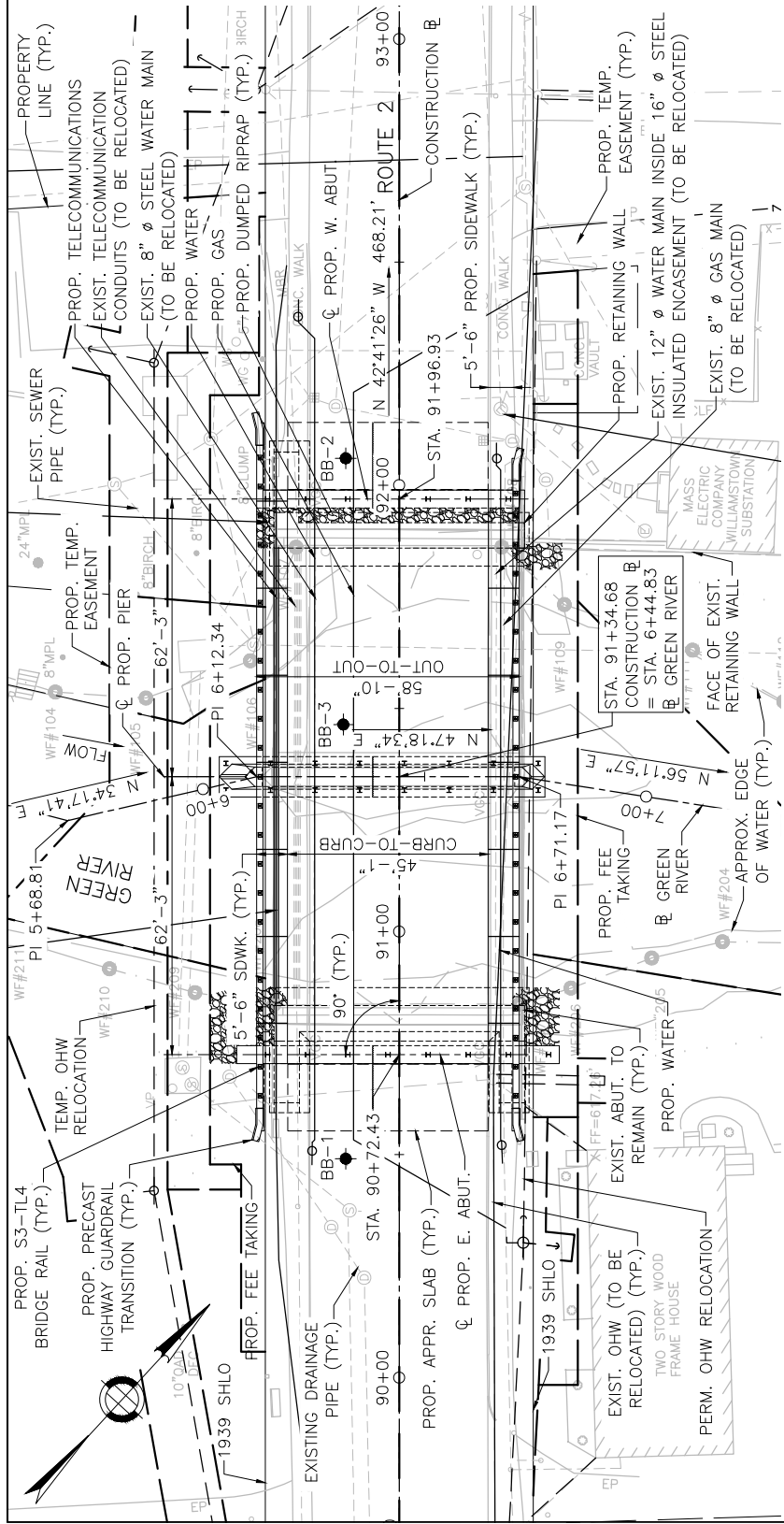
WILLIAMSTOWN
ROUTE 2 (MAIN STREET) OVER GREEN RIVER
ENVIRONMENTAL PLANS
11-08-2019

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	3	9

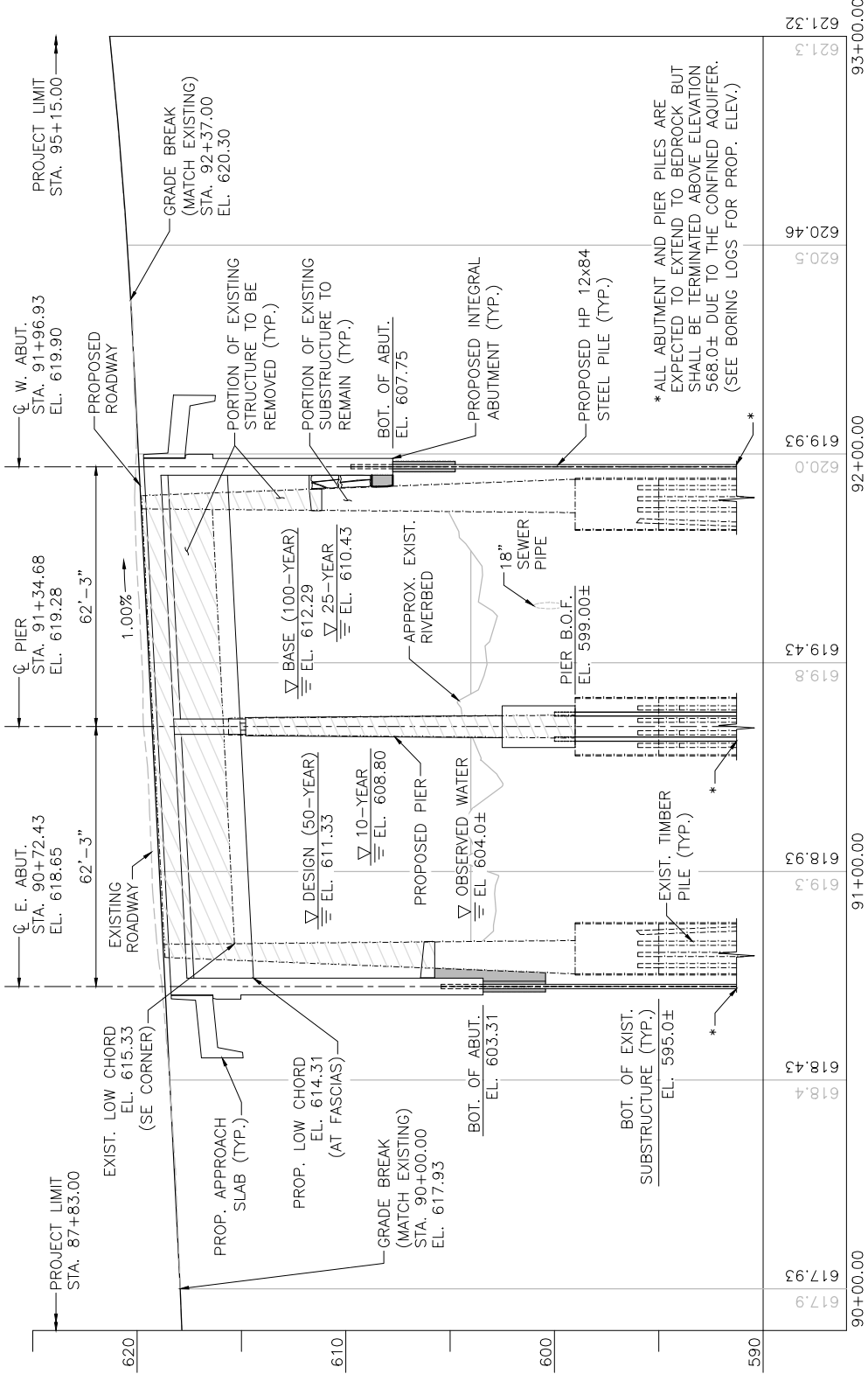
PROJECT FILE NO.	605356
------------------	--------



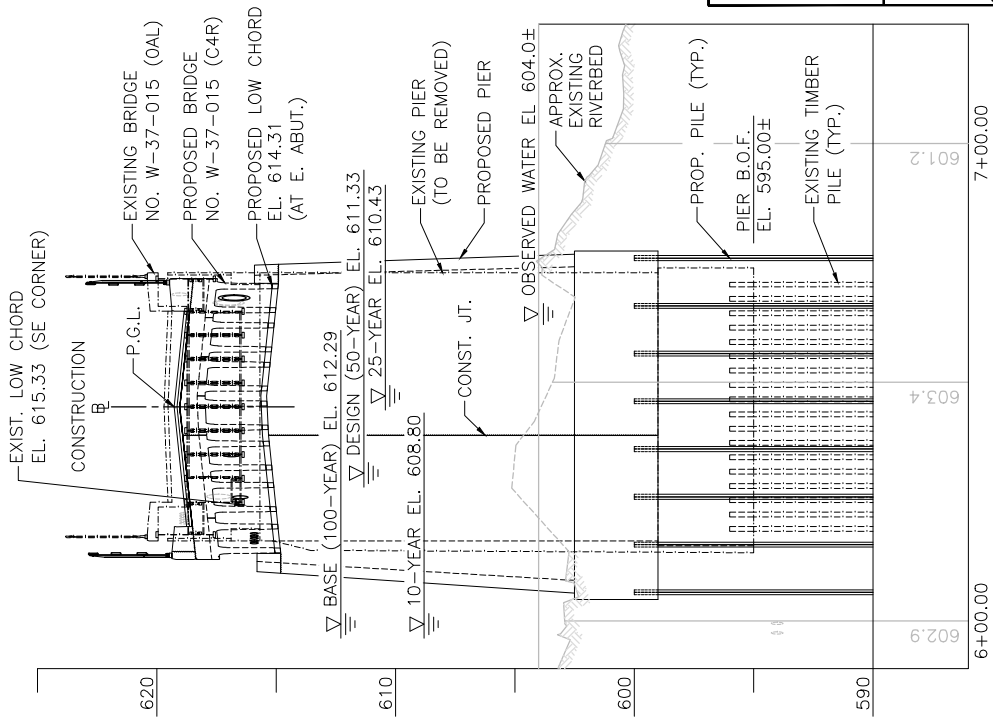
LOCUS
SCALE: 1" = 2000'



KEY PLAN
SCALE: 1" = 20'-0"



PROFILE - CONSTRUCTION B (ROUTE 2)
HORIZONTAL SCALE: 1" = 20'-0"
VERTICAL SCALE: 1/4" = 1'-0"



PROFILE - GREEN RIVER
HORIZONTAL SCALE: 1" = 20'-0"
VERTICAL SCALE: 1/4" = 1'-0"

P.E.
STAMP
SIGNATURE



PROPOSED BRIDGE REPLACEMENT
WILLIAMSTOWN

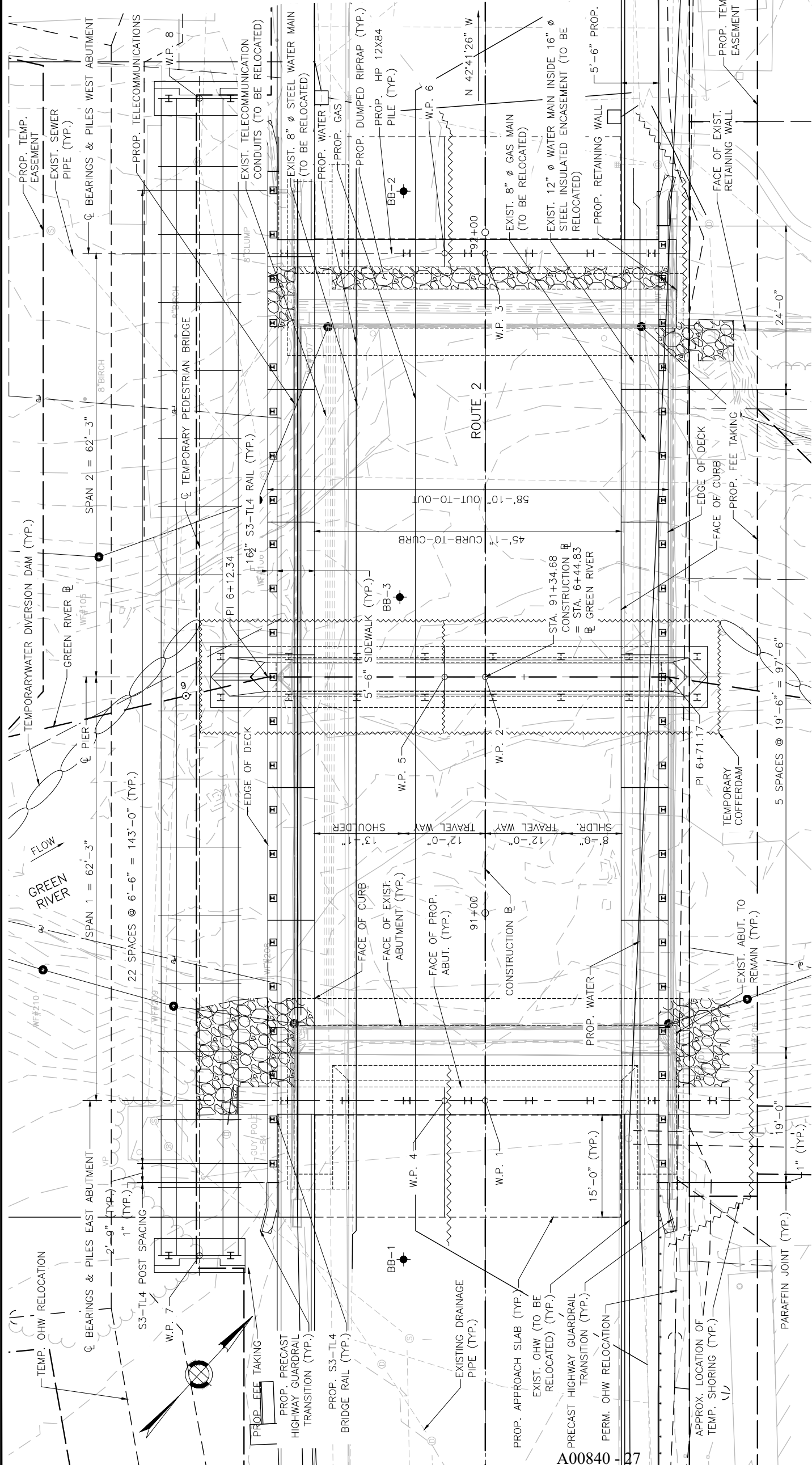
ST 2 (MAIN STREET)
OVER GREEN RIVER
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

TITLE: _____ CHIEF ENGINEER



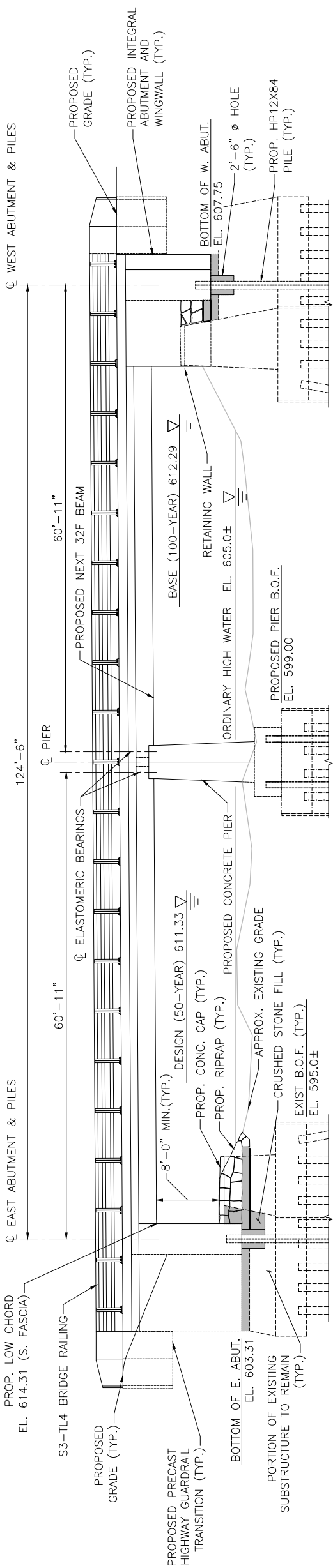
CME ASSOCIATES, INC.
101 East River Drive, 1st Floor
East Hartford, CT 06108
888-291-3827 www.cmeengineering.com

WORKING POINT LOCATIONS			
NO.	DESCRIPTION	STATION	OFFSET
1	☉ CONSTRUCTION, ☉ EAST ABUTMENT	90+72.43	0
2	☉ CONSTRUCTION, ☉ PIER	91+34.68	0
3	☉ CONSTRUCTION, ☉ WEST ABUTMENT	91+96.93	0
4	CONSTRUCTION JOINT, ☉ EAST ABUTMENT	90+72.43	5.96 LT.
5	CONSTRUCTION JOINT, ☉ PIER	91+34.68	5.96 LT.
6	CONSTRUCTION JOINT, ☉ WEST ABUTMENT	91+96.93	5.96 LT.
7	☉ TEMP. BRIDGE, ☉ EAST BEARINGS	90+49.68	41.96 LT.
8	☉ TEMP. BRIDGE, ☉ WEST BEARINGS	92+19.68	41.96 LT.



LAYOUT PLAN

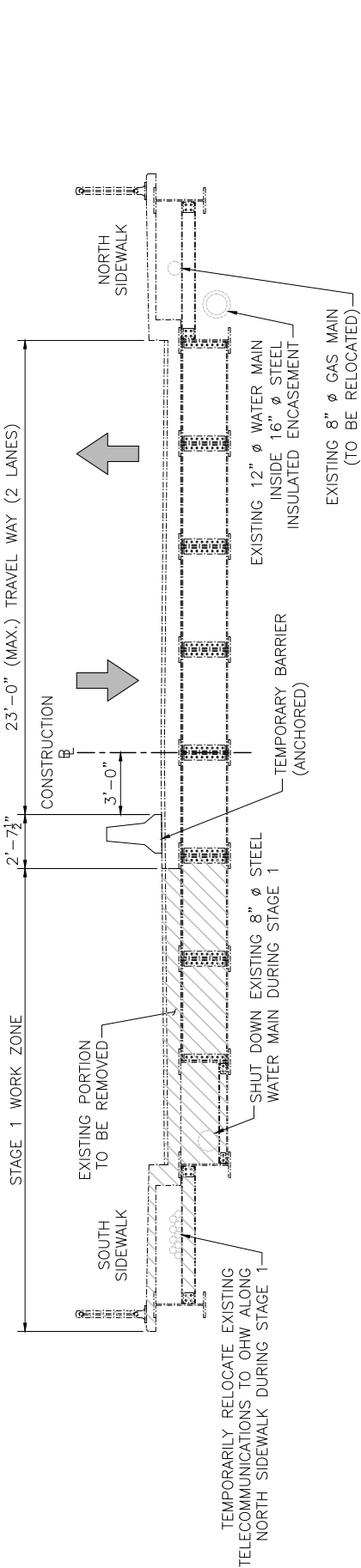
SCALE: 1/8" = 1'-0"



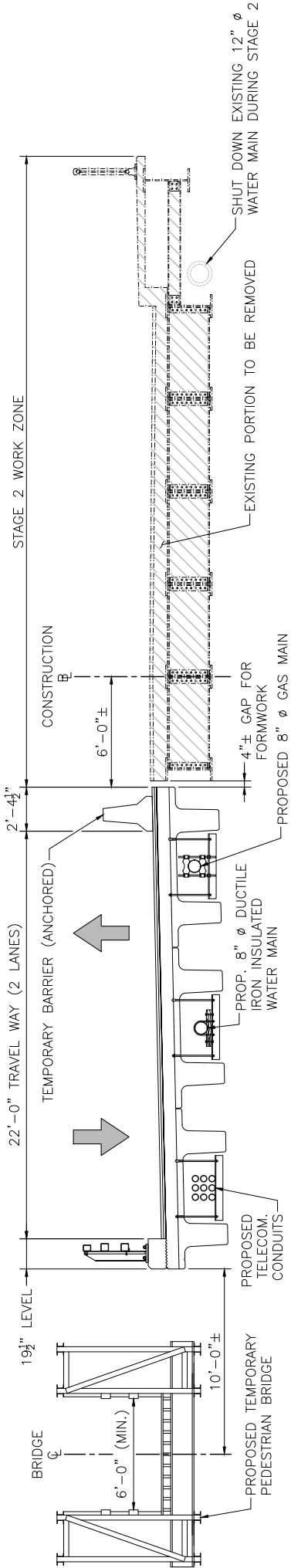
NORTH ELEVATION

SCALE: 1" = 8'-0"

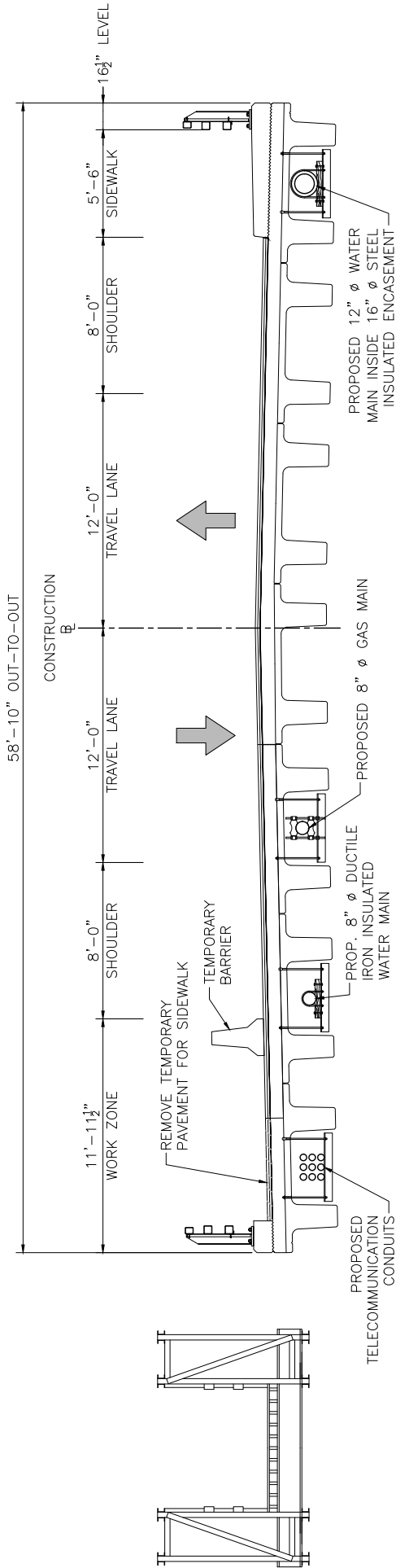
MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	



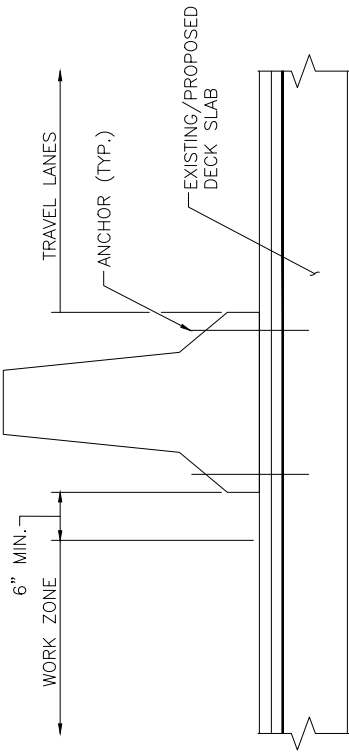
STAGE 1
SCALE: 1" = 1'-0"



STAGE 2
SCALE: 1" = 1'-0"



POST-STAGE 2
SCALE: 1" = 1'-0"



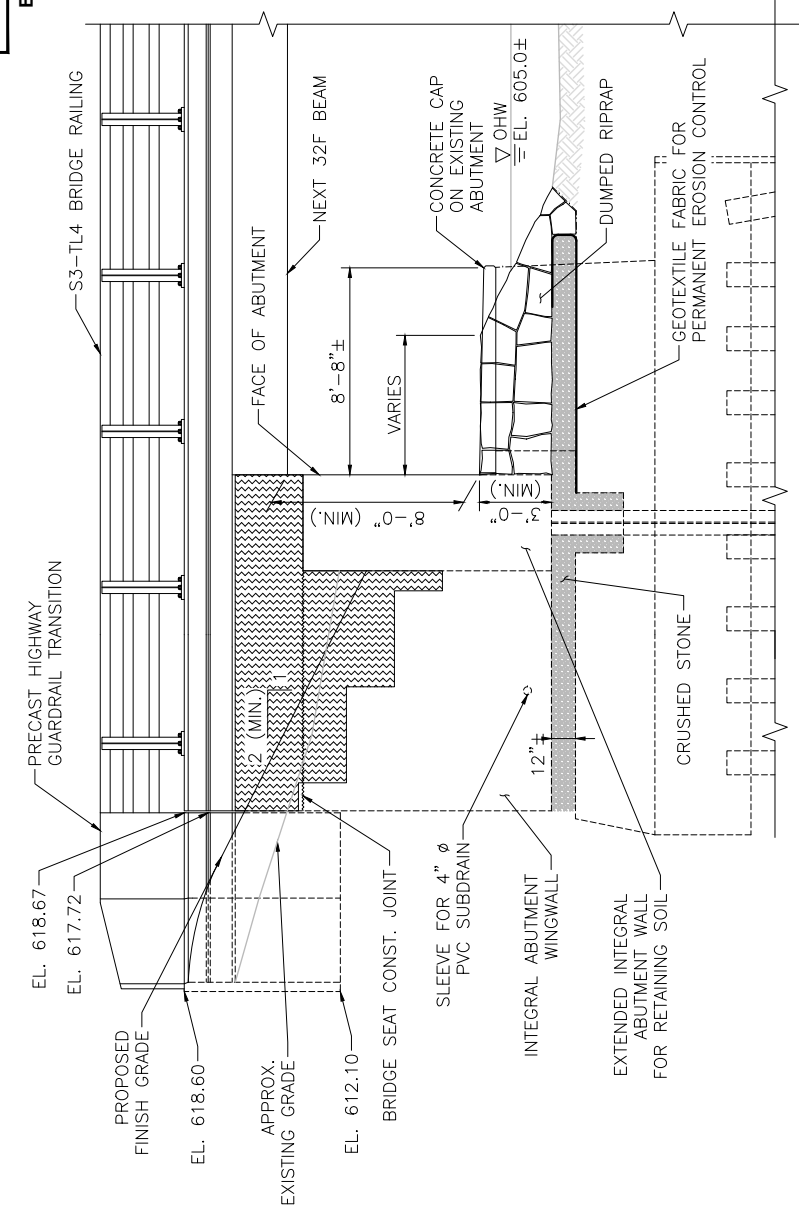
TEMPORARY ANCHORED BARRIER
SCALE: 1" = 1'-0"

- NOTES:
- EXISTING UTILITIES SHALL BE RELOCATED THROUGHOUT CONSTRUCTION. CONTRACTOR SHALL PROVIDE ACCESS FOR UTILITY COMPANY TO REPAIR BROKEN CONDUIT JOINTS.

		ISSUED FOR CONSTRUCTION
MONTH, DD, YYYY		DESCRIPTION
DATE		USE ONLY PRINTS OF LATEST DATE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	6	9
PROJECT FILE NO. 605356			

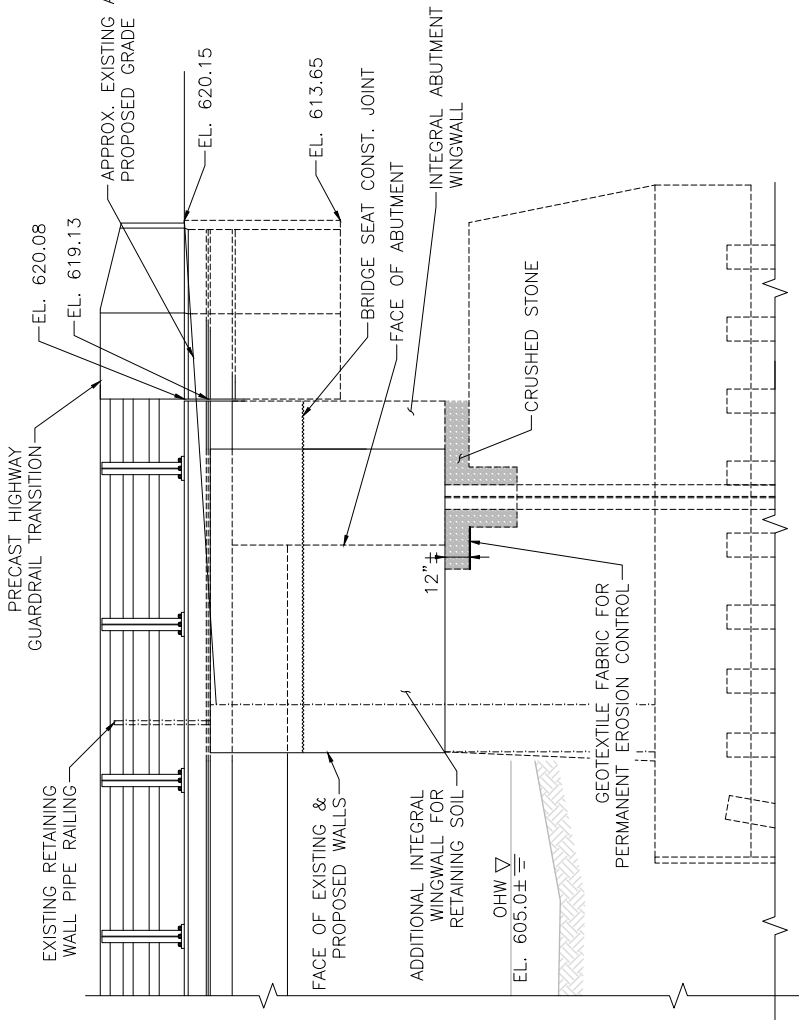
ENVIRONMENTAL PLANS
09-16-2019



PROPOSED NORTHEAST ELEVATION

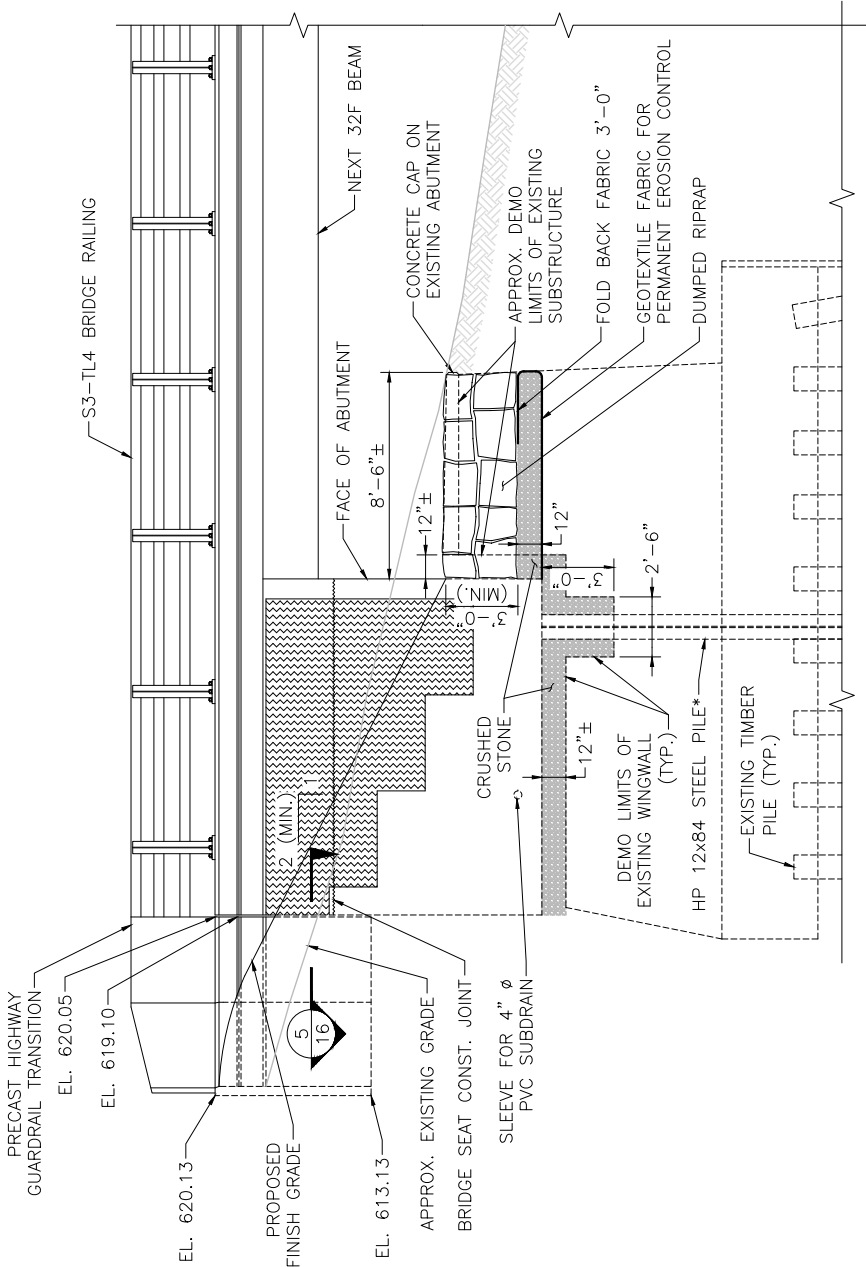
SCALE: 1/4" = 1'-0"

NOTE:
EXTERIOR PILES MAY REQUIRE
CORING THROUGH OR REMOVING
PORTIONS OF EXISTING WINGWALLS



PROPOSED NORTHWEST ELEVATION

SCALE: 1/4" = 1'-0"



PROPOSED SOUTHWEST ELEVATION

SCALE: 1/4" = 1'-0"

PROPOSED SOUTHEAST ELEVATION

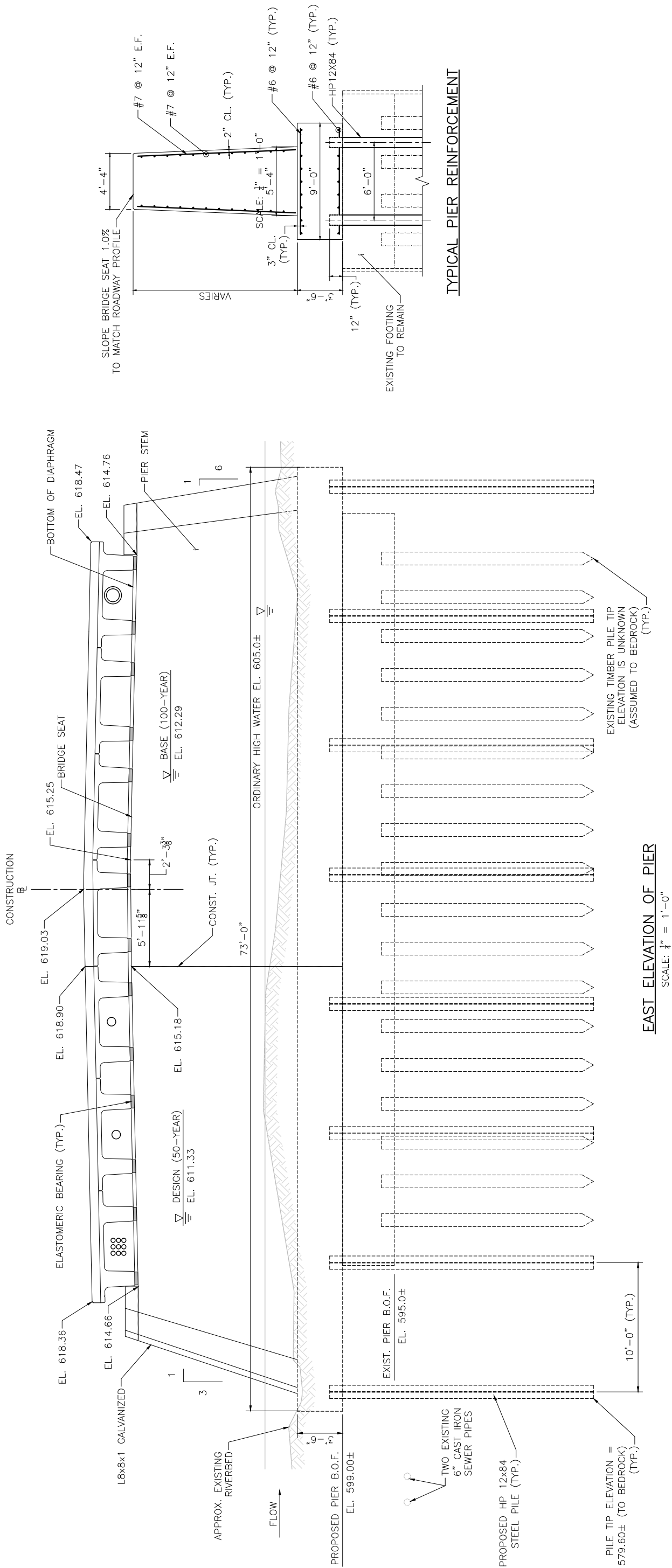
SCALE: 1/4" = 1'-0"

MONTH, DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
	USE ONLY PRINTS OF LATEST DATE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	7	9
PROJECT FILE NO. 605356			

ENVIRONMENTAL PLANS

09-16-2019



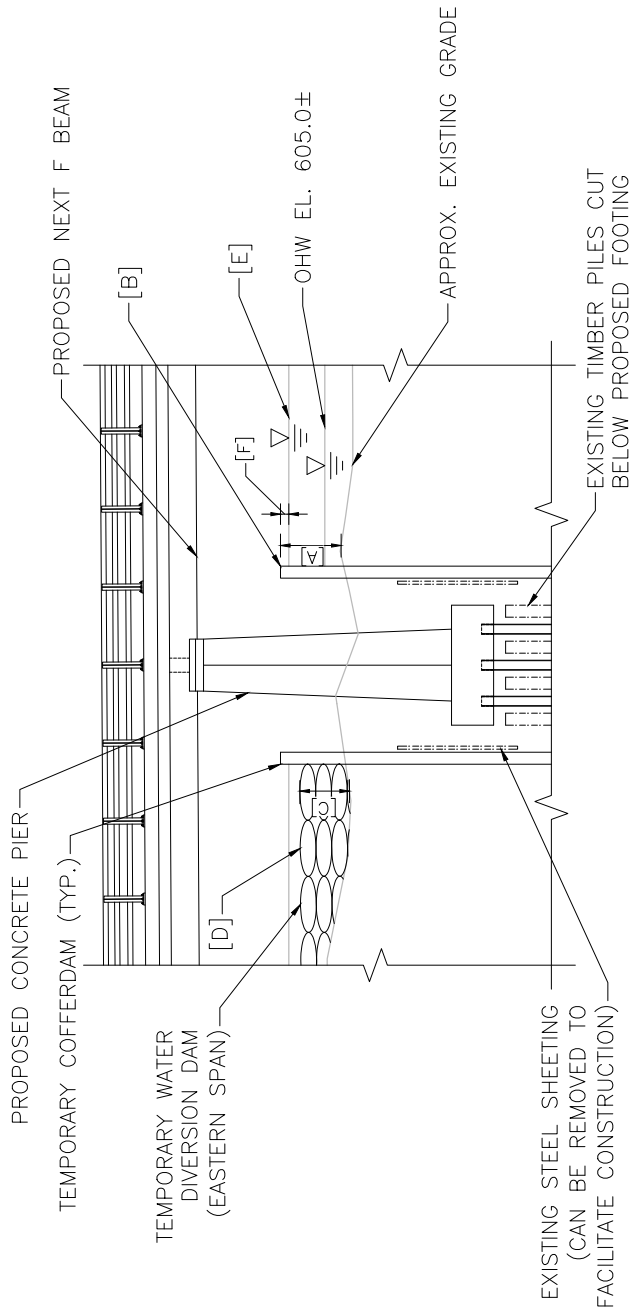
MONTH DD, YYYY	ISSUED FOR CONSTRUCTION	
DATE	DESCRIPTION	
USE ONLY PRINTS OF LATEST DATE		

NOTES:

1. THE TEMPORARY COFFERDAM SHALL BE DESIGNED BY THE CONTRACTOR.
2. ALL DEWATERING SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND REQUIREMENTS.
3. TEMPORARY HYDRAULIC DATA SHOWS SANDBAGS, HOWEVER, DIVERSION MATERIAL CAN BE CHOSEN AT CONTRACTOR'S DISCRETION.

ENVIRONMENTAL PLANS

ENVIRONMENTAL PLANS
11-08-2019



ANTICIPATED COFFERDAM DETAIL

NOT TO SCALE

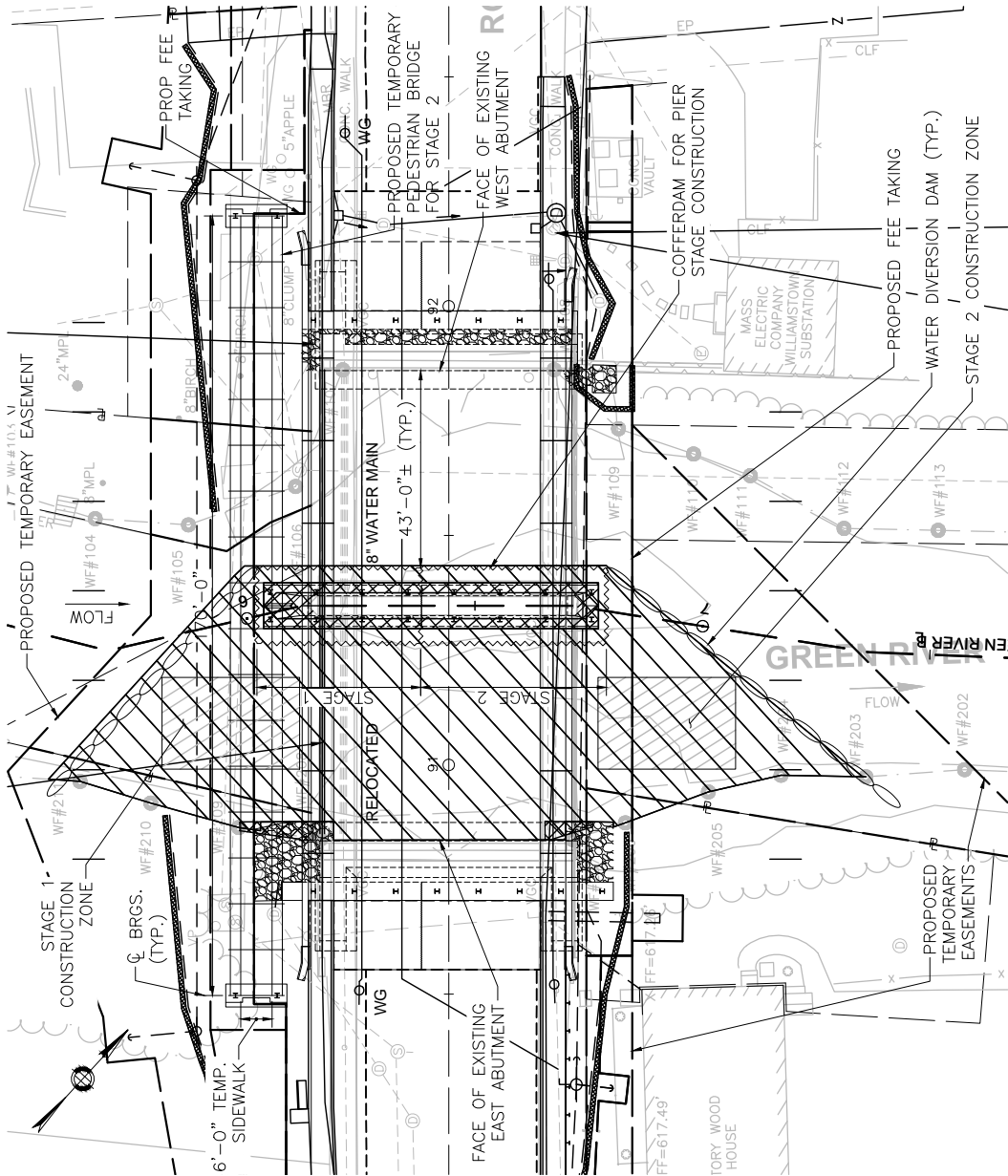
COFFORDAM AND SANDBAG DESIGN DATA						
COFFORDAM (FT) [A]	COFFORDAM ELEV. (FT) [B]	SANDBAG (FT) [C]	SANDBAG ELEV (UPSTREAM) (FT) [D]	SANDBAG ELEV (DOWNSTREAM) (FT) [D]	WSE AT BRIDGE (FT) [E]	FREEBOARD TO COFFORDAM (FT) [F]
8.0	609.25	5	606.76	605.02	608.32	0.93
7.5	608.75	4	605.76	604.02	607.87	0.88
7.0	608.25	3	604.76	603.02	607.43	0.82
6.5	607.75	2.5	604.26	602.52	607.29	0.46

TEMPORARY WATER CONTROL DESIGN DATA:

1. DESIGN FLOOD DISCHARGE: 1540 CUBIC FEET PER SECOND
2. DESIGN FLOOD ANNUAL CHANCE (RETURN FREQUENCY): 50% (2-YEARS)

SUGGESTED CONSTRUCTION SEQUENCE:

1. AFTER SUPERSTRUCTURE DEMO FOR STAGE 1, INSTALL TEMPORARY COFFERDAM AND TEMPORARY WATER DIVERSION DAM.
2. DEWATER AREA INSIDE OF COFFERDAM AND CONSTRUCTION ZONE.
3. DEMO EXISTING CONCRETE PIER FOR CONSTRUCTION STAGE 1.
4. CUT EXISTING TIMBER PILES (STAGE 1).
5. BUILD PROPOSED FOOTING (STAGE 1).
6. BUILD PROPOSED CONCRETE PIER (STAGE 1).
7. ADD FILL TO DEWATERED AREA UP TO EXISTING STREAMBED ELEVATION.
8. FINISH STAGE 1 CONSTRUCTION.
9. EXTEND TEMPORARY COFFERDAM AND ADJUST WATER DIVERSION DAM FOR STAGE 2.
10. REPEAT STEPS 2-8 FOR STAGE 2.
11. REMOVE TEMPORARY COFFERDAM AND TEMPORARY WATER DIVERSION DAM.



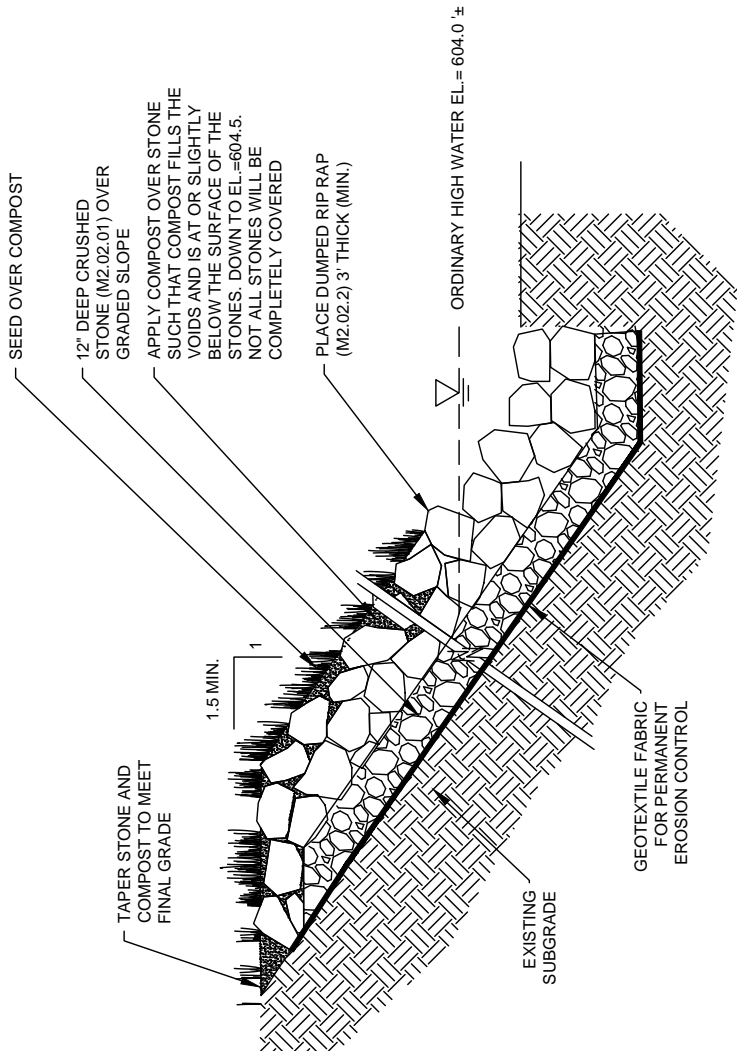
CONSTRUCTION ENVIRONMENTAL IMPACT PLAN

SCALE: 1" = 40'-0"

**WILLIAMSTOWN
ROUTE 2 (MAIN STREET) OVER GREEN RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	9	9
PROJECT FILE NO.			605356

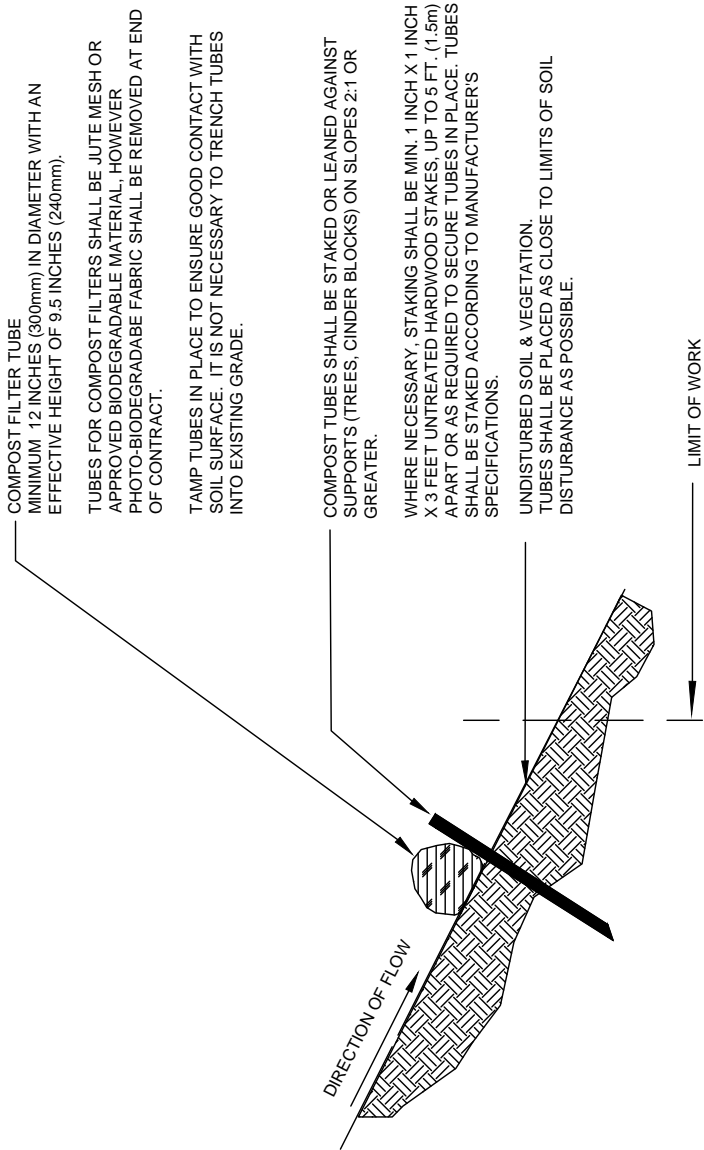
ENVIRONMENTAL PLANS
11-08-2019



COMPOST AND SEED OVER DUMPED RIPRAP

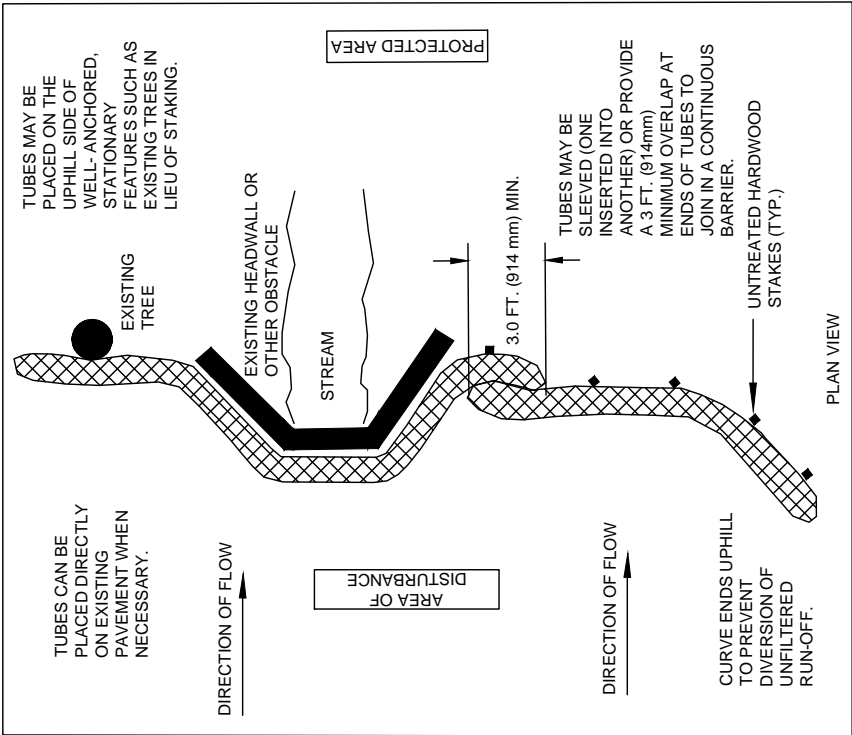
NOT TO SCALE

20160320_MassDOT



COMPOST FILTER TUBE TUBE DETAIL

NOT TO SCALE



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. TUBE LOCATION MAY BE SHIFTED TO ADJUST TO LANDSCAPE FEATURES, BUT SHALL PROTECT UNDISTURBED AREA AND VEGETATION TO MAXIMUM EXTENT POSSIBLE.
4. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
5. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.
6. ADDITIONAL STAKING SHALL BE USED AT THE DIRECTION OF THE ENGINEER.

DOCUMENT A00841

**MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER QUALITY CERTIFICATION**

THIS PAGE INTENTIONALLY LEFT BLANK



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Kathleen A. Theoharides
Secretary

Martin Suuberg
Commissioner

August 31, 2020

MassDOT – Highway Division
Ten Park Plaza, Room 4260
Boston, MA 02116
Attn: Tim Dexter

TRANSMITTAL # X283960
Project Number: 605356

RE: WATER QUALITY CERTIFICATION
Application for: BRP WW 11
MINOR FILL AND EXCAVATION PROJECTS – BRIDGE REPLACEMENT

AT: Route 2 over Green River
Bridge No: W-37-015
WILLIAMSTOWN
Hoosic River Watershed

Dear Mr. Dexter:

The Department of Environmental Protection ("MassDEP") has reviewed your application for a Water Quality Certification (WQC), as referenced above. 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 entails full replacement of the structurally deficient Route 2 bridge (Main Street) over the Green River. The superstructure and substructure will be removed, the existing abutments are to be cut down and a concrete cap will be installed. The center pier will be reconstructed. The replacement bridge will be a two-span structure with integral abutments to be constructed behind the existing abutments. The bridge will have an out-to-out width of 58'-10", a length of 124'-6" with no skew. The low-chord will be reduced by 1.02' from 615.33 to 614.31. However, the hydraulic opening will be wider due to the proposed wider spans resulting in no increase to the flood elevation. A temporary pedestrian bridge will be installed for use throughout construction.

Vegetated riprap will be installed at the outlet of an existing drainage pipe located adjacent to the northeast wingwall. Dumped riprap will be placed within the space between the western existing and proposed abutments with a smaller amount of riprap will be placed at the two corners of the proposed east wingwall.

On December 13, 2019, the Natural Heritage & Endangered Species Program of the Division of Fisheries & Wildlife (the Division) issued a letter in response to a submittal for this proposed project work (NHESP File No. 19-39073) under the Massachusetts Endangered Species Act (MESA), signed by Everose Schluter, Ph.D. Assistant Director.

The Division determined:

...that this Project, as currently proposed, will occur within the actual habitat of the Longnose Sucker (*Catostomus catostomus*), a species state-listed as Special Concern. This species and its habitats are protected in accordance with the MESA. A fact sheet for this species can be found on our website: www.mass.gov/nhesp.

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 in order 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 following conditions must be met:

- The Division shall be notified at least seven (7) days prior to the start of work (contact David Paulson, DFW Biologist, 508-389-6366; david.paulson@mass.gov). The Division will sample/remove any fish or aquatic species inside the limits of the proposed cofferdams.
- All erosion and sedimentation controls shall be removed and properly disposed of after the project is completed and as soon as surrounding areas are stabilized.

Wetland impacts are associated with the demolition and construction of the center pier as well as placement of riprap. This work will result in the unavoidable cumulative impact of 6,991 ft² to Land Under Water (LUW) of which 437 ft² will be permanent and 6,554 ft² will be temporary.

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 Berkshire Eagle on December 10, 2019 and the Environmental Monitor on August 10, 2020. MassDEP did not receive any public comments during the public comment periods which ended on December 31, 2019 and August 31, 2020.

Therefore, based on information currently in the record, the Department grants a 401 Water Quality Certification 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.

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. In addition, those conditions with the (Submittal) designation shall be included in the Special Provisions and reviewed at the District Pre-Construction Conference.

1. This project could result in a violation of the water quality standards adopted by MassDEP's Division of Water Pollution Control. Therefore, reasonable care and diligence shall be taken by the applicant to ensure that the proposed activity will not violate Inland Water Class B criteria [314 CMR 4.05 (3) (a) and (5)].
2. Prior to the start of work, MassDOT shall provide MassDEP with an electronic copy the 100% Design Plans. **(Submittal)**
3. Prior to start of work, the applicant shall provide MassDEP with the name, address and phone number(s) of the person responsible for ensuring that all work complies with the conditions of this Water Quality Certification. **(Submittal)**
4. A minimum of 21-days prior to commencement of construction the contractor shall submit a copy of the approved Dewatering Plan to MassDep for review and comment. **(Submittal)**
5. Any proposed changes, alterations or amendment request as well as any required submittals shall be sent by email to Christopher.ross@mass.gov. **(Submittal)**
6. Notice shall be provided to Dave Paulson at 508 389 6366 in accordance with the letter dated December 13, 2019 issued by the Division of Fisheries & Wildlife a minimum of seven (7) days prior to the start of work so that the Division can sample/remove any fish or aquatic species inside the limits of the proposed cofferdams. **(Submittal)**
7. All work shall be performed in accordance with the following documents and plans:
 - Application for Water Quality Certificate dated December 6, 2019, Transmittal Form # X283960 with attachments and amendments.
 - Plans entitled: "Williamstown Route 2 (Main Street) Over Green River Environmental Plans" 9 Sheets; Dated: December 18, 2020.

8. Prior to commencement of construction adequate erosion control measures shall be installed to protect all wetland resource areas. Erosion control measures may consist of, but are not limited to silt fence, staked hay bales, silt curtains/booms, silt bags, compost filter tubes, etc.
9. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify MassDEP, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by MassDEP pursuant to this Certification.
10. A stockpile of erosion control materials shall be kept on-site at all times for emergency and routine replacement. The materials may include but are not limited to silt fence, hay bales, stone riprap, filter dikes, compost filter tubes or any other devices planned for use during construction.
11. It is the responsibility of the contractor to assure that all wetland resource areas are adequately protected with erosion and sedimentation controls. Additional erosion and sedimentation control barriers beyond that which is shown on the plan may be required.
12. The contractor shall employ measures to assure that debris does not enter the Green River during demolition of the existing bridge. If debris does enter the Green River notice shall be provided to MassDEP with photographs (to the extent practicable). Debris shall be removed as soon as feasible. **(Submittal)**
13. No more than 6,991 ft² of cumulative impacts to Land Under Water (LUW) shall occur of which 437 ft² will be permanent and 6,554 ft² will be temporary.
14. To the greatest extent practicable, all in stream work shall be conducted during low flow periods throughout the year.
15. Times of year when stream flow is high due to extended rain and/or snow melt events should be avoided.
16. If at any time during construction fish may become isolated, the Division of Fisheries & Wildlife should be notified to determine if salvage operations are desired and/or feasible.
17. Upon completion of construction and once areas have been stabilized all non-biodegradable erosion control barriers shall be removed.
18. Compost filter tubes that are encased in non-biodegradable material(s) shall be sliced and non-biodegradable material(s) removed.

19. No Special Condition set forth herein shall be constructed or operate to prohibit the Department from taking enforcement against MassDOT or its contractors for failure to comply with the terms and requirements of this 401 Water Quality Certification.
20. No activity authorized by this Water Quality Certification may begin prior to the expiration of the 21-day appeal period or until a final decision is issued by MassDEP if an appeal is filed.

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; 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
One Winter Street, 2nd Floor
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
One Winter Street, 2nd Floor
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.

401 WQC - Williamstown - Route 2 X283960

7

Should you have any questions relative to this permit, please contact me at 508 946 2813.

Very truly yours,

A handwritten signature in black ink, appearing to read "CHRIS ROSS".

Christopher Ross
MassDot Project Manager

cc: Williamstown Conservation Commission
31 North Street PO Box 504
Williamstown, MA 01267

Ecc DEP-WERO-David Cameron
ACOE-Dan Vasconcelos
DOT-Cori Beckwith

DOCUMENT A00870

**MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

NATURAL HERITAGE AND ENDANGERED
SPECIES PROGRAM**

THIS PAGE INTENTIONALLY LEFT BLANK



DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

MASSWILDLIFE

December 13, 2019

Timothy Dexter
Massachusetts Department of Transportation
10 Park Plaza, Room 4260
Boston MA 02116

RE: Applicant: Timothy Dexter, Massachusetts Department of Transportation
Project Location: Main Street (Route 2) over Green River, Williamstown
Project Description: Bridge Replacement
NHESP File No.: **19-39073**

Dear Applicant:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the "Division") received the MESA Project Review Checklists, Project Plans (dated 11/8/2019) and other required materials 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 Longnose Sucker (*Catostomus catostomus*), a species state-listed as Special Concern. This species and its habitats are protected in accordance with the MESA. A fact sheet for this species can be found on our website: www.mass.gov/nhesp.

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 in order 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 following conditions must be met:

- The Division shall be notified at least seven (7) days prior to the start of work (contact David Paulson, DFW Biologist, 508-389-6366; david.paulson@mass.gov). The Division will sample/remove any fish or aquatic species inside the limits of the proposed cofferdams.
- All erosion and sedimentation controls shall be removed and properly disposed of after the project is completed and as soon as surrounding areas are stabilized.

MASSWILDLIFE

Provided the above-noted 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 David Paulson, Senior Endangered Species Review Biologist, at (508) 389-6366.

Sincerely,



Everose Schlüter, Ph.D.
Assistant Director

cc: Cori Beckwith, MassDOT

**Contractor COVID-19 Guidelines****Compliance Checklist:**

Contract Number: _____ City/Town: _____

Contract Description: _____

Contractor Name: _____

YES	NO	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Has the <u>COVID-19 Guidelines and Procedures for all Construction Sites and Workers at all Public Work</u> bulletin been posted in a location for workers to observe?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Have all required PPE been made available to all on site personnel? Have all personnel been instructed on the best practices for the use of PPE prior to the start of the work shift?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Have handwashing instructions been posted on the project site?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. For site specific project locations have wash stations been installed? (NOTE: For various location/district wide projects wash stations are not required. For those projects the contractor must provide disinfecting wipes and liquid hand sanitizer)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Has a procedure been established for workers to certify their health to their supervisor prior to the start of each shift, and identified the responsible person on site to manage this provision?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Has signage been posted to prohibit unauthorized visitors to enter the MassDOT and contractor field offices?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Have jobsite cleaning and decontamination procedures been established? Have these been shared with contractor/subcontractor employees?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Have jobsite cleaning and decontamination procedures been established for all areas of the site including trailers, gates, equipment, vehicles, etc. and have they been posted at each entry point to the site, and throughout the project site?

massDOT
Massachusetts Department of Transportation
Contractor COVID-19 Guidelines
Compliance Checklist:

YES	NO	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Has a "No Congregation" policy been put into effect that states that individuals must implement social distancing by maintaining a minimum distance of 6-feet from other individuals?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Are all meetings being held via electronic means, and any required on-site meetings being done following social distancing practices including limiting attendance to 10 persons?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Are individual crew meetings/tailgate talks being held outdoors and following social distancing requirements?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12. Are all restroom and porta-potty stations being sanitized consistent with guidance, and are these locations provided with soap, hand sanitizers and paper towels?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13. Have all field office common areas been cleaned in the last 24 hours; and soap, hand sanitizer, and paper towels provided?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14. Have workers been instructed to bring food from home and practice appropriate hygiene while eating on lunch and at breaks including social distancing?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15. Have employees been instructed about appropriate personal hygiene and about staying home when either they or a family member is feeling sick?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16. Are all employees driving to the work site/ parking area in a single occupant vehicle?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17. Are all employees utilizing the proper PPE for conditions where required social distancing is not achievable? This includes those cases where workers are in the same vehicle to perform work activities (i.e. traffic setups).

massDOT
Massachusetts Department of Transportation
Contractor COVID-19 Guidelines
Compliance Checklist:

I hereby certify that the responses indicated on this document are accurate and that all the necessary actions have taken place on this day to comply with the COVID-19 Guidelines as issued by MassDOT

Name: _____
Signature:

Name: _____ Date: _____
Printed:

Position: _____
Printed:

THIS PAGE INTENTIONALLY LEFT BLANK

DOCUMENT B00420

PROPOSAL

WILLIAMSTOWN

For: **Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)**

COMMONWEALTH OF MASSACHUSETTS

LOCATION

The work referred to herein is in the Town of Williamstown in Berkshire 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:

Route 2 (Main Street)**Beginning – Station 87+83.00 ±****Ending – Station 95+15.00 ±**

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 **1,832 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.

THIS PAGE INTENTIONALLY LEFT BLANK

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
100.	1	SCHEDULE OF OPERATIONS - FIXED PRICE \$36,500 AT Thirty Six Thousand Five Hundred Dollars LUMP SUM	\$36,500.00	\$36,500.00
100.79	2	REMOVE AND RESET BRONZE MEDALLIONS AT _____ EACH		
101.01	1	CLEARING AND GRUBBING AT _____ LUMP SUM		
102.1	260	TREE TRIMMING AT _____ PER FOOT		
102.521	300	TREE AND PLANT PROTECTION FENCE AT _____ PER FOOT		
114.1	1	DEMOLITION OF SUPERSTRUCTURE OF BRIDGE NO. W-37-015 (0AL) AT _____ LUMP SUM		
120.	470	EARTH EXCAVATION AT _____ PER CUBIC YARD		
127.1	510	REINFORCED CONCRETE EXCAVATION AT _____ PER CUBIC YARD		
140.	1,300	BRIDGE EXCAVATION AT _____ PER CUBIC YARD		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
140.1	180	BRIDGE EXCAVATION WITHIN COFFERDAM AT _____ PER CUBIC YARD		
141.	65	CLASS A TRENCH EXCAVATION AT _____ PER CUBIC YARD		
141.1	70	TEST PIT FOR EXPLORATION AT _____ PER CUBIC YARD		
144.	55	CLASS B ROCK EXCAVATION AT _____ PER CUBIC YARD		
146.	2	DRAINAGE STRUCTURE REMOVED AT _____ EACH		
151.	360	GRAVEL BORROW AT _____ PER CUBIC YARD		
151.1	500	GRAVEL BORROW FOR BRIDGE FOUNDATION AT _____ PER CUBIC YARD		
152.	5	PROCESSED GRAVEL AT _____ PER CUBIC YARD		
153.1	2	CONTROLLED DENSITY FILL - NON-EXCAVATABLE AT _____ PER CUBIC YARD		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
156.	170	CRUSHED STONE AT _____ PER TON		
170.	1,350	FINE GRADING AND COMPACTING - SUBGRADE AREA AT _____ PER SQUARE YARD		
182.1	1	INSPECTION AND TESTING FOR ASBESTOS AT _____ LUMP SUM		
182.2	220	REMOVAL OF ASBESTOS AT _____ PER FOOT		
184.1	0.1	DISPOSAL OF TREATED WOOD PRODUCTS AT _____ PER TON		
201.	2	CATCH BASIN AT _____ EACH		
202.	1	MANHOLE AT _____ EACH		
204.	2	GUTTER INLET AT _____ EACH		
220.	2	DRAINAGE STRUCTURE ADJUSTED AT _____ EACH		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
220.2	3	DRAINAGE STRUCTURE REBUILT AT _____ PER FOOT		
220.7	2	SANITARY STRUCTURE ADJUSTED AT _____ EACH		
221.	1	FRAME AND COVER AT _____ EACH		
222.1	2	FRAME AND GRATE - MASSDOT CASCADE TYPE AT _____ EACH		
223.2	2	FRAME AND GRATE (OR COVER) REMOVED AND DISCARDED AT _____ EACH		
227.3	6	REMOVAL OF DRAINAGE STRUCTURE SEDIMENT AT _____ PER CUBIC YARD		
227.31	716	REMOVAL OF DRAINAGE PIPE SEDIMENT AT _____ PER FOOT		
241.12	11	12 INCH REINFORCED CONCRETE PIPE AT _____ PER FOOT		
241.18	4	18 INCH REINFORCED CONCRETE PIPE AT _____ PER FOOT		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
241.24	6	24 INCH REINFORCED CONCRETE PIPE AT _____ PER FOOT		
250.031	10	3 INCH POLYVINYL CHLORIDE DRAIN PIPE AT _____ PER FOOT		
250.061	1	SEWER VENT PIPE RELOCATION AT _____ LUMP SUM		
303.08	196	8 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT) AT _____ PER FOOT		
303.12	159	12 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT) AT _____ PER FOOT		
309.	680	DUCTILE IRON FITTINGS FOR WATER PIPE AT _____ PER POUND		
310.001	1	WATER SPIGOT REMOVED AND DISCARDED AT _____ EACH		
315.08	196	8 INCH WATER MAIN REMOVED AND STACKED AT _____ PER FOOT		
315.12	159	12 INCH WATER MAIN REMOVED AND STACKED AT _____ PER FOOT		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
350.08	2	8 INCH GATE AND GATE BOX AT _____ EACH		
350.12	2	12 INCH GATE AND GATE BOX AT _____ EACH		
358.	4	GATE BOX ADJUSTED AT _____ EACH		
371.08	2	8 INCH COUPLING AT _____ EACH		
371.12	2	12 INCH COUPLING AT _____ EACH		
372.08	2	8 INCH FLEXIBLE EXPANSION JOINT AT _____ EACH		
372.12	2	12 INCH FLEXIBLE EXPANSION JOINT AT _____ EACH		
373.08	125	8 INCH WATER PIPE INSULATION AT _____ PER FOOT		
373.12	125	12 INCH WATER PIPE INSULATION AT _____ PER FOOT		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
376.5	1	HYDRANT - ADJUSTED AT _____ EACH		
415.3	2,350	PAVEMENT MICRO MILLING AT _____ PER SQUARE YARD		
430.	245	CEMENT CONCRETE BASE COURSE AT _____ PER SQUARE YARD		
440.	310	CALCIUM CHLORIDE FOR ROADWAY DUST CONTROL AT _____ PER POUND		
443.	1	WATER FOR ROADWAY DUST CONTROL AT _____ PER 1000 GALLONS		
450.23	320	SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5) AT _____ PER TON		
450.31	290	SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC -12.5) AT _____ PER TON		
450.42	70	SUPERPAVE BASE COURSE - 37.5 (SBC - 37.5) AT _____ PER TON		
450.61	60	SUPERPAVE BRIDGE SURFACE COURSE - 12.5 (SSC-B - 12.5) AT _____ PER TON		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
450.71	60	SUPERPAVE BRIDGE PROTECTIVE COURSE – 12.5 (SPC-B - 12.5) AT _____ PER TON		
451.	5	HMA FOR PATCHING AT _____ PER TON		
452.	220	ASPHALT EMULSION FOR TACK COAT AT _____ PER GALLON		
453.	3,080	HMA JOINT SEALANT AT _____ PER FOOT		
472.	4	TEMPORARY ASPHALT PATCHING AT _____ PER TON		
482.4	50	SAWCUTTING PORTLAND CEMENT CONCRETE AT _____ PER FOOT		
482.5	960	SAWCUTTING ASPHALT PAVEMENT FOR BOX WIDENING AT _____ PER FOOT		
505.	560	GRANITE CURB TYPE VA5 - STRAIGHT AT _____ PER FOOT		
509.	90	GRANITE TRANSITION CURB FOR WHEELCHAIR RAMPS - STRAIGHT AT _____ PER FOOT		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
514.	2	GRANITE CURB INLET - STRAIGHT AT _____ EACH		
590.	590	CURB REMOVED AND STACKED AT _____ PER FOOT		
620.12	25	GUARDRAIL, TL-2 (SINGLE FACED) AT _____ PER FOOT		
627.82	1	GUARDRAIL TANGENT END TREATMENT, TL-2 AT _____ EACH		
628.24	1	TRANSITION TO BRIDGE RAIL AT _____ EACH		
630.2	50	HIGHWAY GUARD REMOVED AND DISCARDED AT _____ PER FOOT		
657.	400	TEMPORARY FENCE AT _____ PER FOOT		
657.5	360	TEMPORARY FENCE REMOVED AND RESET AT _____ PER FOOT		
697.1	5	SILT SACK AT _____ EACH		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
698.4	105	GEOTEXTILE FABRIC FOR PERMANENT EROSION CONTROL AT _____ PER SQUARE YARD		
701.	380	CEMENT CONCRETE SIDEWALK AT _____ PER SQUARE YARD		
701.1	60	CEMENT CONCRETE SIDEWALK AT DRIVEWAYS AT _____ PER SQUARE YARD		
701.2	20	CEMENT CONCRETE PEDESTRIAN CURB RAMP AT _____ PER SQUARE YARD		
702.	40	HOT MIX ASPHALT WALK SURFACE AT _____ PER TON		
707.15	1	PARK BENCH REMOVED AND RESET AT _____ EACH		
734.	2	SIGN REMOVED AND RESET AT _____ EACH		
740.	53	ENGINEERS FIELD OFFICE AND EQUIPMENT (TYPE A) AT _____ PER MONTH		
748.	1	MOBILIZATION AT _____ LUMP SUM		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
751.	140	LOAM BORROW AT _____ PER CUBIC YARD		
765.	950	SEEDING AT _____ PER SQUARE YARD		
765.442	350	SEEDING - ROADSIDE RIVERBANK - PART SHADE MIX AT _____ PER SQUARE YARD		
767.121	730	SEDIMENT CONTROL BARRIER AT _____ PER FOOT		
767.731	350	JUTE MESH EROSION CONTROL FABRIC AT _____ PER SQUARE YARD		
769.	64	PAVEMENT MILLING MULCH UNDER GUARD RAIL AT _____ PER FOOT		
832.	17	WARNING-REGULATORY AND ROUTE MARKER - ALUMINUM PANEL (TYPE A) AT _____ PER SQUARE FOOT		
833.7	1	DELINEATION FOR GUARD RAIL TERMINI AT _____ EACH		
847.1	5	SIGN SUP (N/GUIDE)+RTE MKR W/1 BRKWAY POST ASSEMBLY - STEEL AT _____ EACH		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
850.41	200	ROADWAY FLAGGER AT _____ PER HOUR		
851.1	10	TRAFFIC CONES FOR TRAFFIC MANAGEMENT AT _____ PER DAY		
852.	550	SAFETY SIGNING FOR TRAFFIC MANAGEMENT AT _____ PER SQUARE FOOT		
853.1	5	PORTABLE BREAKAWAY BARRICADE TYPE III AT _____ EACH		
853.21	320	TEMPORARY BARRIER REMOVED AND RESET AT _____ PER FOOT		
853.23	295	TEMPORARY BARRIER (TL-3) AT _____ PER FOOT		
853.33	260	TEMPORARY BARRIER - LIMITED DEFLECTION (TL-3) AT _____ PER FOOT		
853.501	4	TEMPORARY IMPACT ATTENUATOR REMOVED AND RESET AT _____ EACH		
853.53	3	TEMPORARY IMPACT ATTENUATOR UNIDIRECTIONAL, NON-REDIRECTIVE (TL-3) AT _____ EACH		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
853.8	14	TEMPORARY ILLUMINATION FOR WORK ZONE AT _____ PER DAY		
854.016	7,700	TEMPORARY PAVING MARKINGS - 6 INCH (PAINTED) AT _____ PER FOOT		
854.1	1,550	PAVEMENT MARKING REMOVAL AT _____ PER SQUARE FOOT		
856.	7	ARROW BOARD AT _____ PER DAY		
856.12	90	PORTABLE CHANGEABLE MESSAGE SIGN AT _____ PER DAY		
859.	7,750	REFLECTORIZED DRUM AT _____ PER DAY		
864.04	80	PAVEMENT ARROWS AND LEGENDS REFL. WHITE (THERMOPLASTIC) AT _____ PER SQUARE FOOT		
866.206	2,900	6 INCH REFLECTORIZED WHITE LINE (POLYUREA) (RECESSED) AT _____ PER FOOT		
867.206	1,700	6 INCH REFLECTORIZED YELLOW LINE (POLYUREA) (RECESSED) AT _____ PER FOOT		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
867.212	30	12 INCH REFLECTORIZED YELLOW LINE (POLYUREA) (RECESSED) AT _____ PER FOOT		
874.4	4	TRAFFIC SIGN REMOVED AND STACKED AT _____ EACH		
912.5	120	DRILLED AND GROUTED #5 DOWELS AT _____ EACH		
942.124	950	STEEL PILE HP 12 X 84 AT _____ PER FOOT		
945.3	155	OBSTRUCTION EXCAVATION AT _____ PER FOOT		
945.4	5	TIMBER PILE REMOVAL AT _____ EACH		
948.41	10	DYNAMIC LOAD TEST BY CONTRACTOR AT _____ EACH		
948.5	35	PILE SHOES AT _____ EACH		
949.	1	GEOTECHNICAL MONITORING AT _____ LUMP SUM		

Project # 605356		Contract # 113892		
Location : WILLIAMSTOWN				
Description : Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2 (Main Street) over the Green River (Re-Advertised Project)				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
950.1	1	TEMPORARY SHORING AT _____ LUMP SUM		
983.	110	DUMPED RIPRAP AT _____ PER TON		
991.1	1	CONTROL OF WATER - STRUCTURE NO. W-37-015 AT _____ LUMP SUM		
993.1	1	TEMPORARY BRIDGE NO. W-37-015T AT _____ LUMP SUM		
994.01	1	TEMPORARY PROTECTIVE SHIELDING BRIDGE NO. W-37-015 (0AL) AT _____ LUMP SUM		
995.01	1	BRIDGE STRUCTURE, BRIDGE NO. W-37-015 (C4R) AT _____ LUMP SUM		
Total Qty:		46,495.1		

THIS PAGE IS INTENTIONALLY LEFT BLANK

DOCUMENT B00853

SCHEDULE OF PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES (DBES)

PRIME BIDDER: _____

DATE OF BID OPENING: _____ PROJECT NO: 605356FEDERAL AID PROJECT NO: NHP(BR-ON)-003S(205)XPROJECT LOCATION: WILLIAMSTOWN

Name, Address, and Phone Number(s) of DBE	Name of Activity	(a) [†] DBE Contractor Activity Amount <i>Construction Work</i>	(b) DBE Other Business Amount <i>Services, Supplies, Material</i>	(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 TimeWill 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 ***

THIS PAGE INTENTIONALLY LEFT BLANK

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: 605356 FEDERAL AID PROJECT NO: NHP(BR-ON)-003S(205)XPROJECT LOCATION: WILLIAMSTOWN

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.

DBE Company Authorized Signature

Date _____

DISADVANTAGED BUSINESS ENTERPRISES (DBE) PARTICIPATION
LETTER OF INTENT
(To be completed by the DBE – Page 2 of 2)

DATE OF BID OPENING: _____

PROJECT NUMBER: 605356FEDERAL AID PROJECT NUMBER: NHP(BR-ON)-003S(205)XPROJECT LOCATION: WILLIAMSTOWN

PRIME BIDDER: _____

DBE COMPANY NAME: _____

<u>Item number</u> if applicable	<u>NAICS</u> <u>Code</u>	<u>Description of Activity</u> with notations such as Services, or Brokerage, Installation Only, Material Only, or Complete	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
				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: _____

*** END OF DOCUMENT ***

Rev'd 9/20/19

DOCUMENT B00855

DBE JOINT CHECK ARRANGEMENT APPROVAL FORM

*(to be submitted by Prime Contractor)*Contract No: 113892 Project No: 605356 Federal Aid No: NHP(BR-ON)-003S(205)XLocation: WilliamstownProject Description: Bridge Replacement and Related Work Br. No. W-37-015 (NEXT F Beams) Route 2
(Main Street) over the Green River (Re-Advertised Project)

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 ***

THIS PAGE INTENTIONALLY LEFT BLANK

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 ***